

## Antidiabetics

### Background

The CDC defines diabetes as the body's inability to produce sufficient amounts of insulin, or inability to utilize the insulin already present. Between the two distinct types of diabetes, CDC data reveals that from 2017-2020, 38.4 million Americans – about 1 in 10 people – had been diagnosed with diabetes. Of the 38.4 million, individuals 65 years and older represented approximately 29.2% of the population. They also revealed prevalence was disproportionately higher in individuals with I/DD, with about 1 in 6 diagnosed with diabetes.

### Types of diabetes

- **Type 1 diabetes** is thought to be caused by an autoimmune reaction (the body attacks itself by mistake), which stops your body from making insulin.
- In **Type 2 diabetes**, the body does not use insulin well and cannot keep blood sugar at normal levels. About 90-95% of people diagnosed with diabetes have type 2. Fortunately, this type of diabetes can be preventable through lifestyle changes.

### Treatment options

#### Non-Pharmacologic

- Diet
- Physical Activity
- Monitoring Blood Glucose
  - Patients with diabetes should monitor their blood sugar on a daily basis, if not multiple times a day.
  - A general rule of thumb is to measure blood glucose levels according to how many times per day diabetes medication is taken.
  - Another approach to measuring blood glucose is to measure before and after meals to see how effective treatment is at reducing elevated sugar levels.

#### Pharmacologic

Some diabetes medications stimulate the pancreas to produce and release more insulin. Others inhibit the production and release of glucose from the liver, affecting the transport of sugar into the body's cells. Others can block the action of stomach or intestinal enzymes that break down carbohydrates and sugar, or even increase the body's sensitivity to insulin already present.

- Insulin
  - The mainstay of therapy in patients with Type 1 diabetes.
  - Used in patients with Type 2 diabetes who may have failed other therapeutic options or need more intense treatment.

- Multiple formulations of insulin are available, including short-acting (regular insulin), rapid-acting, long-acting (basal insulin), and intermediate options. Depending on an individual's needs, doctors may prescribe a mixture of insulin types to utilize throughout the day.
- Oral medications
  - Metformin is generally considered first line therapy for patients with Type 2 Diabetes.
  - Other Oral Medications:
    - Alpha-glucosidase inhibitors
    - Biguanides
    - DPP-4 inhibitors
    - Meglitinides
    - SGLT2 inhibitors
    - Sulfonylureas
    - TZDs

### Which Oral Diabetes Medication Should I Use?

Depending on the individual's comorbidities, some oral antidiabetic medications may be preferred over others. Some medications, such as certain SGLT2 inhibitors, have additional benefits for those with heart failure or diabetic kidney disease. Others may have greater A1c (average blood sugar level over the last 3 months) lowering affect. Shared clinical decision making should be used when deciding on which medication may be best suitable for the individual's needs. The table below highlights advantages of some antidiabetic medications, which can aid in decision making.

Drug Name (Brand Name)	A1c Lowering Effect (%)	Cardio-Renal Benefits	Weight Effects
<b>Alpha-glucosidase Inhibitors</b>			
Acarbose	0.5 to 1	N/A	Loss
Miglitol			
<b>Biguanides</b>			
Metformin (Glucophage)	1-2	MACE	Neutral
<b>Dipeptidyl Peptidase 4 (DPP-4) Inhibitors</b>			
Alogliptin (Nesina)	0.6 to 1	N/A	Neutral
Linagliptin (Tradjenta)	0.4		
Saxagliptin (Onglyza)	0.4 to 0.5		
Sitagliptin (Januvia)	0.5 to 0.8		

Drug Name (Brand Name)	A1c Lowering Effect (%)	Cardio-Renal Benefits	Weight Effects
<b>GLP-1 Receptor Antagonists</b>			
Semaglutide (Rybelsus)	0.9 to 1.1	N/A	Loss
<b>Meglitinide Derivatives</b>			
Nateglinide (Starlix)	0.4 to 1	N/A	Gain
Repaglinide (Prandin)	0.4 to 1.5		
<b>SGLT2 Inhibitors</b>			
Bexagliflozin (Brenzavvy)	0.5 to 1	N/A	Loss
Canagliflozin (Invokana)	0.8 to 1	MACE, HF, DKD	
Empagliflozin (Jardiance)	0.7 to 0.9		
Dapagliflozin (Farxiga)	0.8 to 0.9	HF, DKD	
Ertugliflozin (Steglatro)	0.7 to 0.8	HF	
<b>Sulfonylureas*</b>			
Glimepiride (Amaryl)	1 to 2	N/A	Gain
Glipizide (Glucotrol)			
Glyburide (Glynase)			
<b>Thiazolidinediones</b>			
Pioglitazone (Actos)	0.5 to 1.4	MACE, MASH	Gain

### Definitions

- MACE - Major Adverse Cardiovascular Events (myocardial infarction, stroke, arrhythmia, etc.)
- HF – Heart Failure
- DKD – Diabetic Kidney Disease
- MASH – Metabolic Dysfunction Associated Steatohepatitis

*\*Sulfonylureas have been identified as a Potentially Inappropriate Medication (PIM) in older adults by the American Geriatrics Society’s Beers’ Criteria due to their profound blood sugar lowering effect and association with fall risk. Prescribe with caution.*

### American Diabetes Association (ADA)

In addition to the table above, the **American Diabetes Association (ADA) Standards of Care** is a beneficial resource for providers to refer to when initially deciding on a glucose lowering agent. These guidelines provide clinical practice recommendations on topics such as glycemic targets and diabetes technology, but also include recommendations for specific high-risk populations such as those with chronic kidney disease and older adults.

It is important to note that [Figure 9.3](#) in the ADA Standards of Care serves a great visual reference to help facilitate therapy selection based on patient specific risk factors and goals to therapy. Additionally, [Table 9.2](#) within the guide provides an overview of each medication class highlighting efficacy, cost and other clinical considerations.

### Resources

- [Lexidrug® UpToDate®, Noninsulin Antidiabetic Agents Comparison Tables](#). Wolters Kluwer. April 17, 2023.
- [CDC, National Diabetes Statistics Report](#). National Center for Chronic Disease Prevention and Health Promotion. May 15, 2024.
- [Disability and Diabetes Prevention](#). Centers for Disease Control and Prevention. November 28, 2022.
- [Standards of Care in Diabetes](#). American Diabetes Association. 2025.