

Addressing Hypoglycemia Risk in Type 2 Diabetes

Hypoglycemia is one of the most frequent adverse events in patients with type 2 diabetes.

A1c is not the best predictor of hypoglycemic risk.

- Hypoglycemia accounts for **one in four** hospitalizations related to an adverse drug event.
- Hospitalization rates for *hypoglycemia* now exceed those for *hyperglycemic* emergencies.
- Patients with a history of hypoglycemia may stop taking diabetes medications due to fear of future episodes of hypoglycemia.
- A history of severe hypoglycemia increases risk for [cardiovascular events, mortality](#), and [dementia](#).
- Preventing hypoglycemia is an important target for primary care providers to reduce high costs, impaired quality of life, morbidity, and mortality.

Classification of hypoglycemia:

	Glycemic Criteria/Description
Level 1	Glucose < 70 mg/dL and ≥ 54 mg/dL; Glucose level < 70 mg/dL is recognized as a threshold for neuroendocrine responses to falling glucose in people <i>without diabetes</i> . This level is considered important in lieu of severity of symptoms.
Level 2	Glucose < 54 mg/dL; This is the threshold at which neuroglycopenic symptoms begin to occur. Requires immediate action. Patients with level 2 hypoglycemia without symptoms have hypoglycemia unawareness, a risk which increases with every episode of hypoglycemia.
Level 3	A severe event characterized by altered mental and/or physical status requiring assistance for treatment of hypoglycemia; Level 3 hypoglycemia can result in loss of consciousness, seizure, coma, and death.

Occurrence and risk of hypoglycemia should be reviewed at every diabetic patient encounter, even for patients not meeting glycemic goals.

Factors that increase risk of hypoglycemia:

- Use of insulin
- Use of insulin secretagogues (sulfonylureas or glinides)
- Polypharmacy
- Cognitive impairment
- Fragility or older age
- Impaired kidney or liver function
- Longer duration of diabetes
- Hypoglycemia unawareness
- Alcohol use
- Food insecurity
- Fasting

The 2021 American Diabetes Guidelines reference a comprehensive risk prediction model that could be used to target patients for preventative intervention. The [Kaiser Hypoglycemia Model](#) is a risk stratification tool using six variables: number of prior hypoglycemia-related ED or hospital encounters, number of ED encounters for any reason in the prior 12 months, insulin use, sulfonylurea use, presence of severe kidney disease, and age ≥ 77 years.

Overview of hypoglycemia treatment:

Carbohydrates

1. Consume a *fast-acting* carbohydrate containing 15-20 grams of glucose and no fat (AVOID chocolate!) Examples:
 - ½ cup (4 oz) of juice
 - ½ can (6 oz) of regular (not diet) soda
 - 4 glucose tablets
 - 1 glucose gel pack
 - 1 tbsp honey (or 1-2 packets)
2. Wait 15 minutes. Check blood sugar. If not above 70mg/dL, repeat step #1.
3. Eat a meal or a snack to prevent recurrent hypoglycemia.

Glucagon

- If a patient is unwilling or unable to consume carbohydrates, use glucagon.
- **ADA guidelines recommend prescribing glucagon for any patient at risk for level 2 hypoglycemia.**
- **CHOOSE GENERIC** if possible, unless caregivers are unable to reconstitute or inject glucagon.

Glucagon formulations: **NEW GENERIC** formulation is now on the market

Type and Name	Out of Pocket Cost per dose*
GENERIC Kit - powder (Glucagon for Injection Emergency kit) *Must be reconstituted	\$97
Brand name kit - powder (GlucaGen, Glucagon Novaplus, Glucagon Emergency) *Must be reconstituted	\$300
Solution Auto-injector (Gvoke HypoPen) and Prefilled Syringe (Gvoke PFS)	\$280
Nasal spray (Baqsimi)	\$280

*Most insurance providers cover glucagon, copays vary

Hypoglycemia Prevention:

- More frequent self-monitoring of blood glucose.
- Treat with carbohydrates at first symptoms of hypoglycemia – do not delay!
- Medication adjustments or deprescribing (**consider Ambulatory Care pharmacy referral: REF168**).
- Education on situations that increase risk (fasting, delayed meals, exercise, alcohol consumption).
- Matching insulin dose to meal size (for more complex patients, consider dietician referral).
- Close associates, such as a spouse or partner, should be taught to recognize severe hypoglycemia and treat it with glucagon.

New technologies such as continuous glucose monitoring (CGM) and automated insulin dosing may help prevent hypoglycemic events and may be the future of diabetes self-management. For now, continue usual preventative measures.