

Type 2 Diabetes



Illinois Department of
Healthcare and
Family Services

At HFS, we're monitoring our patients with diabetes closely in efforts to improve care. How can you, as a pharmacist, help us with this process?

What the guidelines say:

| Treatment Goals | American Diabetes Association (ADA) Guidelines ¹ | American Association of Clinical Endocrinologists (AACE) and American College of Endocrinology (ACE) Guidelines ^{2,3} | | |
|----------------------------------|---|--|---|-------|
| Pre-meal (fasting) blood glucose | 80 - 130 mg/dL | <110 mg/dL | | |
| Post-meal blood glucose | <180 mg/dL | <140 mg/dL | | |
| A1c | Most adults | ≤7.0% | Without serious comorbid illness and at low hypoglycemic risk | ≤6.5% |
| | More stringent* | ≤6.5% | With serious comorbid illness | >6.5% |
| | Less stringent* | ≤8.0% | and at risk for hypoglycemia | |

* "Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycemia unawareness, and individual patient considerations."¹

| Medications | Average A1c lowering ^{4,5} |
|---|-------------------------------------|
| Biquanides • Metformin [†] | 1.0 - 2.0% |
| Sulfonylureas (SFU) • Glimepiride [†] • Glipizide [†] • Glyburide [†] | 1.0 - 2.0% |
| Meglitinides • Nateglinide [†] • Repaglinide | 0.5 - 1.5% |
| Alpha-glucosidase inhibitors • Acarbose [†] • Miglitol [†] | 0.5 - 0.8% |
| Thiazolidinediones (TZD) • Pioglitazone [†] • Rosiglitazone [†] | 0.5 - 1.4% |
| DPP-4 inhibitors • Alogliptin • Linagliptin [†] • Saxagliptin • Sitagliptin | 0.5 - 0.8% |
| SGLT2 inhibitors • Canagliflozin • Dapagliflozin • Empagliflozin | 0.5 - 1.0% |
| GLP-1 receptor agonists • Albiglutide • Dulaglutide • Exenatide IR [†] • Exenatide ER • Liraglutide | 0.5 - 1.0% |
| Insulin • Humalog products [†] • Humulin products [†] • Lantus (vial only) [†] • Novolin products • Novolog products • Apidra (glulisine) • Levemir (detemir) • Toujeo (glargine) | 1.5 - 3.5+% |

Bolded = preferred agents.

| Algorithm for Pharmacologic Therapy ⁴ | | |
|--|---|--|
| Entry A1c < 9% = Monotherapy | Entry A1c ≥ 9% = Dual therapy | Entry A1c ≥ 10-12% = Combination injectable therapy |
| Metformin | Metformin + SFU TZD DPP-4 inhibitor SGLT2 inhibitor GLP-1 receptor agonist Basal insulin | Metformin + Basal insulin + Meatime insulin <i>or</i> GLP-1 receptor agonist |
| <ul style="list-style-type: none"> • <u>First-line unless contraindicated.</u> (Significant evidence for safety and efficacy; inexpensive; may reduce risk of cardiovascular events) • Systematic review of studies looking at long-term clinical outcomes (e.g., cardiovascular morbidity and mortality) utilized higher metformin doses.⁶ • Maximum doses:⁷ IR = 2550 mg/day ER = 2000 mg/day | <ul style="list-style-type: none"> • Insulin is recommended in severe hyperglycemia if patient is markedly symptomatic or has any catabolic features [e.g., weight loss, ketosis]. • If goal A1c is not reached after 3 months of optimized dual therapy, triple therapy can be considered. | |

If goal is not achieved after 3 months of optimized doses, proceed to next step in the above algorithm.

Once patient is receiving basal and short/rapid acting insulin, the following medications are usually discontinued:

- Sulfonylureas^{4,5}
- Meglitinides⁴
- DPP-4 inhibitors⁵
- GLP-1 receptor agonists⁵

What you can look for / What HFS recommends:

- Encourage lifestyle modifications (e.g., healthy eating, weight control, increased physical activity) and diabetes education for all patients.^{1,2}
- Metformin is first-line therapy unless contraindicated.¹ Recommend **gradual titration** of dose to minimize gastrointestinal side effects.⁷ Maximum recommended doses are as follows:
 - IR formulation: 2550 mg/day
 - ER formulation: 2000 mg/day
- Ensure **adherence** to high-dose metformin (2000 mg/day) for at least 3 months. If A1c is still not at goal, up to **two** additional, preferred, non-insulin agents may eventually be approved. Avoid duplication of therapies that have similar mechanisms of action (such as DPP-4 inhibitors and GLP-1 receptor agonists).
- If A1c is still not at goal after patient has been on 3 non-insulin agents (including metformin unless contraindicated), recommend transitioning patient to insulin therapy as clinically appropriate. Once a patient is on basal and short/rapid-acting insulin, avoid or discontinue medications that increase insulin secretion such as sulfonylureas, DPP-4 inhibitors, and GLP-1 receptor agonists.^{4,5}

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