



DIABETES AND HEALTHY AGING: PROMOTING HEALTHY BEHAVIORS AND INDEPENDENCE AT EVERY AGE

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Disclosures

I have no financial disclosures or conflicts of interest

Objectives

- Describe the impact of diabetes on aging and barriers to self-care.
- Identify factors that promote healthy aging and how to support them.
- Employ new strategies to introduce tools for diabetes self-management based on identified aging barriers.

Diabetes and Aging

- Impact of diabetes and aging related to age at diagnosis and disease duration
- Glycemic control plays a part
- “May we all live long enough to have some pancreatic poop-out” aka as we age we lose beta cell function, increased insulin resistance, and decrease in mitochondrial activity.
- Diabetes can accelerate the aging process as well
 - Over 29% of individuals 65 years and older have diabetes

Impact of Diabetes

- Diabetes CAN accelerate traditional aging aspects:
 - cognitive impairment
 - Depression
 - urinary incontinence
 - Falls
 - Frailty
 - functional disability
 - accelerated muscle loss
- Age of diagnosis plays a part:
 - **Earlier diagnosis (ages 50-59) confers substantially higher relative risks** for heart disease, stroke, disability, and cognitive impairment compared to later diagnosis (≥ 70 years)

What are we doing about it?

- The American Diabetes Association recommends comprehensive assessment of medical, psychological, functional, and social domains in older adults, with annual screening for geriatric syndromes.
 - Eye exam
 - Dental care
 - Foot checks
 - FIB4/Liver health
 - Annual health exam
 - Assessment of home/social situation
 - Minicog
 - 3-word registration
 - Clock drawing test
 - 3-word recall

Glycemic Targets: A guideline

- **Healthy older adults** (few chronic illnesses, intact cognitive and functional status): A1C 7.0–7.5% or time in range $\geq 70\%$ with time below range $\leq 4\%$
- **Complex/intermediate health** (multiple chronic illnesses, ≥ 2 ADL impairments, or mild-moderate cognitive impairment): A1C 8.0% or time in range $\geq 50\%$ with time below range 1%, prioritizing avoidance of hypoglycemia
- **Very complex/poor health** (end-stage chronic illnesses, moderate-severe cognitive impairment): Avoid reliance on A1C; focus on preventing hypoglycemia and symptomatic hyperglycemia

Hypoglycemia risk considerations

- The ADA recommends selecting medications with **low hypoglycemia risk** for older adults, particularly those with risk factors for hypoglycemia.
 - Deintensify or simplify regimens wherever possible
 - What medications should be avoided?
 - Should you avoid GLP1 or SGLT2s?
- Older adults should be routinely assessed for hypoglycemic episodes at each visit
- Glucose sensors should be considered for any patient on insulin
- Does your patient have glucagon at home?

Medication use in older populations

- The selection of glucose-lowering medications in older adults requires a **comorbidity-driven approach** rather than focusing solely on glycemic control.
- For older adults with established atherosclerotic cardiovascular disease, heart failure, or chronic kidney disease, SGLT2 inhibitors and/or GLP-1 receptor agonists with proven cardiovascular benefit should be initiated independent of A1C level.
- **Renal function is a critical determinant** of medication selection and dosing in older adults with diabetes

Medications by class

- **Metformin:** Should not be initiated if $\text{eGFR} < 45 \text{ mL/min/1.73 m}^2$; dose should be reduced when eGFR falls below $45 \text{ mL/min/1.73 m}^2$, and discontinued when $\text{eGFR} < 30 \text{ mL/min/1.73 m}^2$.
- **SGLT2 Inhibitors:** Can be initiated if $\text{eGFR} \geq 20 \text{ mL/min/1.73 m}^2$ for kidney and cardiovascular protection, though glucose-lowering efficacy declines when eGFR falls below $45 \text{ mL/min/1.73 m}^2$.
- **GLP-1 Receptor Agonists:** Most agents (semaglutide, dulaglutide, liraglutide) are effective regardless of kidney function with low hypoglycemia risk.
- **DPP-4 Inhibitors:** Can be used regardless of kidney function, appetite, or weight status, though some require dose adjustment based on eGFR .
- **Sulfonylureas and Insulin:** Should be used sparingly in older adults with CKD due to high hypoglycemia risk, particularly as eGFR declines.

The 4S Pathway provides a structured approach to deprescribing:

- **Seeking triggers:** Identify hypoglycemia, cognitive decline, functional impairment, or high treatment burden
- **Shared decision-making:** Collaborate with patients to align treatment with values and preferences
- **Setting and resetting goals:** Individualize glycemic targets based on health status
- **Simpler and safer medications:** Reduce or discontinue hypoglycemia-causing agents



Cost: the missing variable

Cost may affect your patient's selection or de-selection of treatments

Asking about cost and prioritizing the most beneficial treatments may assist with this

Glucose sensors may be covered under part B of Medicare and may help reduce cost by using a DME company

Glucagon cost may make this prohibitive

Use the end of the year (after deductible has been met) as a time to make sure your patient has their glucagon!

Physical Activity

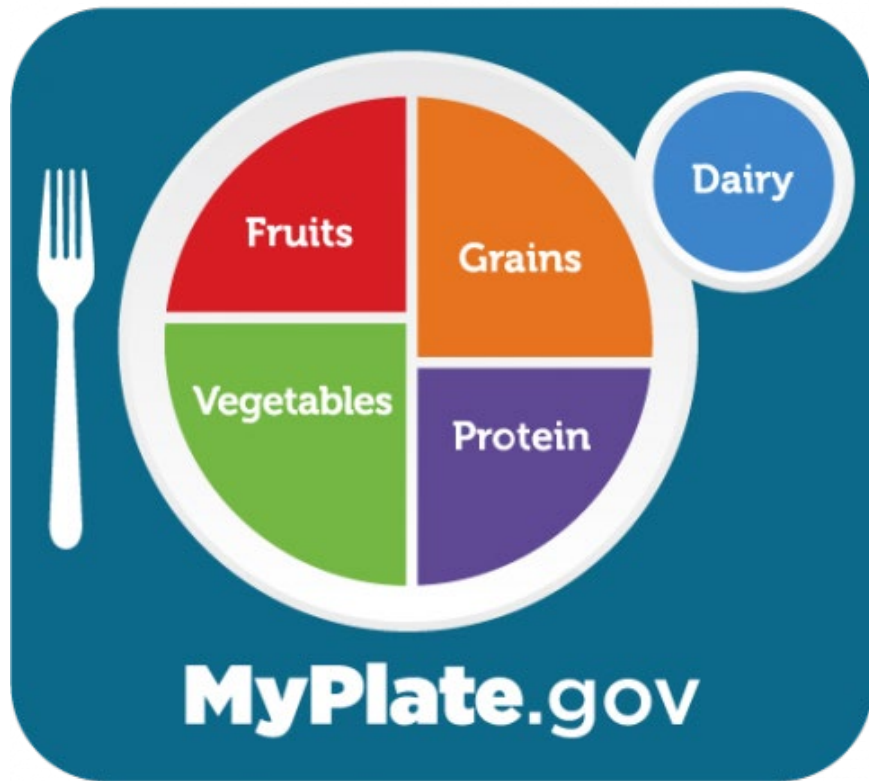


Physical Activity: The Cornerstone Intervention

What is best?

Combined aerobic and resistance exercise is the most effective intervention for promoting healthy aging in older adults with diabetes, with benefits across glycemic control, cardiovascular risk, physical function, and frailty prevention.

Dietary Intake



- **Adequate protein intake combined with resistance exercise is essential** to counteract the accelerated sarcopenia seen in diabetes.
- **Protein Minimum:** 0.8 g/kg body weight/day to maintain lean body mass
- **Per-meal distribution:** 25-30 g protein per meal to maximize muscle protein synthesis
- **Vitamin D:** Maintain adequate levels; associated with muscle strength
- **Omega-3 fatty acids:** May augment exercise benefits
- **Polyunsaturated fatty acids:** Prioritize as fat source for metabolic health
- **Malnutrition screening:** Essential given its association with sarcopenia, decreased ADLs, and cognitive decline

Strategies to Preserve Cognitive Function:



- Avoid both hyperglycemia (associated with cognitive decline) and hypoglycemia (associated with dementia risk)
- Intensive glycemic management (A1C <6.0-6.5%) has not shown cognitive benefits; moderate targets are preferred
- **GLP-1 receptor agonists** are associated with statistically significant reduction in all-cause dementia
- Blood pressure control and statin therapy are associated with reduced dementia risk
- Exercise may be a potential nonpharmacologic treatment for cognitive impairment in older adults with type 2 diabetes

Integrated Approach

Domain	Key Interventions	Evidence-Based Targets	References
Physical Activity	Combined aerobic + resistance training; balance exercises	≥ 150 min/week aerobic; 2-3 sessions/week resistance	[1-3]
Nutrition	Adequate protein; Mediterranean-style diet; malnutrition screening	1.0-1.5 g/kg/day protein; ≥ 30 kcal/kg/day	[4-6]
Glycemic Control	Individualized targets; avoid hypoglycemia; consider GLP-1 RAs	A1C 7.0-8.0% based on health status	[4, 7]
Cognitive Health	Annual screening; exercise; tai chi; cognitive training	MoCA or Mini-Cog annually after age 65	[4, 8-9]
Social Engagement	Leisure activities; social network; address social needs	Regular social contact; screen for isolation	[10-12]
Frailty Prevention	Multicomponent exercise + nutrition; CGA; medication optimization	Screen annually; combine interventions	[4, 13-14]

“SMART AGING”
USING
TECHNOLOGY

MULTI DOSE INSULIN



Continuous glucose monitors

What typically IS required is insulin use



What is not typically required:

Frequency of glucose
testing

Frequency of insulin use



A patient on insulin should have a glucose
sensor offered

The CGMs:

Eversense



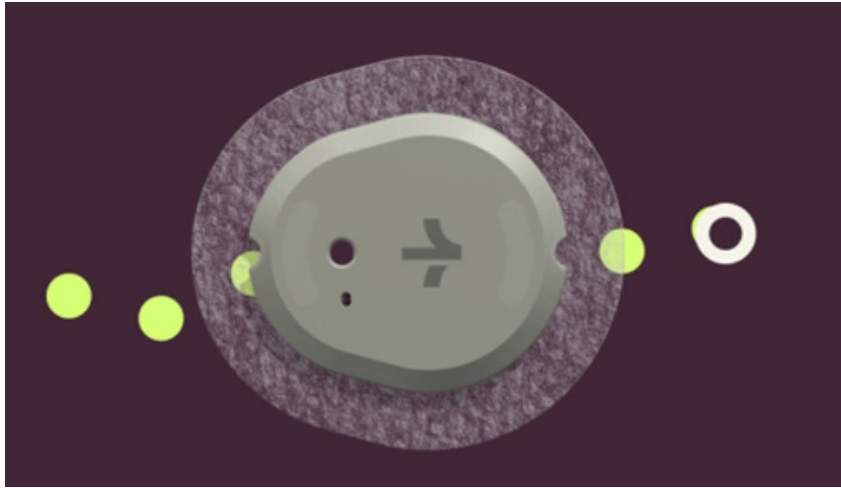
Ab bott Libre 3 plus

Dexcom G7

Guardian 4



CGMs available over the counter



Stelo by Dexcom

15 day wear

Not covered by insurance

Not intended for people on insulin

Cost: \$99/month - \$252/90 day subscription



Lingo by Abbott

15 day wear

Not covered by insurance

Not intended for people on insulin

Cost: \$89/month - \$249/90 day subscription

Another way to think about sensors:

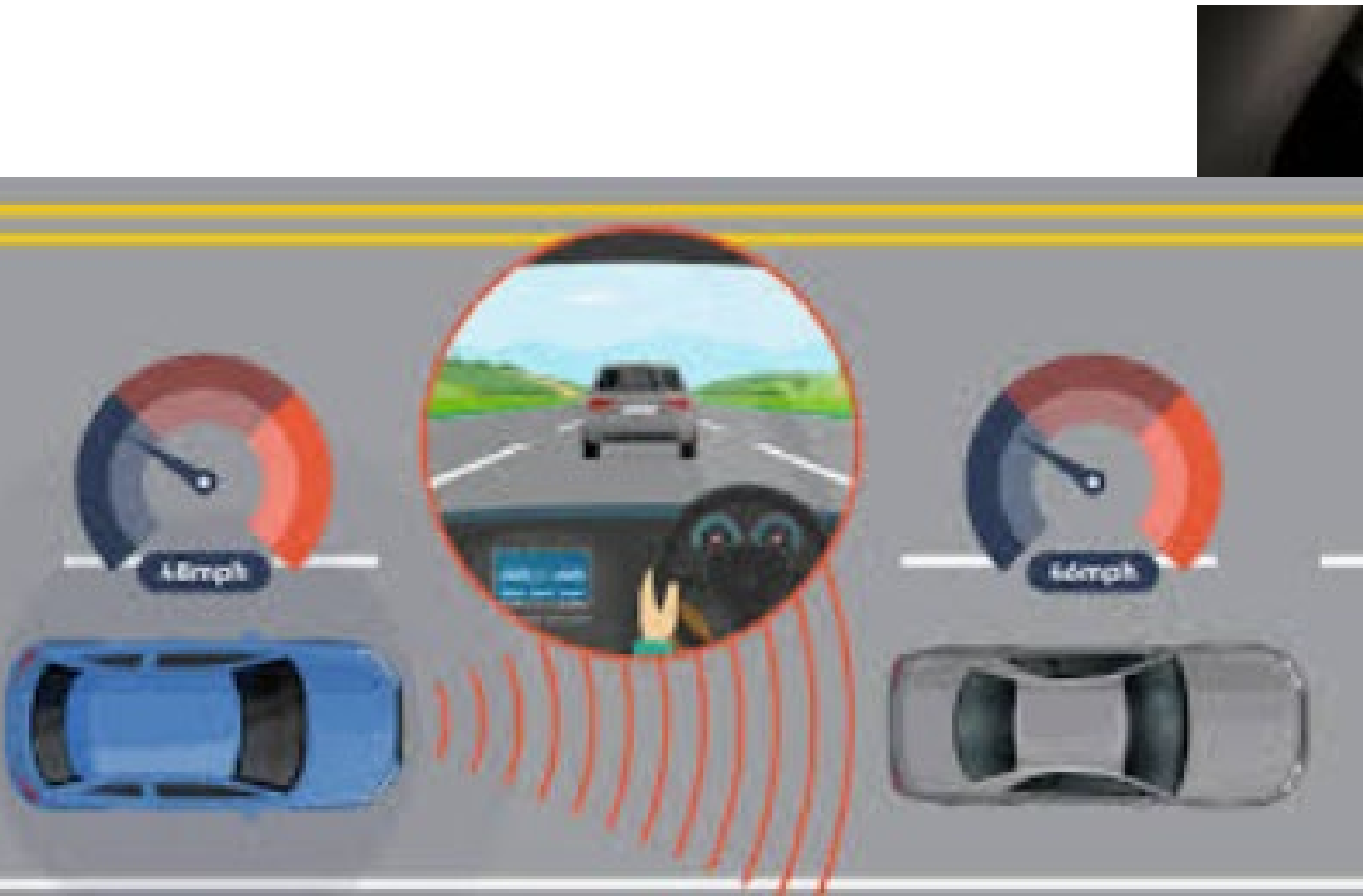
LOW TECH/NO PHONE

- Libre –with a reader
 - Libre 2 plus vs 3 plus
- Dexcom with a receiver

HIGH TECH/SMART PHONE

- Libre –phone interface
 - Share data with family/friends
- Dexcom –with a phone interface
 - Share data with family friends
 - Integration into other smart devices (watch, ring)
- Eversense (requires phone)

Insulin Pumps: Automated Insulin Delivery



Insulin Pumps

- **Insulin pump therapy (CSII) in type 2 diabetes provides superior glycemic control compared to multiple daily injections (MDI), with an HbA1c reduction of 0.4-0.7% greater than MDI, approximately 26% lower insulin requirements, and no increase in weight or hypoglycemia.**
- You do not have to de-intensify other therapies
 - Continuation of GLP1 or SGLT2 along with metformin utilized in trials
- **OpT2mise Trial (Landmark Study)**
 - The OpT2mise trial randomized 331 patients with poorly controlled type 2 diabetes (HbA1c 8-12%) despite optimized MDI to either CSII or continued MDI for 6 months.
 - **HbA1c reduction:** 1.1% with CSII vs 0.4% with MDI (between-group difference -0.7%, $p < 0.0001$)
 - **Insulin dose:** 97 units/day with CSII vs 122 units/day with MDI ($p < 0.0001$)
 - **Weight:** No significant difference between groups
 - **Safety:** No ketoacidosis in either group; one severe hypoglycemia episode in MDI group

Pumps on the market:



Omnipod: Pharmacy benefit and tubeless

MiniMed (formerly Medtronic)



Beta Bionics ILet



Tandem: X2 and Mobi



Who is a candidate?

- **Practical Considerations:**

- Capable of using devices safely (though notably, ~38% of OpT2mise pump users had mild cognitive impairment and still benefited)
- Realistic expectations of system capabilities
- Appropriate training and support available
- No requirement for advanced carbohydrate counting skills with AID systems

- **Guideline Recommendations**

- The **American Diabetes Association (2026)** recommends that insulin pump therapy be offered to individuals with type 2 diabetes taking MDI who are capable of using these devices safely



Cost of Pumps

For Medicare: If using part B (Medtronic, Tandem, Beta Bionics) Must have documentation showing positive antibodies or low C-peptide

For Medicare: If patient does not meet this criteria – Omnipod is through Part D only (Pharmacy benefit) and may be affordable

For Medicaid: Pumps are accessible and not cost prohibitive

For Commercial: Based on plan

Pump therapy may be an option

- Not all pumps are the same – different solutions may fit based on individual situation
- Patients in facilities need to be able to have family support of self-manage to some extent
- Not all pumps are “set it and forget it” need to be able to have someone checking in

Non-automated Insulin Delivery



CeQur

Mealtime insulin only

Every click delivers 2 units

4-day wear

Water resistant

Patient fills with up to 200 units
of insulin



V-Go

Replaces basal/bolus

Every click delivers 2 units (up to 36 units a day)

Basal rate set at 20, 30, or 40 units/day

1-day wear

Water resistant

Patient fills with up to 80 units of insulin

Smart Pens/Pen Caps

- **Medtronic InPen:** A reusable smart pen that uses cartridges of rapid-acting insulin (like Humalog, Novolog, and Fiasp). Its app is known for robust dose calculation and tracking of "active insulin" in your body.
- **NovoPen Echo Plus:** A reusable pen from Novo Nordisk that supports personalized management for users of their traditional durable pens.



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