2026

CONTROLLING DIABETES TOOL KIT

Piedmont HEALTHCARE

Controlling Diabetes Roadmap

Purpose: The purpose of the Diabetes Tool Kit is to provide a centralized area for resources to help us take better care of those patients with diabetes. The resources are broken down into patient facing, and provider facing material. ***If you are taking care of a patient with uncontrolled diabetes and don't normally manage diabetes, then ensure they get appropriate follow-up with a provider that does.*** Click the links below to go directly to each resource. *The patient resource materials are available for use in the after-visit summary (AVS) and may be found in Epic by searching the SmartTexts associated with each one. Please refer to page 4 of this Toolkit for the associated SmartTexts for each resource.*

Navigating Diabetes: A Road Map

	Pre-Diagnosis and Office Visits	Diagnosis Detour	Treatment Turnaround	At-Home Monitoring Garage
	Tools to help the patient change course **before** the diabetes trip starts.	Tools to help you and your patient get tuned up and back on the road.		Patient-facing resources for self-monitoring of their diabetes.
Physician and Staff Resources	CGMs CE Video Interventions for helping to meet treatment targets in Type 2 Diabetes Diabetes Treatment Algorithm Diabetes Medication Treatment Algorithm Nephropathy Screening Barriers to Interventions PAD Retinopathy	Considerations for Diabetes Management in Women of Reproductive Age Features of medications for lowering glucose in type 2 diabetes Diabetes mellitus treatment class with their PROS and CONS Weight Management Instruction Insulin Regimens	Insulin Chart: What You Need to Know About Insulin Types and Timing Insulin Comparison Chart Patient Assistant Programs Representative relative attributes of insulin delivery Time in range targets for CGM Hypoglycemia Anesthesiology	Summary of glycemic goals for many nonpregnant adults with diabetes When to Check for Antibodies for Type 1 ADA recommends screening: Adults and children at risk for autoimmune DM Recommended Vaccines When to Refer to Endocrinologist
Patient Resources	Prediabetes Complications of Diabetes Mellitus The Glycemic Index Portion Size	How Does Exercise Affect Blood Sugar Levels Blood Glucose Chart HBA1C Ranges for: Pregnant Women Glucagon Hypoglycemia		Blood Glucose Log Rule of 15 for Glucose Less Than 80

INTRODUCTION

Per the Georgia Department of Public Health, the "diabetes epidemic affects approximately 1,210,400 or 11.3% of the adult population." This number is growing rapidly every year, demonstrating the glaring need for improved diabetic disease management. Piedmont Healthcare reaches ~80% of the state of Georgia through Primary Care services and aims to be in the top 10% of performers nationally. Currently Piedmont Healthcare, for Web-Interface submission not eCQM submission, for PY24 is scored at 11.23% and falls within the 10-20th percentile.

Piedmont Diabetes Quality Metric goal is <13% of all diabetic patients with an HbA1c ≥9%

Diabetes Metric		
Importance	**Definition**	**Performance Tracking**

For 2023, diabetes was the seventh leading cause of death in the United States, with 95,190 deaths. (Centers for Disease Control and Prevention [CDC], 2024). Diabetes is a long-lasting disease marked by high blood glucose levels, resulting from the body's inability to produce or use insulin properly. People with diabetes are at increased risk of serious health complications including vision loss, heart disease, stroke, kidney failure, amputation of toes, feet or legs, and premature death.	• **Denominator:**
	  • **Epic:** Patients 18 to 75 years of age with diabetes (see Appendix A) with a primary care visit in the last 12 months
	  • **Non-Epic:** Patients 18 - 75 years of age with diabetes with a visit during the measurement period (January - December) Note: Providers are only accountable for the patients they bill (ICD10 AND CPT) during the measurement period. Every provider will have a unique denominator of patients based on their billed encounters. Patients may qualify for the denominator for multiple providers, if they incur multiple denominator-qualifying encounters.
	• **Numerator:**
	  • **Epic:** Patients whose most recent A1c level (performed between 12 months prior to encounter date and end of measurement period) is >9.0 or no A1c value present.
	  • **Non-Epic Note:** The measurement period will accept the most recent A1c from 12 months prior to encounter date. A1c results must be documented in the patients' medical record. The patients' most recent A1c may satisfy the numerator of multiple providers if documented on the same instance of the EMR by *any* provider, except those taken during an inpatient stay or ED visit.
		Clinical Integration Dashboard
		Providers may log in to see their performance.
		Provider Metric Card

Quick Print Guide

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Patient Material

Resource	Purpose
Prediabetes	Give to patients at initial prediabetes diagnosis. Web Link
Blood Glucose Ranges for Adults	A simple image to demonstrate glucose levels for adults
Blood Glucose Ranges for: Pregnant Women	A simple image to demonstrate pregnant women glucose ranges
How Does Exercise Affect Blood Sugar Levels	Help patient understand what exercise does to their glucose level
Hypoglycemia	Give to patients at initial diagnosis and to those patients that are having more difficulty controlling their hypoglycemia and they do not understand complications if left untreated
Rule of 15 for Glucose Less Than 80	The Rule of 15 is a treatment protocol used to manage hypoglycemia (low blood sugar) in people with diabetes
Glucagon	Give to patients at initial diagnosis and to those patients that are having more difficulty controlling their glucagon hormone to understand the role in regulating blood sugar levels
Weight Management Instruction	Weight loss management
Portion Size	Diet, that is helpful in controlling diabetes. Give to patients at initial diagnosis and to those patients that are having more difficulty controlling their glucose levels.
The Glycemic Index	Give to patients at initial diagnosis and to those patients that are having more difficulty controlling their blood sugar to understand how quickly they raise blood sugar levels after eating
Debunking the Diabetes Medications Myths	Myths debunked include meds aren't a last resort, you can't eat anything once on them, and they don't cure diabetes.
Complications of Diabetes Mellitus	A simple image to demonstrate diabetes complications
Blood Glucose Log	Give to patients when asked to start self-monitoring glucose levels at home. Web Link

Prediabetes: What Is It and What Can I Do?

American Diabetes Association.

What is prediabetes?

Prediabetes is a condition that comes before diabetes. It means your blood glucose levels are higher than normal but aren't high enough to be called diabetes.

There are no clear symptoms of prediabetes. You can have it and not know it.

If I have prediabetes, what does it mean?

It means you might get type 2 diabetes soon or down the road. You are also more likely to get heart disease or have a stroke.

The good news is that you can take steps to delay or prevent type 2 diabetes.

How can I delay or prevent type 2 diabetes?

You may be able to delay or prevent type 2 diabetes with:

- Daily physical activity, such as walking.
- Weight loss, if needed. Losing even a few pounds will help.
- Medication, if your doctor prescribes it.

If you have prediabetes, these steps may bring your blood glucose to a normal range. But you are still at a higher risk for type 2 diabetes.

Regular physical activity can delay or prevent diabetes.

Being active is one of the best ways to delay or prevent type 2 diabetes. It can also lower your weight and blood pressure, and improve cholesterol levels. Ask your health care team about activities that are safe for you.

One way to be more active is to try to walk for half an hour, five days a week. If you don't have 30 minutes all at once, take shorter walks during the day.

Weight loss can delay or prevent diabetes.

Reaching a healthy weight can help you a lot. If you're overweight, any weight loss, even 7 percent of your weight (for example, losing about 15 pounds if you weigh 200), may lower your risk for diabetes.

Prediabetes: What Is It and What Can I Do?

American Diabetes Association.

Make Healthy Choices

Here are small steps that can go a long way toward building healthy habits. Small steps add up to big rewards.

- Avoid or cut back on regular soft drinks and juice. Have water or try calorie-free drinks.
- Choose lower-calorie snacks, such as popcorn instead of potato chips.
- Include at least one vegetable every day for dinner.
- Be careful with salad toppings—the calories can add up fast.
- Choose fruit instead of cake, pie or cookies.
- Cut calories by:
  - Eating smaller servings of your usual foods.
  - When eating out, share your main course with a friend or family member. Or take half of the meal home for lunch the next day.
- Roast, broil, grill, steam or bake instead of deep-frying or pan-frying.
- Be mindful of how much fat you use in cooking.
- Avoid foods high in saturated fat, such as butter, lard and shortening.
- Use healthy oils, such as canola, olive and vegetable.
- Start with one meat-free meal each week by trying plant-based proteins such as beans or lentils in place of meat.
- Choose fish at least twice a week.
- Eat lean meats, such as the round or loin cuts, or chicken without the skin.
- Cut back on processed meats that are high in fat and sodium. These include hot dogs, sausage and bacon.
- Eat fewer and smaller portion sizes of desserts and treats, such as ice cream, cake and cookies. Try saving these for special occasions.

Track Your Progress

Write down what and how much you eat and drink for a week. Writing things down makes you more aware of what you're eating and helps with weight loss. Take note of the easier changes you can make to reduce your calories and start there.

Summing It Up

Diabetes is a common, but serious, disease. You can prevent or delay type 2 diabetes by increasing your activity and losing a small amount of weight.

Get Started

- Be physically active.
- Make a plan to lose weight.
- Track your progress.

Get Checked

If you are at increased risk for diabetes, ask your doctor about getting tested at your next visit. You can take our risk test at diabetes.org/risktest to find out if you are at risk for type 2 diabetes.

The American Diabetes Association® is here to help. For more information, visit us at **diabetes.org** or call **1-800-DIABETES** (800-342-2383).

Blood Glucose Ranges for Adults

Mg/DL	Fasting	After Eating	2 - 3 Hours After Eating
Normal	80 - 100	170 - 200	120 - 140
Impaired Glucose	100 - 125	190 - 230	140 - 160
Diabetic	126+	220 - 300	200+

Your sugar glucose may be 'red' one time that does not make you diabetic. You will need 2 or more readings for proper diagnosis.

Blood Glucose Ranges for Pregnant Women

Table 15.2—Blood glucose goals in pregnancies associated with diabetes

	Blood glucose goal		
Glucose measurement	Type 1 diabetes or type 2 diabetes^	GDM treated with insulin	GDM not treated with insulin
Fasting glucose	70–95 mg/dL (3.9–5.3 mmol/L)	70–95 mg/dL (3.9–5.3 mmol/L)	<95 mg/dL (<5.3 mmol/L)
1-h postprandial glucose	110–140 mg/dL* (6.1–7.8 mmol/L)	110–140 mg/dL* (6.1–7.8 mmol/L)	<140 mg/dL* (<7.8 mmol/L)
2-h postprandial glucose	100–120 mg/dL (5.6–6.7 mmol/L)	100–120 mg/dL (5.6–6.7 mmol/L)	<120 mg/dL (<6.7 mmol/L)

Gestational diabetes mellitus (GDM) blood glucose goals shown are recommended by the Fifth International Workshop-Conference on Gestational Diabetes Mellitus (42). ^Lower glucose limits do not apply to individuals with type 2 diabetes treated with nutrition alone. Aim for less stringent goals if these cannot be achieved without significant hypoglycemia, based on clinical experience and individualization of care. *Optimal goal includes either a 1-h postprandial glucose level or 2-h postprandial glucose level within column of type of diabetes.

American Diabetes Association Professional Practice Committee; 15. Management of Diabetes in Pregnancy: Standards of Care in Diabetes—2025. *Diabetes Care* 1 January 2025; 48 (Supplement_1): S306–S320. https://doi.org/10.2337/dc25-S015

How Does Exercise Affect Blood Sugar Levels

When you're trying to get your diabetes under control, exercise and other physical activity help your body use insulin better, which keeps your blood sugar, or glucose level, within a safe range. Exercise improves your body's ability to use insulin effectively by increasing insulin sensitivity. How exercise impacts your blood sugar can depend on the kind of exercise you're getting.

For example, *low impact activities that typically reduce blood sugar levels* are:

While exercise that includes short bursts of *hard aerobic exercise such as high intensity interval training (HIIT), can temporarily raise blood sugar levels*.

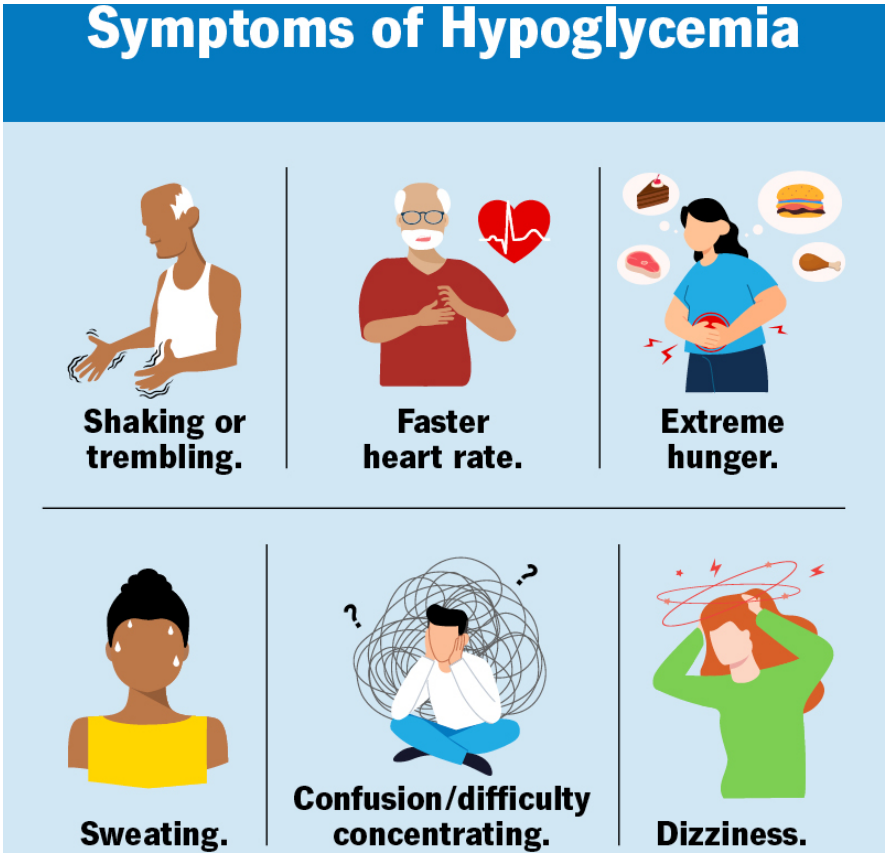
For those *who take insulin, exercise may cause blood sugar to become too low*, a condition known as hypoglycemia.

If this describes you, speak to your healthcare provider about how your preferred physical activity may affect your glucose levels, and the best way to approach diet, exercise, and your diabetes medications. It's good practice to check your blood sugar before, during and after exercise to understand how your body responds to physical activity and reduce the chance of health issues.

Hypoglycemia

Hypoglycemia refers to a low glucose reading below 70 mg/dL that occurs due to insulin or other diabetes medications such as glipizide or glimepiride. Repeated episodes can lead to decrease ability to recognize signs and symptoms of hypoglycemia. Prolonged or severe hypoglycemia with glucose readings below 50 mg/dL can lead to changes in mental status, loss of consciousness, seizure and even death

The only sure way to know whether you are experiencing low blood sugar is to **check your blood sugar**, if possible. If you are experiencing symptoms and you are unable to check your blood sugar for any reason, treat hypoglycemia.



RULE OF 15 FOR GLUCOSE LESS THAN 80

Give 15 grams of fast-acting carbohydrate according to care plan.
Re-check BG in 15 minutes
Repeat treatment if BG less than 80 mg/dl.
(TOO LOW)

1. Take 15 grams of carbohydrate:
    a. 3 or 4 glucose tablets or
    b. 4 oz. (1/2 cup) of fruit juice or
    c. 6 oz regular soda (about 1/2 can)
2. Recheck your blood sugar in 15 minutes
    d. Repeat if blood sugar is still less than 80
3. If next meal is more than 1 hour away, eat a snack.

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Glucagon

Glucagon is a type of medication that helps correct a low glucose reading quickly and helps prevent hypoglycemia emergencies. Use for severely low blood sugar (55 mg/dL or lower) and/or symptoms such as:

Here are some commonly used Glucagon formulations:

GVOKE

1 Pull red

cap off

2 Push yellow

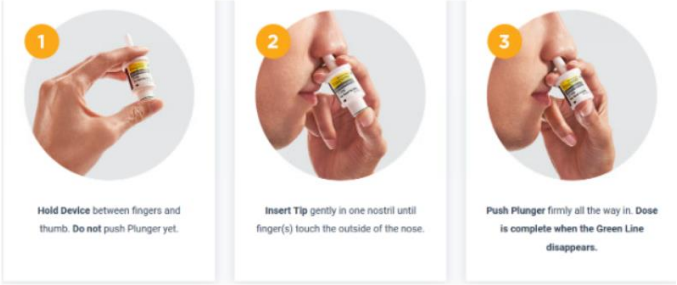
end down on skin and hold 5 seconds. Window will turn red.

Administer into upper arm, stomach, or thigh.

911 Remember

After using **Gvoke HypoPen**, turn person on their side if they have passed out or are seizing. Call for emergency help.[2]

BAQSIMI



After giving BAQSIMI:

- **Call for emergency medical help right away**
- If the person is unconscious, turn the person on their side
- **Throw away the used Device and Tube**
- Encourage the person to eat as soon as possible. When they are able to safely swallow, give the person a fast-acting source of sugar, such as juice. Then encourage the person to eat a snack, such as crackers with cheese or peanut butter
- If the person does not respond after 15 minutes, another dose may be given, if available

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Weight Management Instruction

1. **Avoid eating out**- no more than once every 2 weeks. Restaurant and fast food are very high in sodium, fat, sugar

2. **Drinks-** stick to water the best you can. Avoid juice, soda, lemonade, Powerade, Gatorade, sweet tea. Diet soda and drinks are high in artificial sweeteners such as aspartame which promote obesity

3. **Eat more veggies-** frozen or fresh, not canned, 1/2 your plate should be veggies – prefer raw, steamed, sautéed in olive oil, baked, grilled prefer; try to avoid cooking with butter, adding high sodium flavorings such as smoked meats or seasoning packets

4. Go for **low fat protein** like chicken, fish or turkey, baked sautéed or grilled, air-fried but not fried. Avoid beef, pork, sausage, bacon, shellfish like shrimp, crab, or lobster which are higher in cholesterol.

5. Fiber helps prevent blood sugar spikes and increase satiety. Go for **high fiber carbs** like quinoa or brown rice instead of white rice, chickpea pasta over regular pasta, carb balance tortillas instead of regular ones. Carbs should cover no more than 1/4 of your plate

6. **Avoid processed snacks-** all chips, cookies, pretzels, trail mix, etc. Go for raw almonds, baby carrots, celery, cucumber, apple slices instead. If you need a dip, go for low fat plain yogurt instead of ranch or sour cream

7. **Avoid eating after 8:00 PM**

8. ***Walk daily 30 minutes***

This is a simple 8 Steps diabetes/weight loss tool to go over in clinic with new patients and repeat during follow-up visits to help patients remember.

Portion Size

Controlling portion sizes is key to managing carb intake and blood sugar. Larger portions contain more carbs, which can lead to higher blood sugar levels. It's important to understand how much you're eating and how it affects your body.

1. **Measure Your Food**
   Use measuring cups or a food scale to help control portion sizes. If you don't have these tools, visual guides like your hands can help:
   - **Closed fist = 1/2 cup**
     (for grains or starchy vegetables)
   - **Clenched fist = 1 cup**
     (for vegetables, pasta, or rice)
   - **Palm of your hand = 3-4 ounces**
     (for meat or protein)
   - **Thumb = 2 tablespoons**
     (for fats like oils or nut butters)
2. **Be Mindful of Simple Carb Foods**
   Foods like white pasta, rice, potatoes, and bread can quickly add up in carbs and affect your blood sugar levels. Aim for smaller portions of these foods, and pair them with non-starchy vegetables to balance your meal.
3. **Snack Smartly**
   Snacks can quickly add up in carbs too, so try to measure or estimate your snack portions. Choose snacks that are balanced with lean protein, fiber, and healthy fats to keep blood sugar stable.

Managing Portions
Be mindful of portion sizes, as larger portions mean more carbs.

Front of your closed fist
1/2 cup

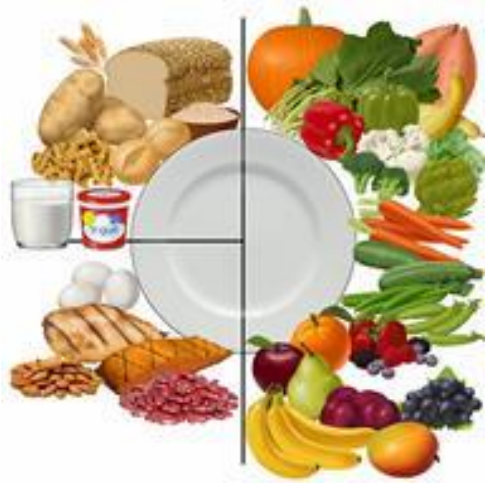
Clenched fist
1 cup serving

Palm of the hand
3 to 4 ounces, standard serving of meat

Thumb
About two tablespoons (1 tablespoon, measure from your knuckle to the tip of your thumb)

Building a Balanced Meal

Half
Veggies Delicious and Nutritious
Quarter
Starch (pasta, rice, potato, bread
Protein (meat, fish, tofu, eggs, nuts)



GI LEGEND	GI
Low Glycemic Index	0-55
Medium Glycemic Index	56-69
High Glycemic Index	70-100

Note: For reference and education only. Variations in testing methods, reporting sources, GI scales and ingredients may produce different values.

The Glycemic Index (GI)

GI is a system used to classify carbohydrate-containing foods based on their effect on blood sugar levels and foods are assigned a numerical value from 0 to 100, where the lower the number the healthier the food.

BAKERY & BREAD	GI
Wheat Tortilla	30
Coarse Barley Bread, 80% Kernels	34
Vanilla Cake Made from Packet Mix with Vanilla Frosting (Betty Crocker)	42
Apple Muffin, Made with Rolled Oats and Sugar	44
Sponge Cake, Plain	46
Banana Cake, Made with Sugar	47
Apple Muffin, Made with Rolled Oats and Without Sugar	48
100% Whole Grain Bread	51
Corn Tortilla	52
Banana Cake, Made Without Sugar	55
Pumpernickel Bread	56
50% Cracked Wheat Kernel Bread	58
Hamburger Bun	61
Pita Bread, White	68
Whole Wheat Bread	69
Bagel, White, Frozen	72
Wonder Bread	73
Kaiser Roll	73
White Wheat Flour Bread	75
Waffles, Aunt Jemima	76
Baguette, White, Plain	95

BEANS & NUTS	GI
Chickpeas	10
Peanuts	13
Soy Beans	15
Cashews	22
Lentils	28
Black Beans	30
Kidney Beans	34
Navy Beans	39
Baked Beans	40
Chickpeas, Canned in Brine	42
Black-Eyed Peas	50

BEVERAGES	GI
Red Wine	15
Beer	15
Tomato Juice	38
Apple Juice, Unsweetened	41
Orange Juice, Unsweetened	50
Coca Cola	63
Fanta, Orange Soft Drink	68
Cranberry Juice Cocktail	68
Gatorade	89

GI Chart Link		

CEREALS	GI
All Bran, Average	44
Rolled Oats	50
Oatmeal, Average	55
Muesli, Average	56
Mini Wheats	58
Raisin Bran	61
Cream of Wheat	66
Special K	69
Cream of Wheat	74
Cheerios	74
Grape Nuts	75
Coco Pops	77
Instant Oatmeal	79
Puffed Wheat Cereal	80
Cornflake	81
Rice Krispies	82

DAIRY PRODUCTS	GI
Whole Milk	31
Skim Milk	31
Sweetened Yogurt	33
Low Fat Yogurt	33
Chocolate Milk	40
Soy Milk	44
Plain Ice Cream	61

FRUITS	GI
Cherries	22
Grapefruit	25
Prunes, Pitted	29
Raspberries	30
Apple	36
Pears	38
Blueberries	40
Strawberries	40
Dates	42
Peach	42
Oranges	45
Grapes	46
Kiwi	47
Banana	48
Pineapple	59
Raisins	64
Cantaloupe	65
Watermelon	72

SWEETENERS	GI
Stevia (Natural)	0
Fructose	15
Agave Syrup	15
Coconut Palm Sugar	35
Maple Syrup	54
Caramel	60
Honey	61
Sucrose	65
Splenda (Artificial)	80
Glucose	100

VEGETABLES	GI
Kale	5
Brussels Sprouts	6
Spinach	6
Broccoli	10
Cabbage	10
Cauliflower	12
Tomato	15
Carrots	39
Parsnips	52
Green Peas	54
Yams	54
Corn on the Cob	54
Sweet Potato	70
French Fries	75
Boiled White Potato	82
Instant Mashed Potato	87
Baked Russet Potato	111

SNACK FOODS	GI
Nutella	33
M&M's, Peanut	33
Corn Chips	42
Snickers Bar (High Fat)	50
Potato Chips, Average	56
Blueberry Muffin	59
Shortbread Cookies	64
Rye Crisps	64
Popcorn	65
Graham Crackers	74
Soda Crackers	74
Donuts	76
Vanilla Wafers	77
Rice Cakes	82
Pretzels	83
Fruit Roll-Ups	99

GRAINS & STARCHES	GI
Pearled Barley	25
Wheat Tortilla	30
Wheat Pasta	30
Parboiled Converted White Rice	38
Whole Wheat Kernels	45
Bulgur	47
Brown Rice, Steamed	50
Corn Tortilla	52
Quinoa	53
Pumpernickel Bread	56
Wheat Bread	60
Quick Cooking White Basmati	63
Couscous	65
Pita Bread	68
Taco Shells	68
Slice of White Bread	70
Plain Bagel	72
Waffles	76
White Rice	85
Baguette (White)	95

PASTA & NOODLES	GI
Fettuccine	32
Spaghetti, Whole Grain, Boiled	42
Spaghetti, White, Boiled	46
Macaroni	50
Macaroni & Cheese	64

Debunking the Diabetes Medications Myths

Diabetes medications include Metformin, SGLT-2 inhibitors (e.g., Jardiance), GLP-1 agonists (e.g., Ozempic, Mounjaro), insulin, and others, used to manage blood sugar, with newer ones offering heart/kidney/weight benefits. Myths debunked include: meds aren't a last resort, you can't eat anything once on them, and they don't cure diabetes. Side effects vary but often involve GI issues (nausea, diarrhea) for GLP-1s, UTIs for SGLT-2s, and potential GI discomfort with Metformin, but benefits often outweigh risks.

Common Diabetes Medications

- Metformin: First-line for Type 2; reduces liver glucose production, improves insulin sensitivity.
- SGLT-2 Inhibitors (**e.g., Invokana, Jardiance**): Block glucose reabsorption in kidneys, removing sugar via urine; also protect heart/kidneys.
- GLP-1 Receptor Agonists (**e.g., Ozempic, Trulicity, Mounjaro**): Slow stomach emptying, boost insulin, reduce appetite, aid weight loss.
- Insulin: Replaces or supplements natural insulin (for Type 1 & some Type 2).
- Sulfonylureas (**e.g., Glipizide**): Stimulate the pancreas to release more insulin (less common now).

Myths Debunked

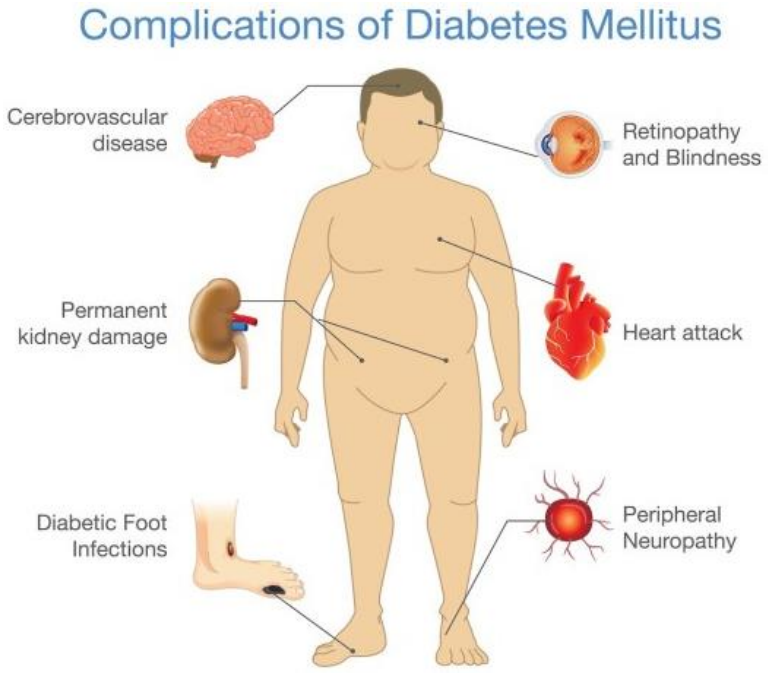
- **Myth**: Avoid meds to delay the inevitable. Fact: Early medication use prevents organ damage from high sugar; it's proactive care, not a failure.
- **Myth**: Medication means I can eat anything. Fact: Diet is still crucial; meds help, but poor food choices spike sugar and require more meds.
- **Myth**: Insulin causes blindness/kidney disease. Fact: Uncontrolled high sugar causes complications; insulin prevents them by controlling sugar.
- **Myth**: If I feel fine, I can skip doses. Fact: Consistent levels are key; skipping doses leads to poor control.

Common Side Effects & Management

- **General**: Nausea, vomiting, diarrhea, constipation (especially with GLP-1s).
- **SGLT-2s**: Increased urination, risk of UTIs/yeast infections.
- **Metformin**: GI upset (bloating, discomfort); often managed by taking with food or starting low.
- **Management**: Start low, go slow; take with food; stay hydrated; consistent timing.

Key Takeaway

Diabetes medication is a tool for health, not a sign of failure, with newer drugs offering significant protective benefits beyond blood sugar control but requires personalized use and adherence.



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Blood Glucose Log

Week of _____

before meal | after meal | insulin/meds | bedtime

American Diabetes Association.
Diabetes Advisor

	BREAKFAST			LUNCH			DINNER			SNACK/ OTHER	BED	
DAY												
Mon												
TIME												
Notes:												
Tues												
TIME												
Notes:												
Wed												
TIME												
Notes:												
Thurs												
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Sat												
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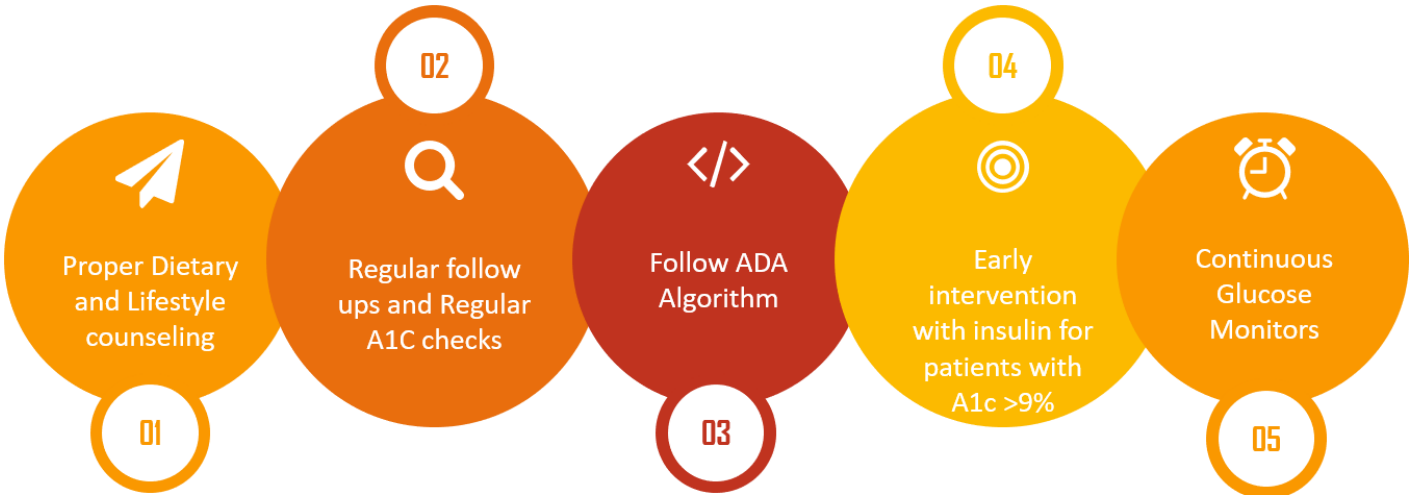
Provider Material	
Resource	**Purpose**
Glycemic goals for nonpregnant adults with diabetes	Quick Reference for Glycemic goals
Interventions for helping to meet treatment targets in Type 2 Diabetes	Quick reference to treatment interventions
Diabetes Treatment Algorithm	To provide quick access to current guideline-based diabetes treatment
Diabetes Medication Treatment Algorithm	To provide quick access to current guideline-based diabetes treatment
Considerations for Diabetes Management in Women of Reproductive Age	Specific considerations for diabetes in women of reproductive age
Summary of GLP-1 agonists interactions with OCPs	OCPs interactions and recommendations
Diabetes mellitus treatment class with their PROS and CONS	Provide information around diabetes medication to providers
Features of medications for lowering glucose in type 2 diabetes	Provide information around diabetes medication to providers
Insulin Chart: What You Need to Know About Insulin Types and Timing	Quick Reference around Insulin Therapy & Regimen designed taking lifestyle and meal schedule into account
Insulin Comparison Chart & Patient Assistant Programs	Quick Reference around Insulin Therapy
Barriers to Insulin Interventions	Easy Reference for Common Insulin Barriers
Hypoglycemia	Tips around managing Hypoglycemia
Anesthesiology CGC Overview	What to do with patients on new Diabetes medication going to surgery
Diabetic Retinopathy	Tips for annual eye exams
Nephropathy Screening	To provide information around annual nephropathy screening interpretation and treatment
Peripheral Artery Disease Screening (PAD)	To provide information around Peripheral arterial screening interpretation and treatment
Recommended Vaccines for Adults with Type 2 Diabetes	Vaccines for Well Diabetes Care
When to Check for Antibodies for Type 1	Autoantibody characteristics associated with increased risk of type 1 diabetes
Adults and children at risk for autoimmune DM Screening	Screening for those at risk for type 1 diabetes and autoimmune markers
When to Refer to Endocrinologist	When to send to endocrine
Continuous Glucose Monitoring, Time in Range Targets for CGM, Types, Interpretation, CGM Education Videos	Information on how to order and help use and interpret Continuous Glucose Monitors
Continuing Education (CE) credits with Diabetes	Cloud CME credits and more PiedmontU education
Glycemic goals for nonpregnant adults with diabetes	Quick Reference for Glycemic goals
Interventions for helping to meet treatment targets in Type 2 Diabetes	Quick reference to treatment interventions
Diabetes Treatment Algorithm	To provide quick access to current guideline-based diabetes treatment

Summary of glycemic goals for many nonpregnant adults with diabetes	
HbA1c	<7.0% (<53 mmol/mol)
Pre-prandial capillary plasma glucose	80-130 mg/dL (4.4-7.2 mmol/L0
Peak Postprandial capillary plasma glucose	<180 mg/dL (<10.0 mmol/L)

Diabetes Care 2025;48 (Supplement_1): S128–S145 https://doi.org/10.2337/dc25-S006

Interventions for helping to meet treatment targets in Type 2 Diabetes

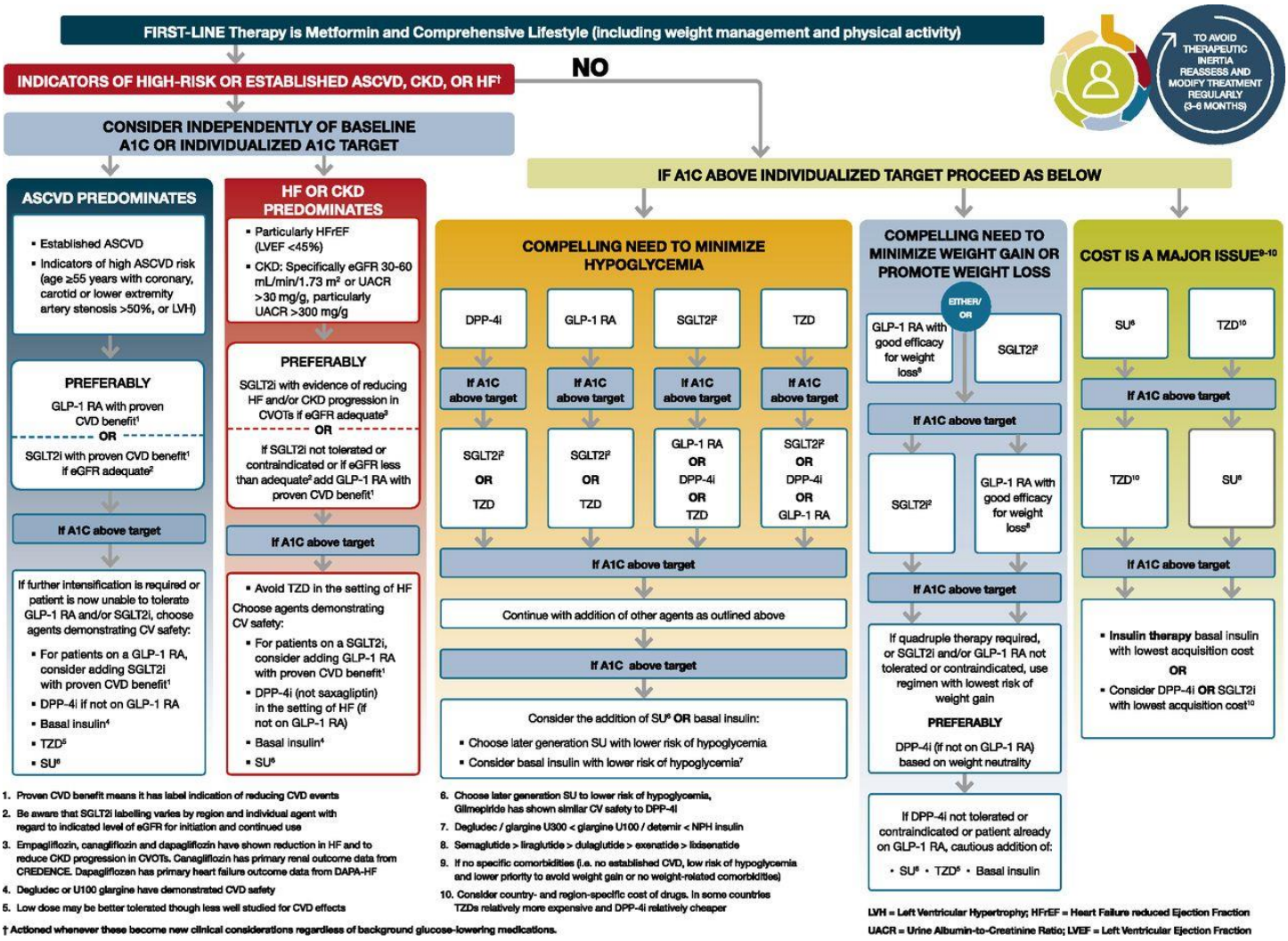


If A1c above 10%, consider insulin or dual therapy.

If A1c above 8% consider DUAL ORAL or ORAL + GLP1.

Diabetes Treatment Algorithm

based on ADA medication treatment algorithm –
https://diabetesjournals.org/view-large/figure/3413232/dc20S009f9-1.jpeg

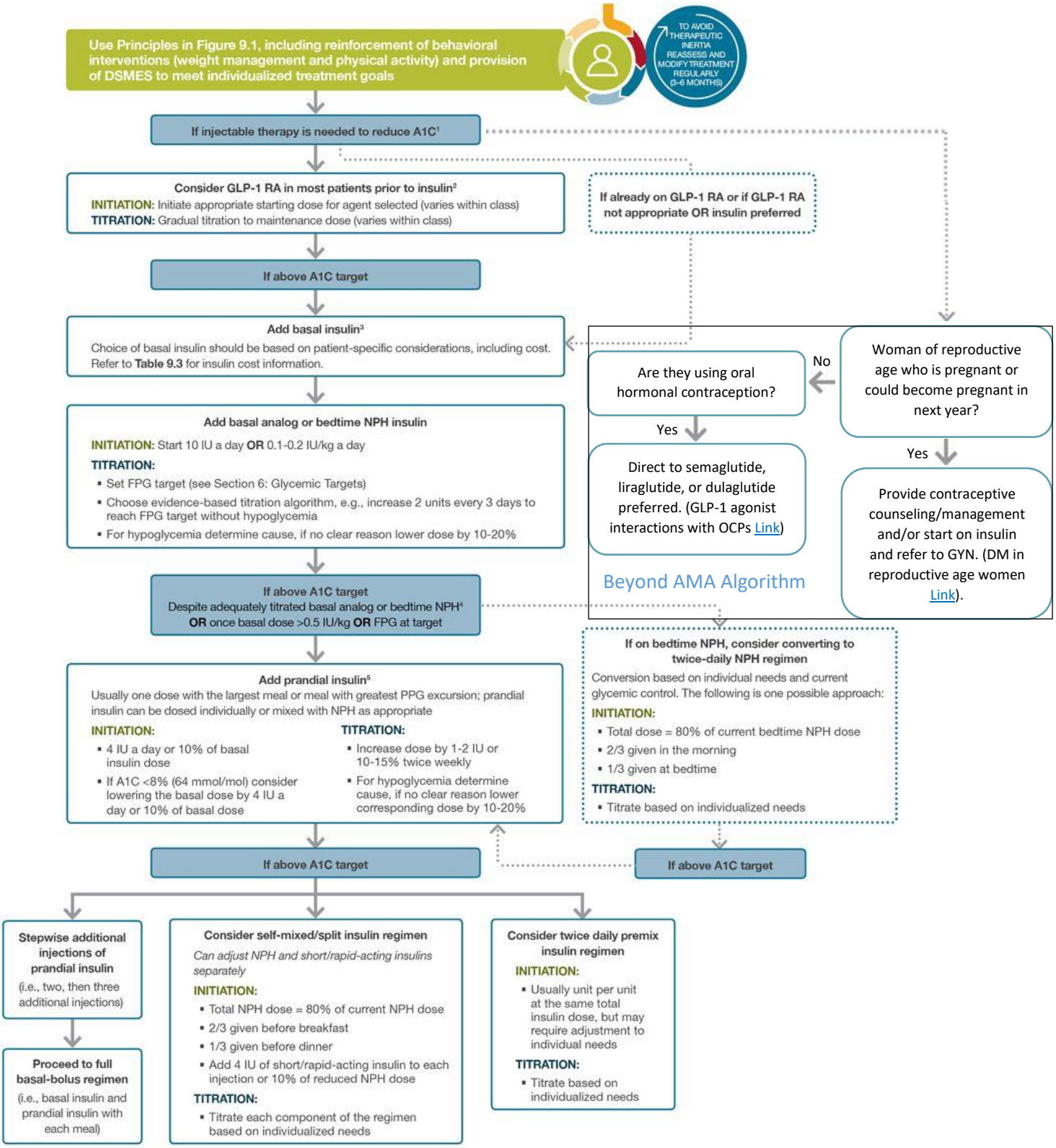


1. Proven CVD benefit means it has label indication of reducing CVD events
2. Be aware that SGLT2i labelling varies by region and individual agent with regard to indicated level of eGFR for initiation and continued use
3. Empagliflozin, canagliflozin and dapagliflozin have shown reduction in HF and to reduce CKD progression in CVOTs. Canagliflozin has primary renal outcome data from CREDENCE. Dapagliflozen has primary heart failure outcome data from DAPA-HF
4. Degludec or U100 glargine have demonstrated CVD safety
5. Low dose may be better tolerated though less well studied for CVD effects
6. Choose later generation SU to lower risk of hypoglycemia, Glimepiride has shown similar CV safety to DPP-4i
7. Degludec / glargine U300 < glargine U100 / detemir < NPH insulin
8. Semaglutide > liraglutide > dulaglutide > exenatide > lixisenatide
9. If no specific comorbidities (i.e. no established CVD, low risk of hypoglycemia and lower priority to avoid weight gain or no weight-related comorbidities)
10. Consider country- and region-specific cost of drugs. In some countries TZDs relatively more expensive and DPP-4i relatively cheaper

† Actioned whenever these become new clinical considerations regardless of background glucose-lowering medications.

LVH = Left Ventricular Hypertrophy; HFrEF = Heart Failure reduced Ejection Fraction
UACR = Urine Albumin-to-Creatinine Ratio; LVEF = Left Ventricular Ejection Fraction

Diabetes Medication Treatment *based on ADA medication treatment algorithm*



1. Consider insulin as the first injectable if evidence of ongoing catabolism, symptoms of hyperglycemia are present, when A1C levels (>10% [86 mmol/mol]) or blood glucose levels (≥300 mg/dL [16.7 mmol/L]) are very high, or a diagnosis of type 1 diabetes is a possibility.
2. When selecting GLP-1 RA, consider: patient preference, A1C lowering, weight-lowering effect, or frequency of injection. If CVD, consider GLP-1 RA with proven CVD benefit.
3. For patients on GLP-1 RA and basal insulin combination, consider use of a fixed-ratio combination product (iDegLira or iGlarLixi).
4. Consider switching from evening NPH to a basal analog if the patient develops hypoglycemia and/or frequently forgets to administer NPH in the evening and would be better managed with an AM dose of a long-acting basal insulin.
5. If adding prandial insulin to NPH, consider initiation of a self-mixed or premixed insulin regimen to decrease the number of injections required.

ADA algorithm lists applicable SGLT2 but not GLP1- Refer to Diabetes mellitus treatment class with their PROS and CONS table which lists each medication with CV/HF/CKD benefit by name.

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Considerations for Diabetes Management in Women of Reproductive Age

- Discuss risks of diabetes in pregnancy and recommendation for reliable contraception until ready to conceive (table 1)
- Discuss the need for excellent glycemic control prior to conception to reduce risks of diabetic embryopathies. Goal HbA1c of < 6.5% ideally. HgbA1c >7% associated with increased risk of congenital malformations.
- Educate patients on the fact that better diabetes control may increase fertility by increasing ovulation frequency. This is especially true for GLP-1 agonists and thus it is especially important to use reliable contraception
- If planning conception, use metformin and/or insulin for glycemic control.
- If planning conception, review medication list and stop any ACE-Is, ARBs, statins, or any other potential teratogens as well. May use labetalol or extended release nifedipine for BP control as needed.
- If planning conception and has been on a weekly injectable medication, patient needs to be off of the injectable medication ideally 4 months prior to conception due to long half-life of the injectable medication.
- Annual (or prn) preconception and contraceptive counseling needs to be provided to the patient reinforcing importance of reliable contraception if the patient is not planning pregnancy.
- Annual nephropathy and retinopathy screening. If actively trying to conceive and has known retinopathy or nephropathy patient should have Maternal Fetal Medicine (MFM) consult for preconception counseling.
- There is a potential drug interaction between select GLP1s (tirzepatide, exenatide, and lixisenatide) and ORAL contraceptive pills. This interaction may be due to delayed gastric emptying effects which may alter absorption of certain medications.
- GLP1s have no effect on other hormonal contraceptive methods (patch, ring, shot, IUD).
- The potential drug interaction is caused by absorption issues related to GLP1 use. If contraceptive pills are not fully absorbed, then they may not be effective.

Summary of GLP-1 agonists interactions with oral contraceptive pills (OCPs) and recommendations for patient care (Link):

Drug	OCP Interactions and Recommendations
Tirzepatide (Mounjaro®)	Decreases bioavailability of OCPs. Recommend patient to use barrier contraception for 4 weeks after initiation or a dosage increase, or to switch to a non-oral contraceptive
Semaglutide (Ozempic®, Wegovy®)	No effect on bioavailability of OCPs.
Liraglutide (Victoza®)	No effect on bioavailability of OCPs.
Dulaglutide (Trulicity®)	No effect on bioavailability of OCPs.
Exenatide (Bydureon®)	Diminishes therapeutic effect of OCPs. Recommend taking OCPs at least one hour prior to exenatide. More frequent blood glucose monitoring is warranted when patients on exenatide begin hormonal contraceptives, as dose adjustments to exenatide may be necessary.
Lixisenatide (Adlyxin®)	Diminishes therapeutic effect of oral contraceptives. Recommend taking OCPs at least one hour prior OR at least 11 hours after lixisenatide.

Supplementary Details

- Abell SK, Nankervis A, Khan KS, Teede HJ. Type 1 and Type 2 Diabetes Preconception and in Pregnancy: Health Impacts, Influence of Obesity and Lifestyle, and Principles of Management. Semin Reprod Med. 2016 Mar;34(2):110-20. doi: 10.1055/s-0035-1571196. Epub 2016 Feb 8. PMID: 26854707.
- Thong EP, Codner E, Laven JSE, Teede H. Diabetes: a metabolic and reproductive disorder in women. Lancet Diabetes Endocrinol. 2020 Feb;8(2):134-149. doi: 10.1016/S2213-8587(19)30345-6. Epub 2019 Oct 18. PMID: 31635966.
- Kitzmiller JL, Ferrara A, Peng T, et al. Preexisting Diabetes and Pregnancy. In: Cowie CC, Casagrande SS, Menke A, et al., editors. Diabetes in America. 3rd edition. Bethesda (MD): National Institute of Diabetes and Digestive and Kidney Diseases (US); 2018 Aug. CHAPTER 5.
- 15. Management of Diabetes in Pregnancy: Standards of Care in Diabetes—2025 | Diabetes Care | American Diabetes Association

Table 1 Adverse pregnancy and delivery outcomes in preexisting diabetes

Maternal outcomes	Delivery outcomes	Fetal outcomes
Development or progression of microvascular complications Miscarriage Pregnancy-induced hypertension Preeclampsia Polyhydramnios Urinary tract infection Premature rupture of membranes	Preterm birth Obstructed labor Induction of labor Cesarean section	Congenital malformations Stillbirth Neonatal death Macrosomia and LGA Growth restriction Shoulder dystocia and birth injury Respiratory distress syndrome Metabolic complications: - Hypoglycemia - Hyperbilirubinemia - Hypocalcemia - Hypomagnesemia

Abbreviation: LGA, large for gestational age.

Table 2 Recommendations for structured preconception care

Health professionals should empower women with diabetes to enable a positive experience of pregnancy and childbirth and to reduce diabetes-related distress
Discuss importance of pregnancy planning and health optimization prior to withdrawal of contraception - Ensure safe contraception advice in any woman not achieving targets - Ensure women are supported to achieve birth spacing
Commence a pregnancy multivitamin (containing iodine 150 µg daily) and folic acid 5 mg daily for 3 mo. prior to conception, continuing until at least 12 wk. postconception
Discuss risks of diabetes for mother, fetus, and neonate, including - Miscarriage, congenital malformation, stillbirth, and perinatal mortality - Onset or progression of microvascular complications of diabetes - Maternal hypertensive complications, polyhydramnios, premature rupture of membranes - Large for gestational age, difficult or obstructed delivery - Induction of labor and cesarean section - Delayed cord clamping - Neonatal morbidity requiring nursery admission, e.g., neonatal hypoglycemia, jaundice, respiratory distress
Optimization of glycemic control - Aim for HbA_{1c} <7% or as close to normal as can safely be achieved - Individualize targets for self-monitoring of blood glucose - Avoid large fluctuations of blood glucose, ketosis, and minimize hypoglycemia - Review diabetes self-management including sick day management
Counsel regarding optimal gestational weight gain based on maternal BMI - Discuss impact of obesity and excess gestational weight gain on pregnancy outcomes
Baseline screening for retinopathy and nephropathy and management as necessary
Screening and management of hypertension and dyslipidemia
Cease potentially harmful medications - Angiotensin-converting enzyme inhibitors, angiotensin-II receptor antagonists, and statins should be discontinued before conception
Cessation of smoking, alcohol, and illicit drugs

Abbreviations: BMI, body mass index.
Notes: This table provides a guide for women with preexisting diabetes desiring pregnancy. Recommendations are specific to diabetes and do not encompass all routine pre-pregnancy advice.

Abell SK, Nankervis A, Khan KS, Teede HJ. Type 1 and Type 2 Diabetes Preconception and in Pregnancy: Health Impacts, Influence of Obesity and Lifestyle, and Principles of Management. Semin Reprod Med. 2016 Mar;34(2):110-20. doi: 10.1055/s-0035-1571196. Epub 2016 Feb 8. PMID: 26854707.

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Diabetes Mellitus Treatment Class with Their PROS and CONS

Medication	Pros	Cons	FYIs
SGLT-2 Inhibitors	• CV Benefit • Weight Loss • A1c • Renal Protection	• Not cost-effective • Genitourinary infections • Fracture risk • Fracture risk is with canagliflozin • Normoglycemic DKA	• If patient is on diuretic, reduce diuretic dosage • Hold 3-4 days prior to surgery
GLP-1 Agonists	• CV Benefit • Weight loss • A1c reduction: 0.5-1.5% • Spoiler alert: pair with insulin, it'll make insulin work better!	• Injection • Not cost-effective • GI upset • Risk for pancreatitis • Avoid if Family history of Medullary thyroid cancer or MEN2	• Hold 1 week prior to surgery • Recommend backup contraception for certain ones if pt on OCPs • May use with insulin. May need to decrease insulin dose
Metformin	• Cost-effective • Improves fasting hyperglycemia • Lowers A1c 1-2 %, 1st line	• GI Side effects • Weight neutral • Avoid in CKD	• Avoid older patients • Avoid kidney disease • Insulin desensitizer • Consider lowering dose with nausea • Hold on **THE DAY OF Surgery** (not 48 hours prior)
Sulfonylureas (SU)	• Cost-effective • Effective prandial coverage	• Hypoglycemia (Beer's criteria) • Ineffective in longstanding DM • Weight gain • β cell burn out	• Prefer newer agents Glipizide or Glimepiride • Avoid Glyburide unless GDM (risk of MI) • Use with caution in elderly
Dipeptidyl peptidase-4 inhibitors (DPP-4i)	• Fewer side effects compared to GLP-1 • A1c reduction: ~1.0%	• Not cost-effective • No determined CV benefits • Pancreatitis reported • Risk of some agents in heart failure (alogliptin & saxagliptin)	• Linagliptin safe in CKD (even ESRD) • Do not use with GLP-1a due to redundancy
Thiazolidinediones (TZDs) PPARγ agonist	• Cost-effective • A1c reduction: 0.5-1.4% • NAFLD • Some CV benefits	• Weight gain • Fluid retention (avoid in CHF, CKD) • Possible risk for bladder cancer • Fractures	

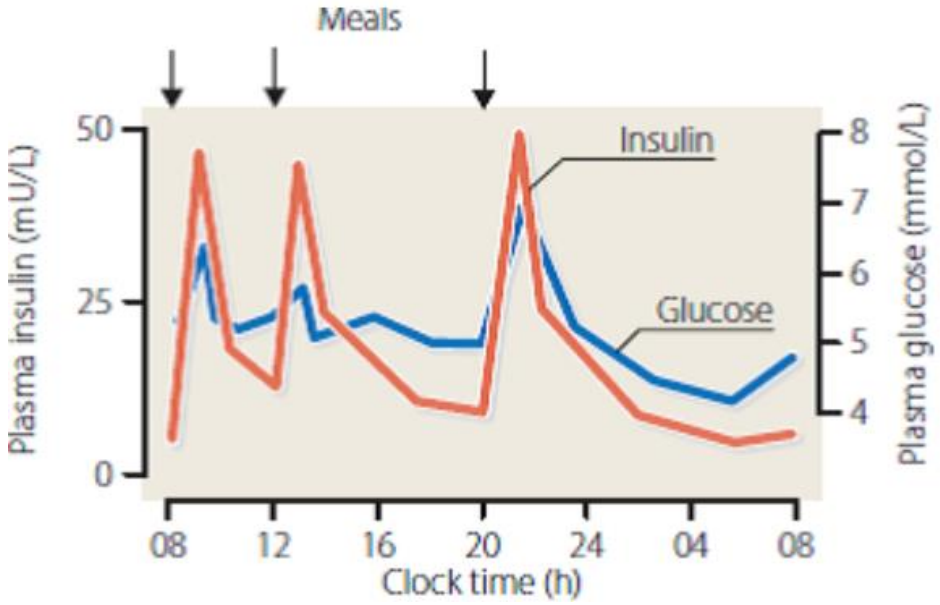
Features of medications for lowering glucose in type 2 diabetes

Medication (route of administration)	Glucose-lowering efficacy[1]	Hypoglycemia risk	Weight effects[2]	CV effects		Kidney effects		MASH effects	Clinical considerations and adverse effects
				Effect on MACE	Effect on HF	Progression of CKD	Dosing/use considerations*		
Metformin (oral)	High	No	Neutral (potential for modest loss)	Potential benefit	Neutral	Neutral	• Contraindicated with eGFR <30 mL/min/1.73 m²	Neutral	• GI side effects: mitigate with slow dose titration, extended-release formulations, and administration with food. • Potential for vitamin B12 deficiency: monitor and replete as appropriate.
SGLT2 inhibitors (oral)	Intermediate to high	No	Loss (intermediate)	Benefit: canagliflozin, empagliflozin	Benefit: canagliflozin, dapagliflozin, empagliflozin, ertugliflozin	Benefit: canagliflozin, dapagliflozin, empagliflozin	• See labels of individual agents for dosage considerations for kidney function • Glucose-lowering effect is minimal at eGFR <45 mL/min/1.73 m² and lower; continue for cardiovascular and kidney benefit until dialysis or transplantation	Unknown	• DKA risk in individuals with insulin deficiency (rare in T2D): discontinue, evaluate, and treat promptly if suspected; be aware of predisposing risk factors and clinical presentations (including euglycemic DKA); mitigate risk with sick-day planning; discontinue before scheduled surgery (e.g., 3-4 days), during critical illness, or during prolonged fasting. • Genital mycotic infections: mitigate risk with genital hygiene and avoid use in high-risk individuals. • Necrotizing fasciitis of the perineum (Fournier gangrene): rare; prompt treatment if suspected. • Intravascular volume depletion: attention to volume status and blood pressure, particularly when ill or fasting; adjust other volume-contracting agents as applicable; monitor kidney function upon initiation.
GLP-1 RAs (SQ; semaglutide also available in oral formulation)	High to very high	No	Loss (intermediate to very high)	Benefit: dulaglutide, liraglutide, semaglutide (SQ) Neutral: exenatide once weekly, lixisenatide	Neutral	Benefit for renal end points in CVOTs, driven by albuminuria outcomes: dulaglutide, liraglutide, semaglutide (SQ) Demonstrated benefit for progression of CKD for semaglutide (SQ)	• See labels of individual agents for dosage considerations for kidney function • No dose adjustment for dulaglutide, liraglutide, or semaglutide • Monitor kidney function when initiating or escalating doses in individuals with kidney impairment reporting severe adverse GI reactions	Potential benefit	• Thyroid C-cell tumors identified in rodents; human relevance not determined. • Ileus: risk level is not well established; provide guidance on discontinuation prior to surgical procedures. • Pancreatitis: acute pancreatitis has been reported, but causality has not been established. Do not initiate if at high risk for pancreatitis, and discontinue if pancreatitis is suspected. • Biliary disease: evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected; avoid use in at-risk individuals. • Diabetic retinopathy: close monitoring of retinopathy in those at high risk (older individuals and those with longer duration of T2D [≥10 years]). • Impact on drug absorption: orally administered drug absorption may be impaired during dose titration (including of oral contraceptives). • GI side effects: counsel on potential for GI side effects; provide guidance on dietary modifications to mitigate GI side effects (reduction in meal size, mindful eating practices [e.g. stop eating once full], decreasing intake of high-fat or spicy food); consider slower dose titration for those experiencing GI challenges. Not recommended for individuals with gastroparesis.
Dual GIP and GLP-1 RA (SQ)	Very high	No	Loss (very high)	Under investigation	Under investigation	Under investigation	• See labels of individual agents for dosage considerations for kidney function • No dose adjustment • Monitor kidney function when initiating or escalating doses in individuals with kidney impairment reporting severe adverse GI reactions	Potential benefit	
DPP-4 inhibitors (oral)	Intermediate	No	Neutral	Neutral	Neutral (potential risk: saxagliptin)	Neutral	• Dose adjustment required based on kidney function (sitagliptin, saxagliptin, alogliptin) • No dose adjustment required for linagliptin	Unknown	• Pancreatitis has been reported, but causality has not been established. Discontinue if pancreatitis is suspected. • Postmarketing concerns about joint pain (consider discontinuing if debilitating and other treatment options are feasible) and bullous pemphigoid (discontinue if suspected).
Pioglitazone (oral)	High	No	Gain	Potential benefit	Increased risk	Neutral	• No dose adjustment required • Generally not recommended in kidney impairment due to potential for fluid retention	Potential benefit	• Increased risk of HF and fluid retention. Do not use in the setting of HF. • Risk of bone fractures. • Bladder cancer: do not use in individuals with active bladder cancer, and use caution in those with prior history of bladder cancer.
Sulfonylureas (2nd generation) (oral)	High	Yes	Gain	Neutral	Neutral	Neutral	• Glyburide: generally not recommended in CKD • Glipizide and glimepiride: initiate conservatively to avoid hypoglycemia	Unknown	• FDA Special Warning on increased risk of CV mortality based on studies of an older sulfonylurea (tolbutamide); glimepiride shown to be CV safe (see text). • Use with caution in individuals at risk for hypoglycemia, particularly if in combination with insulin.
Insulin (human) (SQ; regular insulin also available as inhaled formulation) **Insulin (analogs)** (SQ)	High to very high	Yes	Gain	Neutral	Neutral	Neutral	• Lower insulin doses required with a decrease in eGFR; titrate per clinical response	Unknown	• Injection site reactions • Higher risk of hypoglycemia with human insulin (NPH or premixed formulations) vs. analogs • Risk of hypoglycemia and duration of activity increases with the severity of impaired kidney function. • Refer to device-specific instructions for insulins compatible with different delivery systems (i.e., pumps, connected insulin pens, insulin patches).

American Diabetes Association Professional Practice Committee; 9. Pharmacologic Approaches to Glycemic Treatment: Standards of Care in Diabetes—2025. Diabetes Care 1 January 2025; 48 (Supplement_1): S181–S206 Download Citation

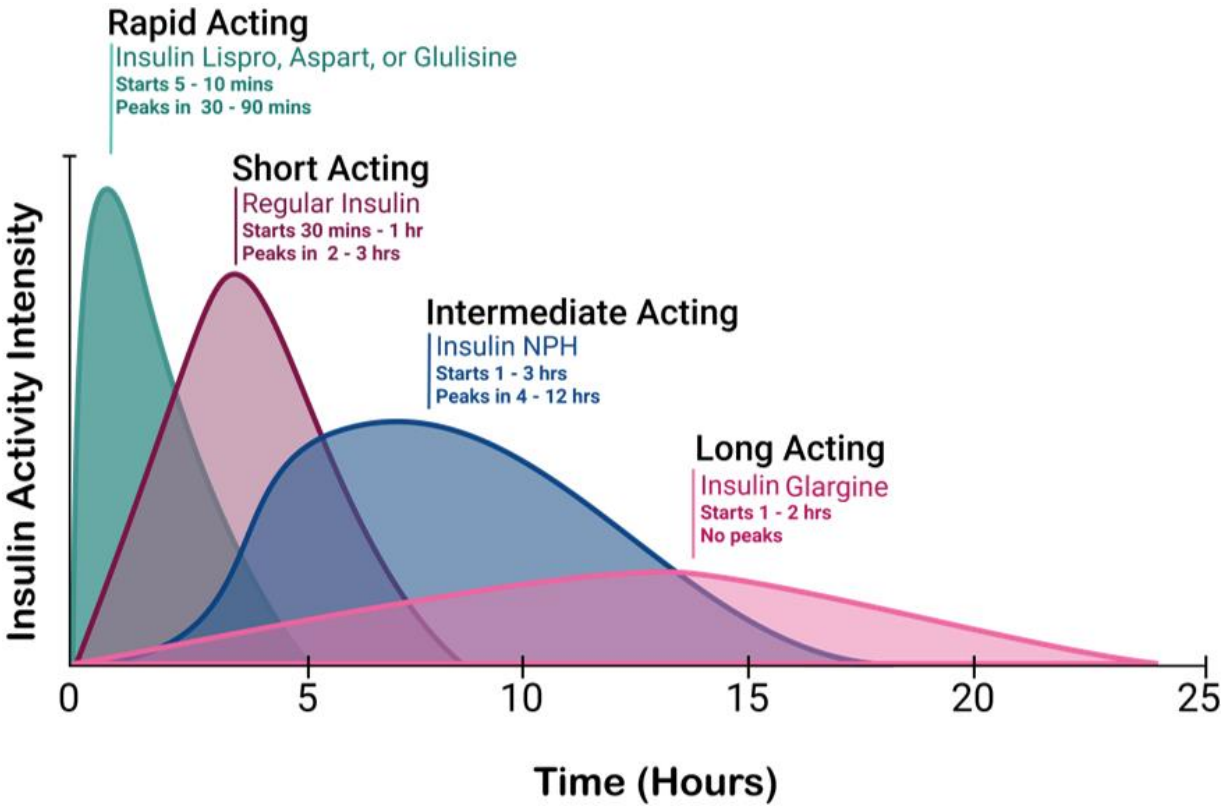
What You Need to Know About Insulin Types and Timing

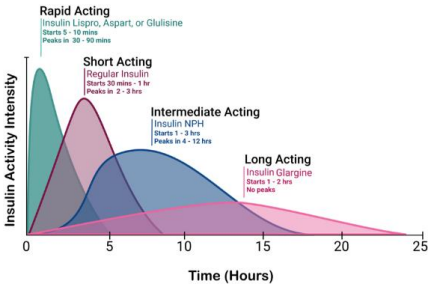
Goal of insulin therapy is to mimic physiological insulin release



Handbook of Diabetes, 4th Edition, Excerpt #4: Normal Physiology of Insulin Secretion and Action Figure 5.19 profiles of plasma glucose and insulin concentrations in individuals without diabetes.

Profiles of Available Insulins





Cheat Sheet Updates based on 2025 Standards

Patient Assistance Program

AstraZeneca
AstraZeneca patient assistance program
Boehringer-Ingelheim
Boehringer-Ingelheim patient assistance program
Johnson & Johnson
Johnson & Johnson patient assistance program
Lilly
Lilly patient assistance program
Novo Nordisk
Novo Nordisk patient assistance program
Sanofi
Sanofi patient assistance program
Takeda
Takeda patient assistance program

Insulin Comparison Chart

Insulin Types (Brand Name)	Onset (Hours)	Peak Glycemic Effect (Hours)	Duration (Hours)
Ultra-Rapids			
Aspart (Fiasp)	2–5 Minutes	1–3 hours	3–5 Hours
Lispro-aabc U-100, 200 (Lyumjev)	1–15 Minutes	1 Hour	4–5 Hours
Rapid-Acting Insulins			
Insulin Lispro (Humalog) Concentrated Humalog U-200	15-30 Minutes	30-90 Minutes	≤5 Hours
Insulin Aspart (Novolog)	12-18 Minutes	30-90 Minutes	3-5 Hours
Insulin Glulisine (Apidra)	12-30 Minutes	30-90 Minutes	3-4 Hours
Insulin (oral inhalation - Afrezza)	15 Minutes	1 Hour	2.5-3 Hours
Short-Acting Insulins			
Insulin regular (Humulin R, Novolin R)	15-60 Minutes	2.5-5 (U-500 → 4-8)	5-8 (U-500 → 13-24)
Intermediate - Acting Insulins			
Insulin NPH (Humulin N, Novolin N)	1-2 Hours	4-12 Hours	12-16 Hours
Long-Acting Insulins			
Insulin Degludec (Tresiba)	30-90 Minutes	None	42 Hours
Insulin Glargine (Basaglar, Lantus, Semglee, Rezvoglar) **(Toujeo - U300)**	3-6 Hours 1-2 Hours	None None	20-26 Hours 36 Hours
Combination Insulins			
Insulin Aspart protamine suspension + Insulin Aspart (Novolog Mix 70/30)	11-20 Minutes	1-4 Hours	12-16 Hours
Insulin Lispro protamine + Insulin Lispro (Humalog Mix 75/25)	15-30 Minutes	1-6.5 Hours	12-16 Hours
Insulin NPH + Insulin Regular (Novolin 70/30)	30 Minutes	2-12 Hours	12-16 Hours

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Barriers to Insulin Interventions

The most common reasons why patients may not want to start insulin therapy include:

- Belief in personal failure, Concerns about complications, Lack of understanding, Social and work-life impact, and Trypanophobia (Express discomfort or fear associated with insulin injections)

Physicians can help manage patients with trypanophobia by employing several strategies:

Counsel patients:

- Explain to patients that the need for insulin may sometimes be temporary in cases of glucotoxocity (extremely high glucose values over 300 mg/dL).
- Provide information about paraphernelia needed for insulin injections, ideal timing of insulin doses, good hygiene and injection technique and safe disposal of needles
- **Be empathetic to patients fears, concerns, and answers questions especially regarding needle phobia.**

These strategies can help healthcare professionals provide better care to patients with trypanophobia, ensuring their safety, comfort, and well-being.

- **Insulin is too expensive:** Diabetes is expensive, particularly for patients who have limited drug coverage or no insurance at all.

Physicians can help manage patients with expenses showing **Empowering You** **which is the last page of their discharge paper work.** Where patients can search for and connect to support of *financial assistance, food pantries, medical care, and other free or reduced-cost help*.

These barriers can significantly impact the management of type 2 diabetes and the overall health outcomes of patients. It is crucial for healthcare providers to address these concerns and support patients in overcoming their reluctance to start insulin therapy.

Overcoming Barriers to the Initiation of Insulin Therapy
Current barriers to initiating insulin therapy in individuals with type 2 diabetes
Barriers to Insulin: Impact of Utilization Management on Access to Insulin

Hypoglycemia

LEVEL 1 HYPOGLYCEMIA

Glucose concentration of **54–69 mg/dL (3.0–3.8 mmol/L)**

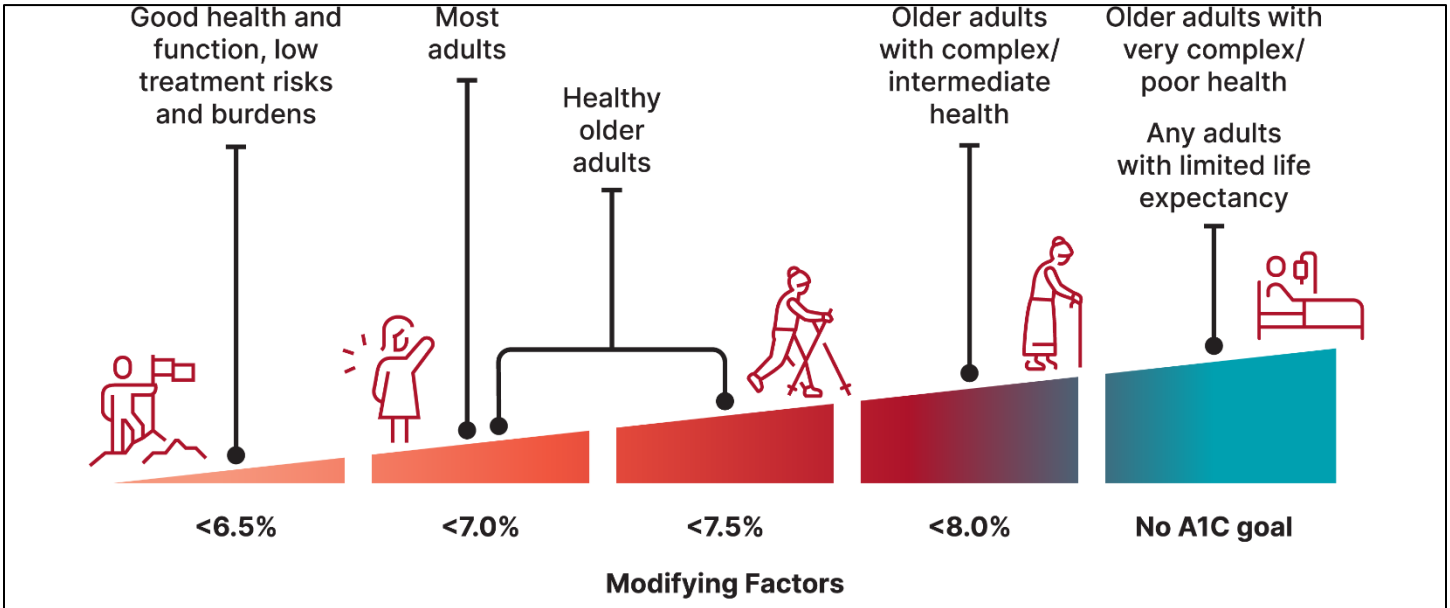
LEVEL 2 HYPOGLYCEMIA

Glucose concentration **<54 mg/dL (<3.0 mmol/L)**, which is typically the threshold for **neuroglycopenic symptoms**

LEVEL 3 HYPOGLYCEMIA

clinical event characterized by **altered mental** and/or **physical functioning that requires assistance from another person for recovery**

American Diabetes Association Professional Practice Committee; 6. Glycemic Goals and Hypoglycemia: *Standards of Care in Diabetes—2024*. *Diabetes Care* 1 January 2024; 47 (Supplement_1): S111–S125. https://doi.org/10.2337/dc24-S006



Modifying Factors

Favor more stringent goal	Favor less stringent goal
Short diabetes duration	Long diabetes duration
Low hypoglycemia risk	High hypoglycemia risk
Low treatment risks and burdens	High treatment risks and burdens
Pharmacotherapy with cardiovascular, kidney, weight, or other benefits	Pharmacotherapy without nonglycemic benefits
No cardiovascular complications	Established cardiovascular complications
Few or minor comorbidities	Severe, life-limiting comorbidities

Anesthesiology CGC Overview - Piedmont Empowered

Peri-Operative Management of Patients on SGLT-2 Inhibitors – Elective Procedures

Background

Disclaimer: This guideline has been developed by a multi-disciplinary group of subject matter experts. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.

In March 2022, the FDA updated a recommendation to include holding SGLT2 inhibitors prior to surgery due to increasing reports of euglycemic diabetic ketoacidosis (DKA). Surgery is a known risk factor for ketoacidosis, and case reports/series have demonstrated there is a risk of DKA in surgical patients taking an SGLT2 inhibitor.

Prior to Elective Procedure

Elective Procedure Type	Risk Level	Recommended Hold Time
Procedures requiring a total NPO window of LESS than 24 hours (excludes colonoscopy)	Low	Only at surgeon or anesthesia discretion
Colonoscopy	⚠ High	3 days + day of procedure
Procedures requiring a total NPO window of MORE than 24 hours	⚠ High	3 days + day of procedure

High Risk

- ✓ Surgeon will instruct patient to hold SGLT-2 inhibitor for FOUR DAYS prior to procedure (three days PLUS day of procedure).
- ✓ Surgeon and patient must coordinate with Primary Care or Endocrinologist to develop a bridge plan to prevent interim hyperglycemia. *Further guidance on bridge plans coming soon.*

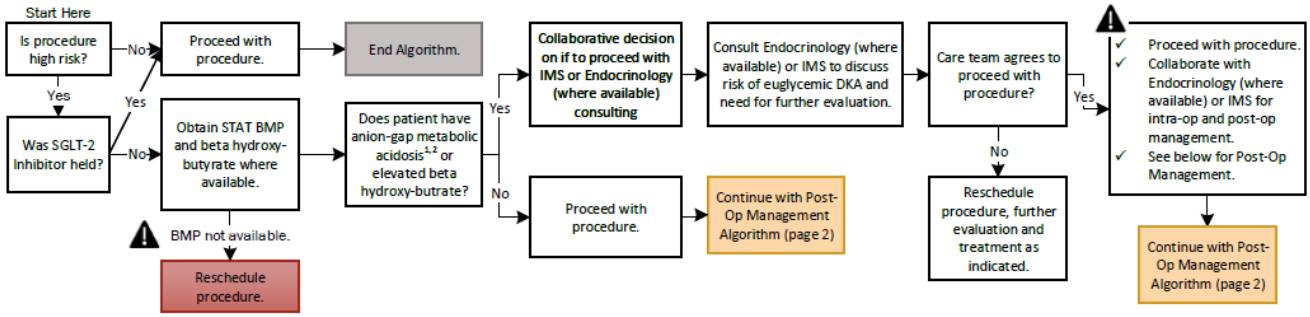
Low Risk

- ✓ Hold SGLT-2 at surgeon or anesthesia discretion

If undergoing a high-risk procedure, SGLT-2 Inhibitors should be held regardless of indication (diabetes, HF, renal, etc.).

- Canagliflozin (Invokana®)
- Canagliflozin/metformin (Invokamet®)
- Canagliflozin/metformin XR (Invokamet® XR)
- Dapagliflozin (Farxiga®)
- Dapagliflozin/metformin XR (Xigduo®)
- Dapagliflozin/metformin XR (Xigduo® XR)
- Dapagliflozin/saxaglipitin (Qtern®)
- Dapagliflozin/saxaglipitin/metformin (Qternmet® XR)
- Empagliflozin (Jardiance®)
- Empagliflozin/metformin (Synjardy®)
- Empagliflozin/metformin XR (Synjardy® XR)
- Empagliflozin/linagliptin (Glyxambi®)
- Empagliflozin/linagliptin/metformin XR (Trijardy® XR)
- Ertugliflozin (Steglatro™)
- Ertugliflozin/metformin (Segluromet™)
- Ertugliflozin/sitagliptin (Steglujan™)

Day of Procedure



Piedmont

Questions? Contact AnesthesiologyCGC@piedmont.org
More Information Available on The Village

[1]Anion-gap metabolic acidosis: bicarbonate < 18 mEq/L and anion gap > 12 (anion gap = Na – (Cl + HCO_3)
[2]If anion gap metabolic acidosis is based on i-STAT results, send STAT BMP to lab for confirmation

5/19/2022

Clinical Governance Council
Anesthesiology

Safety Alert: Perioperative Management of GLP-1 Receptor Agonist

The Concern

Long-acting glucagon-like peptide-1 receptor agonists (GLP-1 RA) injectables have become popular medications for the treatment of diabetes mellitus (DM) and weight loss.

An important mechanism of action for these medications is direct gastric stimulation of GLP-1 agonist receptors leading to **delayed gastric emptying and potential for retained gastric content in our patients presenting for procedures,** especially for those with peripheral neuropathy and gastroparesis as manifestation of DM.

Medications commonly used:
Dulaglutide (Trulicity) - weekly
Extended release (Bydureon) - weekly
Exenatide (Byetta) - twice daily
Semaglutide (Ozempic, Wegovy) - weekly
Liraglutide (Victoza, Saxenda) - daily
Lixisenatide (Adlyxin, Soliqua with insulin) - daily
Tirzepatide (Mounjaro, Zepbound) - weekly
Semaglutide (Rybelsus) - daily

The Ask

PAT Visit
Identify patients who are on GLP-1 RA medications and reiterate patient instructions prior to scheduling surgery

Patient Instructions

1. Hold the last dose of medication (day or week before, according to dosage)
2. Clear liquids 24 hours before procedure
3. NPO at midnight (oral medications with small sip of water day of surgery is okay)
4. Omit Gatorade/carbohydrate drink morning of surgery

Questions? Contact Us
E: AnesthesiologyCGC@piedmont.org
Visit our Village Page

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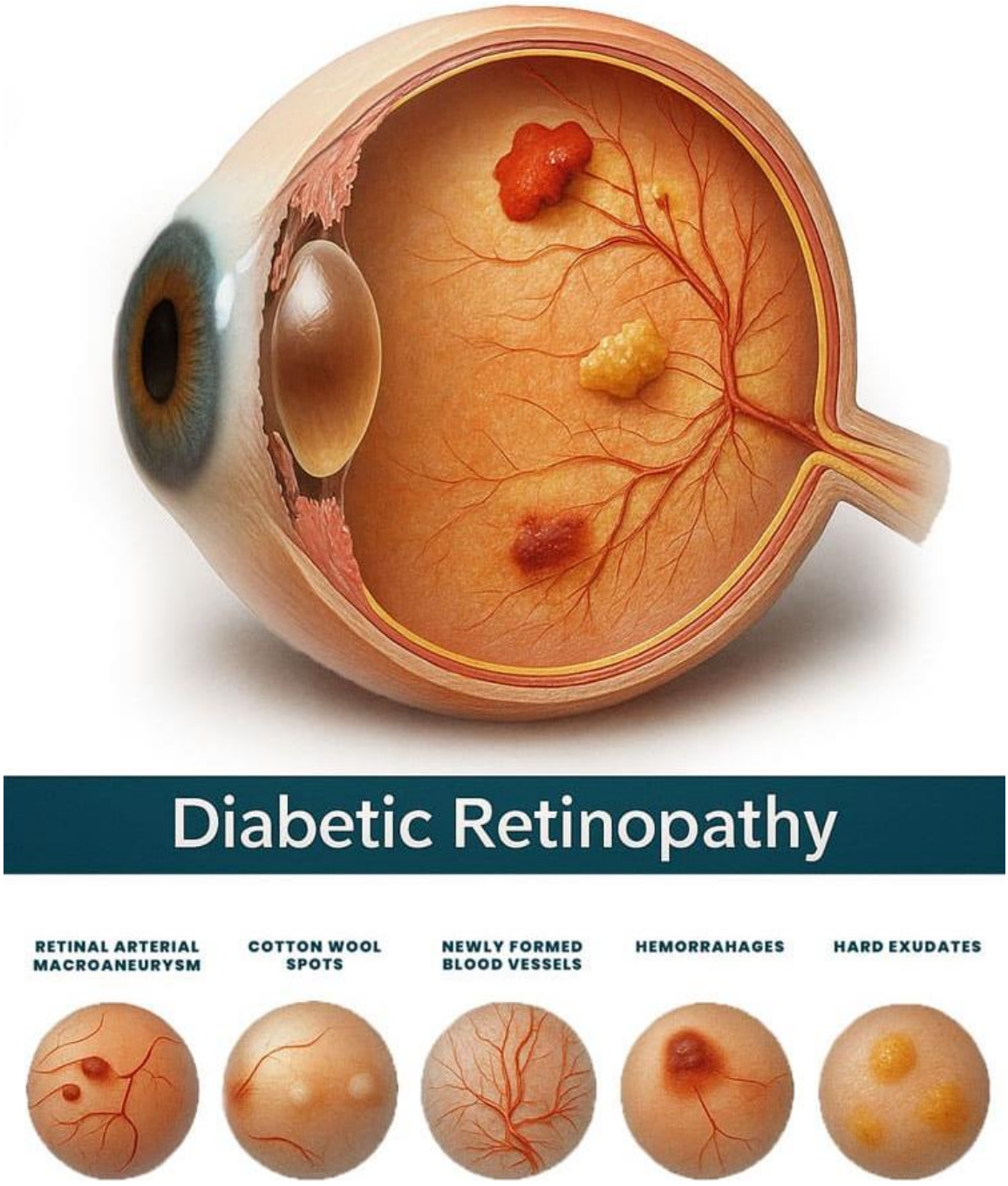
Preventive Care for All Diabetic Patients



- Annual eye exams are recommended for screening diabetic retinopathy in all diabetic patients but more frequently (usually every 3 months) if positive or during pregnancy.
- Placing **referrals** to ophthalmology or optometry in the EHR (rather than verbal communication to the patient) creates an open order for the specialist to receive and helps the specialist know where to send the reports.
- Pregnancy may worsen retinopathy and nephropathy. Additionally, they are both important indicators of small vessel disease and higher risk of fetal and maternal complications in pregnancy.

Nephropathy Screening

CHRONIC KIDNEY DISEASE

Screening

Recommendations

11.1a At least annually, urinary albumin (e.g., spot urinary albumin-to-creatinine ratio [UACR]) and estimated glomerular filtration rate [eGFR] should be assessed in people with type 1 diabetes with duration of ≥5 years and in all people with type 2 diabetes regardless of treatment. **B**

11.1b In people with established chronic kidney disease (CKD), urinary albumin (e.g., spot UACR) and eGFR should be monitored 1–4 times per year depending on the stage of the kidney disease (**Fig. 11.1**). **B**

CKD is classified based on: • Cause (C) • GFR (G) • Albuminuria (A)				Albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30–299 mg/g 3–29 mg/mmol	≥300 mg/g ≥30 mg/mmol
GFR categories (mL/min/1.73 m²) Description and range	G1	Normal or high	≥90	Screen 1	Treat 1	Treat and refer 3
	G2	Mildly decreased	60–89	Screen 1	Treat 1	Treat and refer 3
	G3a	Mildly to moderately decreased	45–59	Treat 1	Treat 2	Treat and refer 3
	G3b	Moderately to severely decreased	30–44	Treat 2	Treat and refer 3	Treat and refer 3
	G4	Severely decreased	15–29	Treat and refer* 3	Treat and refer* 3	Treat and refer 4+
	G5	Kidney failure	<15	Treat and refer 4+	Treat and refer 4+	Treat and refer 4+

Low risk (if no other markers of kidney disease, no CKD)
Moderately increased risk
High risk
Very high risk

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Nephropathy Screening

Recommendations

11.2 Optimize glucose management to reduce the risk or slow the progression of CKD. **A**

11.3 Optimize blood pressure control and reduce blood pressure variability to reduce the risk or slow the progression of CKD and reduce cardiovascular risk. **A**

11.4a In nonpregnant people with diabetes and hypertension, either an ACE inhibitor or an angiotensin receptor blocker (ARB) is recommended for those with moderately increased albuminuria (UACR 30–299 mg/g creatinine) **B** and is strongly recommended for those with severely increased albuminuria (UACR ≥300 mg/g creatinine) and/or eGFR <60 mL/min/1.73 m^2 to prevent the progression of kidney disease and reduce cardiovascular events. **A**

11.4b Periodically monitor for increased serum creatinine and potassium levels when ACE inhibitors, ARBs, and mineralocorticoid receptor antagonists are used, or for hypokalemia when diuretics are used. **B**

11.4c An ACE inhibitor or an ARB is not recommended for the primary prevention of CKD in people with diabetes who have normal blood pressure, normal UACR (<30 mg/g creatinine), and normal eGFR. **A**

11.4d Do not discontinue renin-angiotensin system blockade for mild to moderate increases in serum creatinine (≤30%) in the absence of signs of extracellular fluid volume depletion. **A**

11.5a For people with type 2 diabetes and CKD, use of a sodium–glucose cotransporter 2 (SGLT2) inhibitor is recommended to reduce CKD progression and cardiovascular events in individuals with eGFR ≥20 mL/min/1.73 m^2 and urinary albumin ≥200 mg/g creatinine. **A**

11.5b For people with type 2 diabetes and CKD, use of an SGLT2 inhibitor is recommended to reduce CKD progression and cardiovascular events in individuals with eGFR ≥20 mL/min/1.73 m^2 and urinary albumin ranging from normal to 200 mg/g creatinine. **B**

11.5c For cardiovascular risk reduction in people with type 2 diabetes and CKD, consider use of an SGLT2 inhibitor (if eGFR is ≥20 mL/min/1.73 m^2), a glucagon-like peptide 1 agonist, or a nonsteroidal mineralocorticoid receptor antagonist (if eGFR is ≥25 mL/min/1.73 m^2). **A**

11.5d As people with CKD and albuminuria are at increased risk for cardiovascular events and CKD progression, a nonsteroidal mineralocorticoid receptor antagonist that has been shown to be effective in clinical trials is recommended to reduce cardiovascular events and CKD progression (if eGFR is ≥25 mL/min/1.73 m^2). Potassium levels should be monitored. **A**

11.6 In people with CKD who have ≥300 mg/g urinary albumin, a reduction of 30% or greater in mg/g urinary albumin is recommended to slow CKD progression. **C**

11.7 For people with non–dialysis-dependent stage G3 or higher CKD, dietary protein intake should be aimed to a target level of 0.8 g/kg body weight per day. **A** For individuals on dialysis, 1.0–1.2 g/kg/day of dietary protein intake should be considered since protein energy wasting is a major problem in some individuals on dialysis. **B**

11.8 Individuals should be referred for evaluation by a nephrologist if they have continuously increasing urinary albumin levels and/or continuously decreasing eGFR and/or if the eGFR is <30 mL/min/1.73 m^2. **A**

11.9 Promptly refer to a nephrologist for uncertainty about the etiology of kidney disease, difficult management issues, and rapidly progressing kidney disease. **B**

American Diabetes Association Professional Practice Committee; 11. Chronic Kidney Disease and Risk Management: Standards of Care in Diabetes—2024. Diabetes Care 1 January 2024; 47 (Supplement_1): S219–S230. https://doi.org/10.2337/dc24-S011

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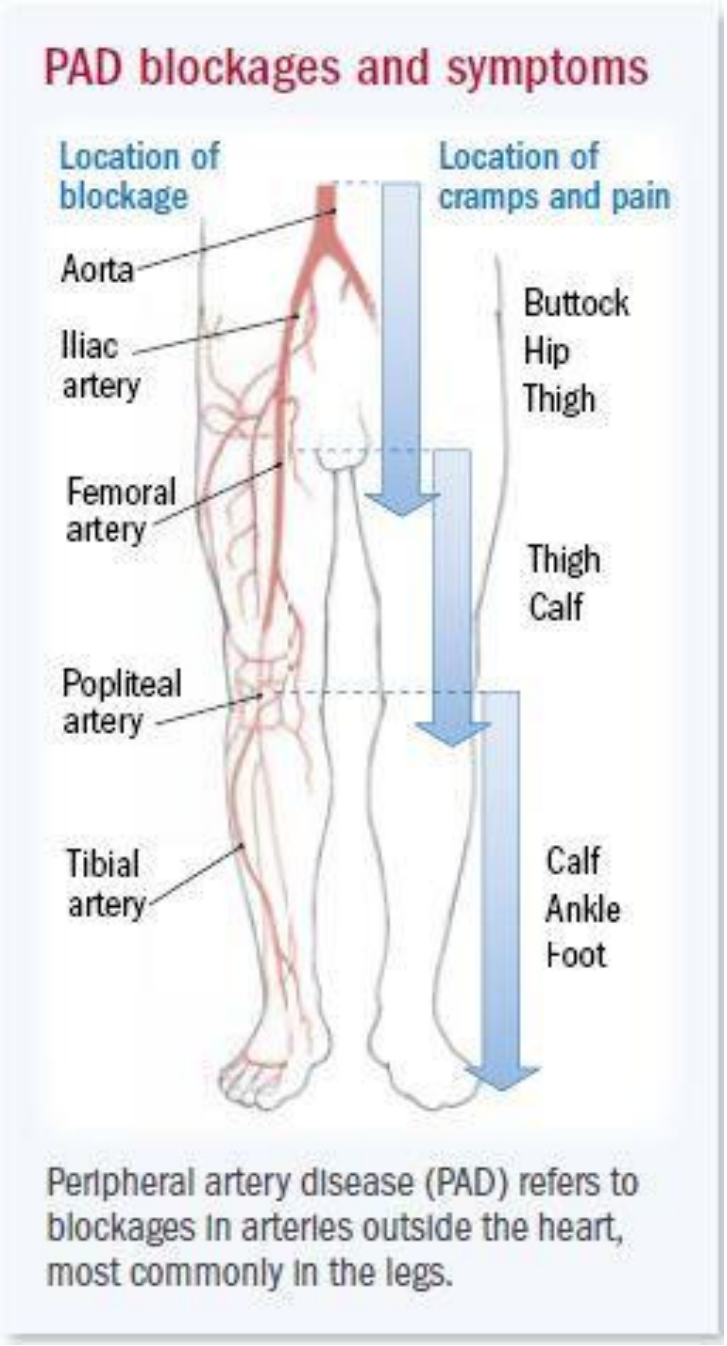
Peripheral Artery Disease (PAD) Screening

PAD screening is recommended by the ADA for:

- Diabetics who are asymptomatic and 50 years old or older
- Microvascular disease in any location
- Foot complications or any end organ damage from diabetes
- Patients who have had diabetes for 10+ years



Importance of Screening:

•Early detection and treatment of PAD can help prevent complications, such as amputation, heart attack, and stroke.

Risk Factors

•High blood pressure
•High cholesterol
•Diabetes
•Smoking
•Family history of PAD

Symptoms of PAD:

•Leg pain or cramping when walking or exercising
•Numbness or tingling in the legs
•Cold feet
•Foot ulcers that do not heal
•Diminished pedal pulses
•Erectile dysfunction in men
•Shiny, smooth skin on legs
•Thinning hair on legs

Types of PAD Screening Tests:

•**Ankle-Brachial Index (ABI):** This is a non-invasive test that compares the blood pressure in the arms and legs. An ABI of less than 0.9 indicates possible PAD.

If patient has any symptoms, then order:

•**Arterial Doppler Ultrasound:** This test uses sound waves to visualize the arteries in the legs and detect blockages.

•**Toe Brachial Index (TBI):** When ABI is unreliable (ABI ≥1.4) but compares blood pressure in the toes and arms.

Treatment for PAD:

- Treatment for PAD depends on the severity of the condition. Options may include:
  - Lifestyle changes, such as quitting smoking and exercising.
  - Medications to improve blood flow.
  - Angioplasty or surgery to open blocked arteries.
  - Referral to vascular specialist for evaluation of treatment options

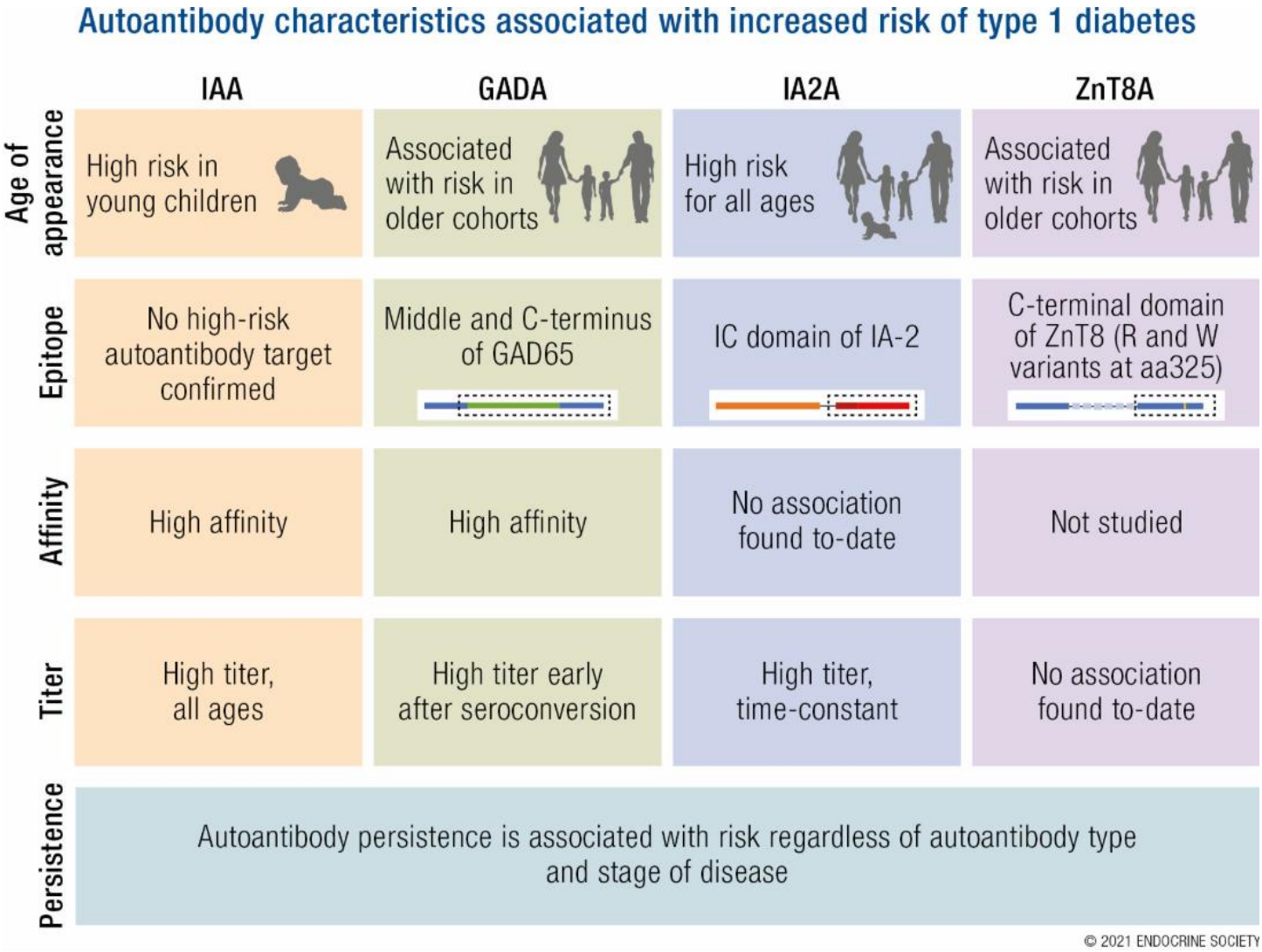
Recommended Vaccines for Adults with Type 2 Diabetes

VACCINE	RECOMMENDED AGES	SCHEDULE
COVID-19	Age ≥ 65 or 19-64 with underlying conditions such as Diabetes	One dose annually for those eligible
Hepatitis B	People <60 years of age People ≥60 years of age based on clinician's risk assessment	—
Influenza	Recommended for all 6 months of age and older. The live attenuated (nasal spray) vaccine should not be used.	Annual
Pneumonia (older vaccine: PPSV23)	19–64 years of age ≥65 years of age	• If received PCV15, follow with PPSV23 after ≥1 year• PPSV23 is not indicated after PCV20 or 21• Adults who received only PPSV23 may receive PCV15 or PCV20 ≥1 year after their last dose • One dose is recommended for those who previously received PCV13• If PCV15 was used, follow with PPSV23 ≥1 year later• PPSV23 is not indicated after PCV20
Pneumonia (newer vaccines: PCV 15, PCV 20, PCV21)	Adults 19–49 years of age with an immunocompromising condition (e.g., chronic renal failure, cochlear implant, or cerebrospinal fluid leak) or ALL adults 50 and over	One dose of PCV21 is recommended by the CDC
RSV	Adults ≥50 years of age with diabetes or other underlying high-risk complications	May receive a single dose of an RSV vaccine
Tetanus, diphtheria, pertussis (Tdap)	• All adults• Pregnant individuals should have an extra dose	Booster every 10 years
Zoster	≥50 years of age	Two doses, even if previously vaccinated

ADA (2025): Protect People with Diabetes with the Recommended Vaccines Downloadable Resources

When to Check for Antibodies for Type 1

(FAMILY HISTORY/A1c NOT IMPROVING) OR LADA (A1c NOT IMPROVING DESPITE INTENSIFICATION WITH NON-INSULIN THERAPY AND COMPLIANCE)



Michelle So, Cate Speake, Andrea K Steck, Markus Lundgren, Peter G Colman, Jerry P Palmer, Kevan C Herold, Carla J Greenbaum, Advances in Type 1 Diabetes Prediction Using Islet Autoantibodies: Beyond a Simple Count, Endocrine Reviews, Volume 42, Issue 5, October 2021, Pages 584–604,
https://doi.org/10.1210/endrev/bnab013
https://academic.oup.com/edrv/article/42/5/584/6243826

When the Antibodies are DETECTED

- Closely monitor the patient's serum C-peptide levels to measure endogenous insulin production
- Transition them to insulin therapy as pancreatic insulin production declines over time
- If any of the 4 antibodies are detected, refer to endocrinology

ADA recommends screening adults and children at risk for autoimmune DM

- Relatives who have type 1 diabetes (1st degree family have 15x greater risk)
- Personal or family history of autoimmune disease - Hashimotos disease, Graves, celiac disease
- Anyone with abnormal glucose at first dysglycemia (e.g. pre-diabetes); especially in those without a family history of type 2 diabetes

Antibodies include:

- Glutamic acid decarboxylase 65 AAB (GADA)
- Insulinoma-associated antigen 2 AAb (IA-2A)
- Insulin AAb (IAA)
- Zinc transporter-8 AAb (AnT8A)

When to Refer to Endocrinologist

- All patients with type 1 diabetes should be referred to Endocrinology
- Type 2 diabetes patients who are on 3 diabetes medications with an A1c ≥9% should be considered for referral to Endocrinology
- If a primary care provider has exhausted their knowledge and treatment options
- If the patient is not responding to current treatments or is experiencing complications

Continuous Glucose Monitors (CGMs)

Early initiation after a diagnosis of diabetes is often recommended to improve glycemic control and quality of life. CGMs can be helpful for those with prediabetes but are not generally covered by insurance, consider OTC like Stello.

For newly diagnosed individuals

- **After diagnosis:** It is recommended to start using a CGM as soon as possible after being diagnosed with diabetes, especially type 1. Most insurance plans generally will cover CGMs in all insulin users
- **Benefits:** Early use can lead to better glycemic control and a higher quality of life, improved glycemic control, improves compliance, reduced hypoglycemia, allows for timely interventions, less "fear of lows", and reduced physical discomfort compared to fingerstick
- **Support:** Your healthcare provider will help you with the setup and answer questions, as seen in this article from UW Health.

***Treatment Goal*:** Maximize Time in Range (TIR) over 70% of the day to keep within glucose 70-180 mg/dL.

Key CGM Targets

Time in Range (70–180 mg/dL): >70% of readings (>17 hours/day).

Time Below Range (<70 mg/dL): <4% of readings (<1 hour/day).

Time Below Range (<54 mg/dL): <1% of readings (<15 mins/day).

Time Above Range (>180 mg/dL): <25% of readings (<6 hours/day).

Time Above Range (>250 mg/dL): <5% of readings (<1 hour/day).

Important Considerations

- **Individualization:** Targets may be tighter or more relaxed based on factors like age, comorbidities, and presence of hypoglycemia unawareness.
- **Pregnancy (Type 1): Target range is typically 63–140 mg/dL, with a goal of >70% time in this range.**
- **Older/High-Risk Adults:** A, time-in-range target of >50% within 70–180 mg/dL is often recommended.
- **Monitoring:** The recommended CGM wear time is at least 15 days to properly evaluate metrics.

Possible Aid for Detecting Hypoglycemic Events during Insulin Tolerance Tests

Who Should Use a Continuous Glucose Monitor?

Clinical Guidance and Targets for Time In Range

Types of CGMs

CGM	Freestyle Libre 2 Plus	Freestyle Libre 3 Plus	Dexcom G6	Dexcom G7
Duration of wear	15 days	15 days	10 days	10 & 15 days
Calibration needed?	No	No	No	No
Alarms	Low <70mg/ dL and High >180 mg/ dL	Low <70mg/ dL and High >180 mg/ dL	Low and High, predictive low/high, rate of change	Low and High, predictive low/high, rate of change
Insulin pump integration	Yes, with Omnipod 5, Tandem Mobi	No	Yes, with Tandem Mobi Libre 3	Yes, with Tandem Control IQ and Mobi, Omnipod 6
Approved for use in pregnancy?	Yes	Yes	No	Yes
Share features for providers	Libreview	Libreview	Dexcom Clarity	Dexcom Clarity
Method of insertion	Self-Inserted	Self-Inserted	Self-Inserted	Self-Inserted

Over the Counter (OTC) CGMs

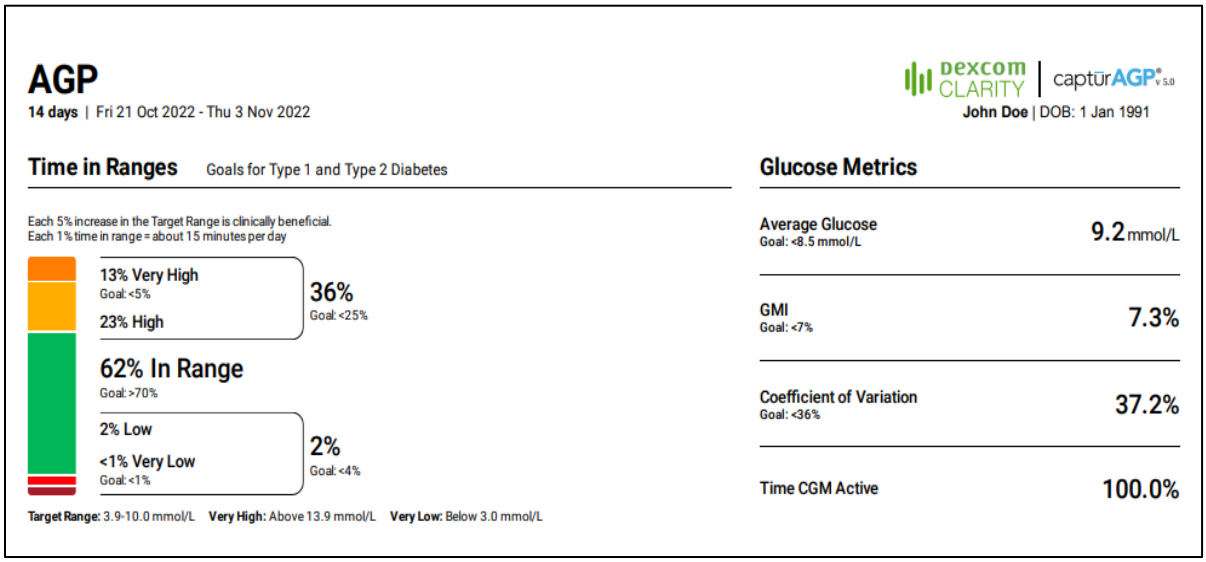
OTC CGMs are now available for purchase. They are not covered by insurance and are designed for adults (≥18) who do not use insulin, do not have hypoglycemia, those with type 2 diabetes, on oral medication, or those without diabetes who want to track their glucose levels for health insights.

Available OTC CGMs (lack the alarms for dangerously low blood glucose levels)

- Dexcom Stelo: The first to be FDA-cleared for OTC use, 15.5 days, and range 70-250 mg/dl
- Abbott Lingo: Also received FDA clearance and is available, 15 days, and range 40-400 mg/dl
- Abbott Libre Rio: Received FDA clearance but has not been commercially launched yet, 14 days, and range 55-200 mg/dl

CGM Interpretation Example

Patient John Doe is on a multiple daily insulin regimen and has an estimated HbA1c of 7.3 per GMI value. The Ambulatory Glucose Profile (AGP) breakdown shows that this patient's TIR is only 62%, 36% above goal of 180 mg/dL and 2% in the hypoglycemia range below 70 mg/dL. The goal of therapy is to achieve TIR over 85% and 0% hypoglycemia. The clinician should counsel the patient to prevent hypo- and hyperglycemia by reviewing proper insulin administration techniques, review correct timing of insulin (mealtime insulin ideally should be taking 10-15 minutes before meal to prevent post-meal spikes and basal insulin should be taken at the same time every day), and reduce basal insulin dose if fasting hypoglycemia is noted or prandial insulin if post meal hypoglycemia is noted. Look for these 5 or ten things as they will mean this to you



Instructional Videos

Insulin pen instructions: https://www.youtube.com/watch?v=LQwxNS7ny0E

Dexcom G7 Receiver: https://www.youtube.com/watch?v=2A6CQfC0KUc&t=31s

Dexcom G7 app: https://www.youtube.com/watch?v=FFqRjansCXs

Libre 3 app: https://www.youtube.com/watch?v=zlDRGD0Rprc

Ozempic video: https://www.youtube.com/watch?v=KGB0h51DaiY&t=7s

CGMs Videos on Devices, Coverage, Wearing, and Interpretation

Devices: Time 11:24 https://www.brainshark.com/piedmont/vu?pi=zGvzaLDPvzrQ56z0

Cost and Coverage: Time 08:09 https://www.brainshark.com/piedmont/vu?pi=zGlz12CHpOzrQ56z0

Wearing the Device and Troubleshooting: Time 19:42
https://www.brainshark.com/piedmont/vu?pi=zJ3zdkgdjzrLMWz0

Interpretation: Time 13:21 https://www.brainshark.com/piedmont/vu?pi=zIQzRH6RyzppZkz0

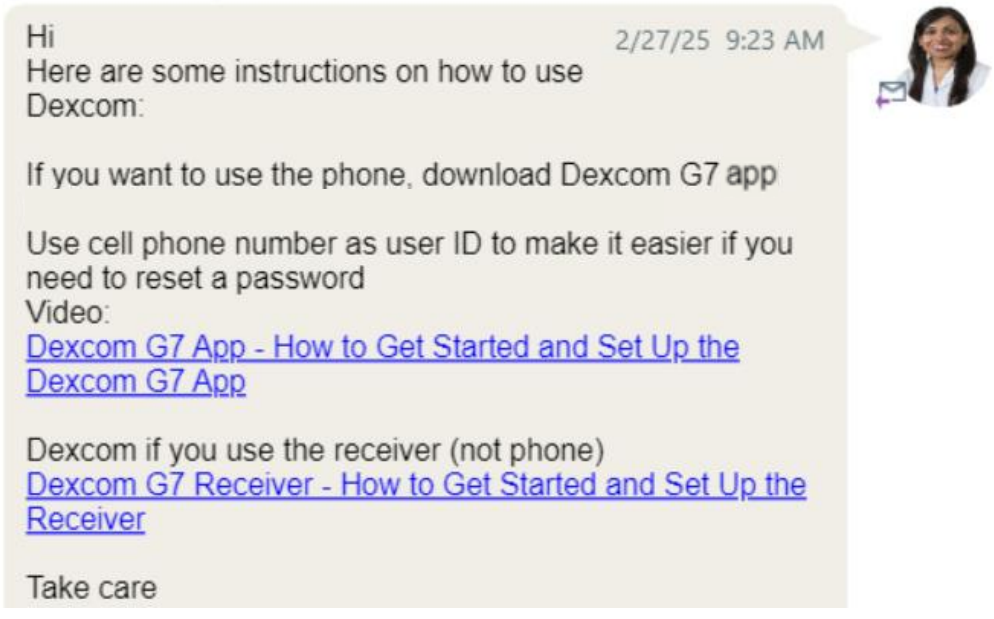
CGM Over counter, prescription, clarity app. How to analyze CGM data: A structured and practical approach

Dot Phrase

You can incorporate video links into your Dot Phrases

If your patient wants to use a phone app, download application

May use cell phone number as user ID to make it easier if you need to reset a password



Diabetes and Beyond - 2025 - Piedmont Healthcare - Continuing Education (CE)

Target Audience

Specialties - Family Medicine

Professions - Nurse, Physician, Physician Associate

Credits

AMA PRA Category 1 Credits™ (12.50 hours), AAPA Category 1 Credit(s) (1.25 hours), ANCC Contact Hour(s) (1.25 hours), Non-Physician Attendance (1.25 hours)

Accreditation

The learner must have a profile in CloudCME to register for the activity and claim credit.

JOINTLY ACCREDITED PROVIDER™
INTERPROFESSIONAL CONTINUING EDUCATION

In support of improving patient care, Piedmont Healthcare is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

In addition to AMA PRA Category 1 Credit ™ for physicians, ANCC credit for nurses, and ACPE credit for pharmacists, Piedmont Healthcare also offers AAPA Category 1 Credit for PAs, APA credit for psychologists, ASWB ACE credit for social work, BOC credit for athletic trainers, CPEU CDR credit for dietitians, and IPCE credit.

Session Overview:

Section 1: Screening; diagnosis; glycemia targets; glycemic monitoring

Section 2: Managing comorbidities – obesity; hypertension; dyslipidemia; retinopathy, neuropathy, DM-related DKD/CKD, and CVD

Section 3: Managing prediabetes, T2D, and T1D –choosing glycemic targets, lifestyle interventions, oral/injectable medication (insulin therapy in T1D)

Section 4: Vaccine review in persons with DM – recommendations and CGM review

PiedmontU

There are several educational opportunities within PiedmontU. Such As: *Understanding Diabetes for Nurses, Understanding Diabetes - for Healthcare Assistants, Patient Teaching: Diabetes, and Live Classes*.

TROUBLESHOOTING TIPS IF YOU ARE HAVING DIFFICULTY WITH COURSES IN PIEDMONT U:

- If you are working remotely, the best way to access PiedmontU is to go directly to Piedmont University - Remote Link without going through CITRIX.
- Be sure to use a desktop/laptop when completing courses. Do not use a Smart phone.
- If you are working on courses that will not load and/or freeze, please ensure your pop-up blockers are off and that you are using Microsoft Edge/Chrome as your web browser.
- You may also try the following:
    - Turn Pop Up Blockers off
    - Clear your Browsers Cache

- Ensure Browser is updated with the most recent version (use Microsoft Edge/Chrome)