

Drugs for Type 2 Diabetes

Modified August 2025

–Information in chart may differ from product labeling. For place in therapy, see our resource, [Stepwise Treatment of Type 2 Diabetes](#).–

Dosing/Cost per month ^a	A1C Reduction ^b	Weight Gain/Neutral/Loss	Hypoglycemia Risk	Comments
Alpha-glucosidase inhibitors: acarbose and miglitol (US)				
Initial 25 mg once daily to TID Max 300 mg (acarbose: 150 mg if <60 kg), divided TID. ² US: acarbose ~\$50, miglitol ~\$280; Canada ~\$30 (acarbose)	0.7% to 0.8% (acarbose), ¹ ~0.3% to 0.8% (miglitol monotherapy) ³	Neutral ¹	No ⁴	<ul style="list-style-type: none"> MOA: slows intestinal carbohydrate digestion/absorption to reduce postprandial glucose; taken with meals.² GI side effects (e.g., abdominal pain, flatulence, diarrhea).^{1,2}
Dipeptidyl peptidase-4 (DPP-4) inhibitors: Alogliptin (Nesina; with metformin [Kazano]; with pioglitazone [Oseni (US)]; authorized generics (US)). Linagliptin (Tradjenta [US]; Trajenta [Canada]; with metformin [Jentadueto, Jentadueto XR (US)]; with empagliflozin [Glyxambi (US)]; with metformin and empagliflozin [Trijardy XR (US)]). Saxagliptin (Onglyza [Canada], generics; with metformin [Konboglyze (Canada), generics (US)]; with dapagliflozin [Qtern (US)]). Sitagliptin (Januvia, Zituvio [US], Brynovin [US]; with metformin [Janumet, Janumet XR, Zituvimet (US), Zituvimet XR (US), generics (Canada)]; with ertugliflozin [Steglujan (US)]).				
Alogliptin 25 mg once daily. ² US: ~\$200; Canada: ~\$40 (Kazano 25/1700 mg) Linagliptin 5 mg once daily. ² US: ~\$530; Canada: ~\$80 Saxagliptin 2.5 to 5 mg once daily. ² US: ~\$250; Canada: ~\$50 Sitagliptin 100 mg once daily. ² US: \$80; Brynovin oral solution (US): \$295; Canada: ~\$90	0.5% to 0.7% ¹	Neutral ⁸	No ⁴	<ul style="list-style-type: none"> MOA: increases insulin secretion in response to elevated blood glucose, decreases glucagon secretion, and slows gastric emptying.¹ Reduces postprandial glucose.⁹ Risk of new or worsening heart failure (saxagliptin and alogliptin).⁸ Rare cases of severe joint pain, pancreatitis, and bullous pemphigoid.^{1,4} Have not been effective in youth.^{5,6} CYP3A4 interactions (linagliptin, saxagliptin).² Dosage modification with kidney impairment needed (see footnote c)²
GLP-1 agonists: see our chart, Comparison of GLP-1 and GIP/GLP-1 Receptor Agonists.				
Insulin: See our chart, Comparison of Insulins (US)(Canada) for available products and cost.				
Initial: consider basal insulin 0.1 to 0.2 units/kg for adults or 0.25 to 0.5 mg/kg basal insulin for youth. ^{4,6} No maximum dose. ¹	0.9% to 1.2% or more ¹	+ 1 to 3.5 kg or more ¹	Yes ⁴	<ul style="list-style-type: none"> MOA: promotes uptake of glucose into muscle and fat tissues; inhibits glucose production.²
Meglitinide: nateglinide (US) and repaglinide				
Nateglinide 180 to 360 mg, divided TID with meals. ² US: ~\$180 Repaglinide: Initial 1 to 2 mg with meals (0.5 mg if A1C <8%). ² Max 16 mg, divided four times daily. ² US: ~\$50; Canada: ~\$60	0.7% to 1.1% ¹	+ 1.4 to 3.3 kg ¹	Yes (but less than with sulfonylureas) ^{7,8}	<ul style="list-style-type: none"> MOA: stimulates pancreatic insulin secretion.² Taken within 30 min before a meal; skip dose if skipping meal.² Reduces postprandial glucose more than sulfonylureas.⁷ Safer than sulfonylureas in kidney impairment.¹

Drugs for Type 2 Diabetes

Modified August 2025

Dosing/Cost per month ^a	A1C Reduction ^b	Weight Gain/Neutral/Loss	Hypoglycemia Risk	Comments
Metformin (Fortamet [US], Glucophage [Canada], Glumetza, generics). Available as an oral solution (US). Available in combination with DPP-4 inhibitors, SGLT2 inhibitors, and sulfonylureas (see below).				
<p>Immediate release: Initial 850 mg once daily (adults only) or 500 mg BID. Max 2,000 to 2,550 mg,* divided BID to TID.² US: ~\$15; Canada: <\$5). *max dose 2,000 mg for 10 to 17 years of age.²</p> <p>Extended release: Initial 500 mg once daily. Max 2,000 mg, once daily or divided BID.² US ~\$60; Canada ~\$90</p>	1% (as monotherapy) ¹	<p>Weight neutral to modest weight loss.⁴</p> <p>Ameliorates insulin weight gain.⁷</p>	No ⁴	<ul style="list-style-type: none"> MOA: inhibits glucose production and absorption; increases insulin sensitivity in muscle and fat.² Mitigate GI effects (e.g., diarrhea, nausea) with slow titration of an extended-release product, with food.^{2,4} Potential for lactic acidosis. Can be started in patients with an eGFR >45 mL/min/1.73m² (Canada: ≥30 mL/min/1.73m²)^{1,4}. Hold for eGFR <30 mL/min/1.73m², or illness or procedure posing risk of intravascular volume depletion or kidney injury.⁴ Test vitamin B12 level periodically.⁴ First-line oral agent for youth (with insulin, if appropriate [see below]).^{5,6}
Pioglitazone (Actos [US], generics; with metformin [ACTOplus Met, generics (US)]; with glimepiride [Duetact, generics (US)], with alogliptin [Oseni, generics])				
<p>Initial 15 to 30 mg once daily.² Max 45 mg once daily.² US: <\$10; Canada: ~\$30</p> <p>Pediatrics: Consider a max dose of 30 mg/day; 45 mg dose has limited additional benefit with more side effects.⁶</p>	-0.7% to 0.9% ¹	+ 2 to 2.5 kg or more. ¹	No ⁴	<ul style="list-style-type: none"> MOA: increases insulin sensitivity in liver, muscle, and fat.² Reduces triglycerides.⁸ Glycemic control is better sustained over diabetes course than metformin or sulfonylureas.⁹ Serious adverse effects: edema, heart failure (avoid in patients with symptomatic heart failure), fractures.^{1,8} Do not use in bladder cancer, and use caution in patients with a history of bladder cancer.² Counsel patients to report hematuria or increased or painful urination.²

Drugs for Type 2 Diabetes

Modified August 2025

Dosing/Cost per month ^a	A1C Reduction ^b	Weight Gain/Neutral/Loss	Hypoglycemia Risk	Comments
Sodium-glucose co-transporter 2 (SGLT2) inhibitors: Bexagliflozin (Brenzavvy [US]). Canagliflozin (Invokana; with metformin [Invokamet, Invokamet XR (US)]). Dapagliflozin (Farxiga [US], Forxiga [Canada], generics; with metformin [Xigduo XR, generics]; with saxagliptin [Qtern (US)]). Empagliflozin (Jardiance; with linagliptin [Glyxambi (US)]; with metformin [Synjardy, Synjardy XR (US)], with linagliptin and metformin [Trijardy XR (US)]). Ertugliflozin (Steglatro [US]; with metformin [Segluromet (US)]; with sitagliptin [Steglujan (US)]).				
Bexagliflozin 20 mg once daily. ² (US: ~\$50 [from Cost Plus] ¹¹) Canagliflozin :* Initial: 100 mg once daily. Max 300 mg once daily. ² US: ~\$600; Canada: ~\$100 Dapagliflozin : Initial 5 mg once daily. Max 10 mg once daily. ² US: ~\$380; Canada: ~\$20 Empagliflozin :* Initial 10 mg once daily. Max 25 mg once daily. ² US: ~\$630; Canada: ~\$90 Ertugliflozin : Initial 5 mg once daily. Max 15 mg once daily. ² US: ~\$360 *dosing for ages ≥10 years	0.5% to 0.7% (adults); ¹ 0.2% (pediatrics) ⁷	-- Weight loss (2 to 3 kg in adults, 0.79 kg in pediatrics). ^{1,10}	No ⁴	<ul style="list-style-type: none"> MOA: blocks glucose and sodium reabsorption in the kidney; increases urinary excretion of glucose, sodium, and uric acid; and decreases plasma volume.² Serious adverse effects: genital yeast infections (male/female), UTI, <u>ketoacidosis</u> (rare), <u>volume depletion</u>, acute pancreatitis (rare),^{2,14} fracture risk (conflicting evidence),¹⁵ Fournier's gangrene (rare; in men and women)^{2,12-15} See our chart, <u>Perioperative Management of Diabetes</u>, and FAQ, <u>Hyperglycemia in the Hospital</u> for information on prevention and management of SGLT2 inhibitor-associated euglycemic ketoacidosis. For information on use in kidney impairment, see footnote d.
Sulfonylurea-second generation: Gliclazide (generics [Canada]; Diamicon-MR, generics [Canada]). Glimepiride (Amaryl [US], generics; with pioglitazone [Duetact, generics (US)]). Glipizide (generics (US); Glucotrol XL, generics (US); with metformin [generics (US)]). Glyburide (DiaBeta [US], generics; Glynase, generics [US]; with metformin [generics (US)])				
Gliclazide (standard): Initial 80 mg BID. Max 160 mg BID. ¹⁶ Canada: ~\$10 Gliclazide (modified release): Initial 30 mg once daily. Max 120 mg once daily. ¹⁷ Canada: <\$5 Glimepiride : Initial 1 to 2 mg once daily (1 mg in kidney impairment). Max 8 mg once daily. ² US: <\$10; Canada: \$70 Glipizide IR : Initial 5 mg once daily. Max 20 mg BID. ² US: <\$10 Glipizide XL : Initial 5 mg once daily. Max 20 mg once daily. ² US: ~\$15 Glyburide (standard): Initial 2.5 to 5 mg once daily. Max 10 mg BID. ² US: ~\$15; Canada: <\$10 Glyburide (micronized): Initial 1 to 3 mg once daily. Max 12 mg (once daily or in divided BID). ² US: ~\$35	0.6% to 1.2% ¹	+ 1.2 to 3.2 kg ¹ Less weight gain with glipizide and glimepiride versus glyburide. ¹⁹	Yes, especially with glyburide and/or in kidney impairment. ¹ Hypoglycemic risk with glipizide or gliclazide < glimepiride < glyburide. ^{9,18}	<ul style="list-style-type: none"> MOA: stimulates pancreatic insulin secretion.¹ Efficacy is relatively short-lived.¹ Avoid sulfonylureas in the elderly, in patients with hypoglycemia risk, and in patients who are overweight or obese.^{8,18} Not preferred in youth due to weight gain and hypoglycemia (requires self-monitoring of blood glucose), and potential for accelerated loss of beta-cell function.⁶ Avoid glyburide in kidney impairment.^{1,4}

Drugs for Type 2 Diabetes

Modified August 2025

Footnotes

- a. Dosing is for adults unless otherwise specified. Pricing (for generic when available) is based on wholesale acquisition cost (WAC) of max dose unless otherwise specified. US medication pricing by Elsevier, accessed December 2024 (Brynovin August 2025). Canadian price is wholesale.
- b. Expected reduction as a metformin add-on, unless otherwise noted.
- c. Max dose of DPP-4 inhibitors in kidney impairment:
 - **Alogliptin:** CrCl 30 to 59 mL/min, 12.5 mg once daily. CrCl <30 mL/min. (including hemodialysis), 6.25 mg once daily.²
 - **Saxagliptin:** eGFR <45 mL/min/1.73m² (including hemodialysis), 2.5 mg once daily. Give dose after hemodialysis.²
 - **Sitagliptin:** eGFR 30 to 44 mL/min/1.73m², 50 mg once daily. eGFR <30 mL/min/1.73m² (including hemodialysis), 25 mg once daily.²
- d. Use of SGLT2 antagonists in kidney impairment:
 - **Bexagliflozin:** not recommended if eGFR <30 mL/min/1.73m².²
 - **Canagliflozin:** do not initiate if eGFR <20 mL/min/1.73m².² Reduce dose to 100 mg/day in patients with eGFR <60 mL/min/1.73m². Limited efficacy for glycemic control if eGFR <30 mL/min/1.73m², but can continue for CV or kidney indications until dialysis is needed.²
 - **Dapagliflozin:** do not initiate if eGFR <25 mL/min/1.73m².² Limited efficacy for glycemic control if eGFR <45 mL/min/1.73m², but can continue for CV or kidney indications until dialysis is needed.²
 - **Empagliflozin:** do not initiate if eGFR <20 mL/min/1.73m².² Reduce dose to 10 mg/day in patients with eGFR <30 mL/min/1.73m². Limited efficacy for glycemic control if eGFR <30 mL/min/1.73m², but can continue for CV or kidney indications until dialysis is needed.²
 - **Ertugliflozin:** limited efficacy for glycemic control if eGFR <45 mL/min/1.73m², but can continue for CV or kidney indications until dialysis is needed.⁴

References

1. Diabetes Canada Clinical Practice Guidelines Expert Committee, Lipscombe L, Butalia S, et al. Pharmacologic Glycemic Management of Type 2 Diabetes in Adults: 2020 Update. Can J Diabetes. 2020 Oct;44(7):575-591.
2. Clinical Pharmacology powered by ClinicalKey. Tampa (FL): Elsevier. 2024. <http://www.clinicalkey.com>. (Accessed December 28, 2024).
3. Product information for miglitol. Westminster Pharmaceuticals. Nashville, TN 37217. October 2020.
4. American Diabetes Association Professional Practice Committee. 9. Pharmacologic Approaches to Glycemic Treatment: Standards of Care in Diabetes-2025. Diabetes Care. 2025 Jan 1;48(Supplement_1):S181-S206.
5. American Diabetes Association Professional Practice Committee. 14. Children and Adolescents: Standards of Care in Diabetes-2025. Diabetes Care. 2025 Jan 1;48(Supplement_1):S283-S305.
6. Shah AS, Zeitler PS, Wong J, et al. ISPAD Clinical Practice Consensus Guidelines 2022: Type 2 diabetes in children and adolescents. Pediatr Diabetes. 2022 Nov;23(7):872-902.
7. Diabetes Canada Clinical Practice Guidelines Expert Committee, Lipscombe L, Booth G, et al. Pharmacologic Glycemic Management of Type 2 Diabetes in Adults. Can J Diabetes. 2018 Apr;42 Suppl 1:S88-S103. Erratum in: Can J Diabetes. 2018 Jun;42(3):336. Erratum in: Can J Diabetes. 2018 Oct;42(5):575.
8. Samson SL, Vellanki P, Blonde L, et al. American Association of Clinical Endocrinology Consensus Statement: Comprehensive Type 2 Diabetes Management Algorithm - 2023 Update. Erratum In: Endocr Pract. 2023 May;29(5):305-340.
9. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, Harper W, Clement M, et al. Pharmacologic management of type 2 diabetes. Can J Diabetes. 2013 Apr;37 Suppl 1:S61-8.
10. Laffel LM, Danne T, Klingensmith GJ, et al. Efficacy and safety of the SGLT2 inhibitor empagliflozin versus placebo and the DPP-4 inhibitor linagliptin versus placebo in young people with type 2 diabetes (DINAMO): a multicentre, randomised, double-blind, parallel group, phase 3 trial. Lancet Diabetes Endocrinol. 2023 Mar;11(3):169-181.
11. CostPlus Drug Company. www.costplusdrugs.com. (Accessed January 1, 2025).
12. FDA. Drug safety communication. FDA warns about rare occurrences of a serious infection of the genital area with SGLT2 inhibitors for diabetes. September 7, 2018. <https://www.fda.gov/drugs/drug-safety-and-availability/fda-warns-about-rare-occurrences-serious-infection-genital-area-sglit2-inhibitors-diabetes>. (Accessed January 2, 2025).
13. FDA. Drug safety communication. FDA revises labels of SGLT2 inhibitors for diabetes to include warnings about too much acid in the blood and serious urinary tract infection. March 16, 2022. <https://www.fda.gov/drugs/drug-safety-and-availability/fda-revises-labels-sglit2-inhibitors-diabetes-include-warnings-about-too-much-acid-blood-and-serious>. (Accessed January 2, 2025).
14. Li R, Luo P, Guo Y, et al. Clinical features, treatment, and prognosis of SGLT2 inhibitors induced acute pancreatitis. Expert Opin Drug Saf. 2024 Sep 4;1-5 [abstract].
15. Khashayar P, Rad FF, Tabatabaei-Malazy O, et al. Hypoglycemic agents and bone health; an umbrella systematic review of the clinical trials' meta-analysis studies. Diabetol Metab Syndr. 2024 Dec 23;16(1):310.
16. Product monograph for gliclazide. Sanis Health. Brampton, ON L6Y 5S5. March 2020.
17. Product monograph for Diamicron MR. Servier Canada. Laval, QC H7T 2S4. August 2023.
18. By the 2023 American Geriatrics Society Beers Criteria® Update Expert Panel. American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. J Am Geriatr Soc. 2023 Jul;71(7):2052-2081.
19. Malone M. Medications associated with weight gain. Ann Pharmacother. 2005 Dec;39(12):2046-55.

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.

Copyright © 2025 by Therapeutic Research Center. All Rights Reserved. trchealthcare.com

Clinical Resource, *Drugs for Type 2 Diabetes. Pharmacist's Letter/Pharmacy Technician's Letter/Prescriber Insights*. December 2024. [401271]. For nearly 40 years, our editors have distilled primary literature into unbiased, evidence-based recommendations with 0% pharma sponsorship. [Learn more](#)