Diabetes Education SERVICES™ | LIVE SEMINAR www.DiabetesEd.net

- From Fundamentals to Advanced Diabetes Practice

- Beverly Thomassian, RN, MPH, BC-ADM, CDCES
- Pronouns: She, her and hers
  Founder - www.DiabetesEd.net

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Partners for Advancing Clinical Education

Diabetes Education SERVICES

Joint Accreditation Statement

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Type of Activity: Application

Dietitian Continuing Education

This program offers 8 CPEUs for dietitians.

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2. Sign Up or Log in.
3. Complete the activity evaluation.
4. Upon completion of all evaluation questions your credit will be made available for download immediately.

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Coach Bev has no Conflict of Interest

- She's not on any speaker's bureau.
- Does not invest or have any financial relationships with diabetes related companies.
- Gathers information from reading package inserts, research and articles.
- The ADA Standards of Medical Care is main resource for course content.

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Conflict of Interest

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Faculty	Financial Relationships
Beverly Thomassian	Has no relevant financial relationships.

Diabetes Management: From Fundamentals to Advanced Practice

Objectives:

- Review the changes & updates to the annual ADA *Standards of Medical Care in Diabetes.*
- Identify the key elements of the standards that improve clinical care for people with diabetes.
- Review and discuss appropriate use of the latest medications that address hyperglycemia and cardiorenal health.
- Describe strategies to incorporate lifestyle changes into diabetes self-management.
- Share practical approaches to assess and address diabetes distress in clinical care.

17. Diabetes Advocacy

- People living with diabetes deserve to be free from the burden of discrimination.
- We need to all be a part of advocating to ensure a healthy and productive life for people living with diabetes.
- Decrease barriers to diabetes self-management.

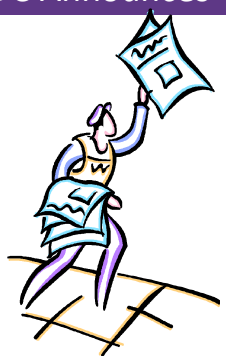
Diabetes Care needs to meet outlined standards in all settings.

- In school setting
- Young children in childcare
- For Drivers
- In work settings
- In Detention Facilities
- Insulin Access & Affordability

17. Diabetes Advocacy: Standards of Care in Diabetes—2025

American Diabetes Association Professional Practice Committee

CDC Announces



35% of Americans will have Diabetes by 2050

Boyle, Thompson, Barker, Williamson
2010, Oct 22:8(1)29
www.pophealthmetrics.com

Poll Question 1

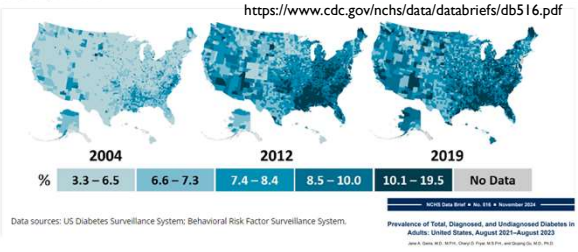
- According to the CDC, what best describes the current prevalence of prediabetes and diabetes in the U.S.?
  a. 30% of people above the age of 20 have type 2 diabetes.
  b. The rate of type 1 and type 2 diabetes have tripled since 2010.
  c. A total of 50% of people have prediabetes or diabetes.
  d. 1 out of 2 persons above age 20 have prediabetes.

Type 2 Diabetes in America 2025

- 16.8% with Diabetes
  - 11% don't know they have it
- 38% with Prediabetes – 97 million adults

Figure 3. Age-adjusted, county-level prevalence of diagnosed diabetes among adults aged 20 years or older, United States, 2004, 2012, and 2019

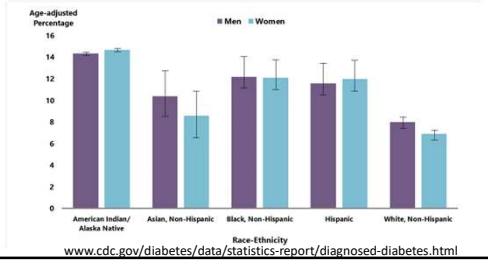
https://www.cdc.gov/nchs/data/databriefs/db516.pdf



Diabetes Prevalence by Ethnic Group

- For adults, diabetes prevalence highest among:
  - American Indians and Alaska Natives (14.5%),
  - Non-Hispanic Blacks (12.1%),
  - People of Hispanic origin (11.8%),
  - Non-Hispanic Asians (9.5%)

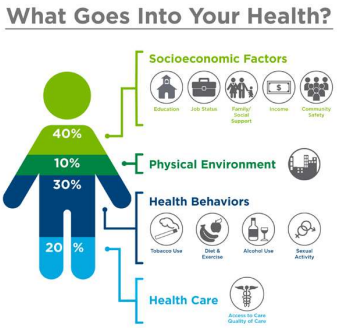
Figure 2. Age-adjusted estimated prevalence of diagnosed diabetes by race/ethnicity group and sex for adults aged 18 years or older, United States, 2018–2019



www.cdc.gov/diabetes/data/statistics-report/diagnosed-diabetes.html

Address Barriers to Self Management

- **Barriers exist** within health system, payer, health care professional & individual.
- **Address barriers** through innovation, including community health workers, telehealth, other digital health solutions.
- **Consider social determinants of health** in the target population when designing care.



https://coveragetoolkit.org/health-equity/defining-health-equity/

Social Drivers of Health

- The conditions in which people:
  - Play
  - Live
  - Work
  - Learn
  - Pray

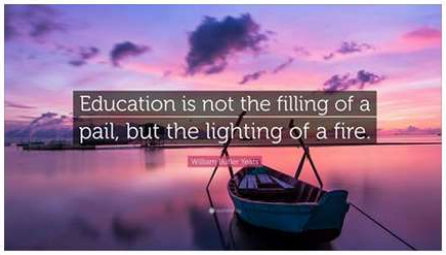
Directly affects their health risks and outcome

AADE Population Health & Diabetes Educators Evolving Role 2019

Status of Diabetes Care

- In 2015–2018, U.S. community-dwelling adults with diabetes achieved:
  - A1C <7% by 50.5%
    - 75.4% achieved A1C <8%.
  - BP target of <130/80 achieved by 47.7%
    - 70.4% achieved blood pressure <140/90 mmHg.
  - Lipid control (non-HDL cholesterol) <130 mg/dL, achieved by 55.7%
- 22.2% met targets for all three risk factors
- Many not receiving adequate lifestyle or pharmacotherapy.

Let's meet people where they are at.



Pre Diabetes & Type 2- Screening Guidelines (ADA 2025 Clinical Practice Guidelines)

1. Start screening all people at age 35.
2. Screen at any age if BMI ≥ 25 (Asians BMI ≥ 23) plus one or > additional **risk factor**:

- First-degree relative w/ diabetes
- Member of a high-risk ethnic population
- Habitual physical inactivity
- History of heart disease
- Check more frequently if taking high risk meds; antiretrovirals, 2nd generation antipsychotics or steroids, thiazide diuretics, statins
- History of pancreatitis, prediabetes, GDM, periodontitis

Diabetes 2 - Who is at Risk?

(ADA 2024 Clinical Practice Guidelines)

Screen using A1C, Fasting Blood Glucose or OGTT.

Repeat screening at least every 3 years if negative.

*If prediabetes or on high risk meds, recheck yearly

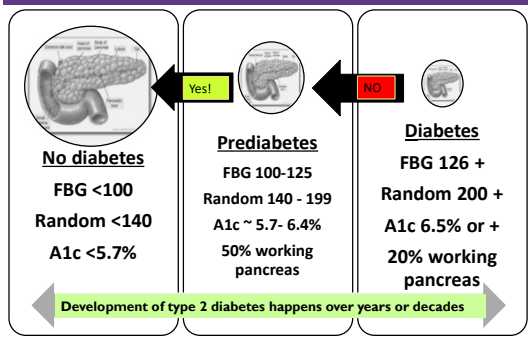
Risk factors cont'd

- HTN - BP > 130/80
- HDL < 35 or triglycerides > 250
- History of Gestational Diabetes Mellitus
- Polycystic ovary syndrome (PCOS)
- Other conditions associated w/ insulin resistance:
  - Elevated BMI, acanthosis nigricans (AN)

Poll Question 2

- Which of the following level is considered diabetes range?
  a. Random BG of 211
  b. A1c of 5.9 %
  c. After meal BG of 197
  d. Fasting BG 119

2. Diagnosis and Classification and of Diabetes Natural History of Diabetes



Poll Question 3

- What best describes prediabetes in the U.S.?
  a. Prediabetes affects 18-20% of people above the age of 20.
  b. Prediabetes is associated with increased risk of CV disease
  c. The prevalence of prediabetes and diabetes are almost equal.
  d. Most people with BMI of 30 or greater have prediabetes.

PreDiabetes is FREAKING ME OUT

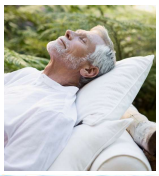
- 96 million people in US
  - 38% of population
- 80% don't know they have it
- In 3-5 years, about 30% of predm will get diabetes
- Associated with higher rates of heart attack, stroke, neuropathy and vessel disease

Do I look like I am freaking out?

3. Prevention or Delay of Diabetes and Associated Comorbidities: Standards of Care in Diabetes—2025

Get About 7 Hours of Quality Sleep to Prevent Diabetes

- Poor sleep quality was associated with a 40–84% increased risk of developing type 2 diabetes in a meta-analysis.
- Chronotype preference has been linked with many chronic diseases, including type 2 diabetes.
  - For those with a preference for evenings (i.e., going to bed late and getting up late)
    - 2.5-fold higher odds ratio for type 2 diabetes than for those with a preference for mornings (i.e., going to bed early and getting up early),
    - Independent of sleep duration and sleep sufficiency



3. Prevention or Delay of Diabetes and Associated Comorbidities: Standards of Care in Diabetes—2025

The composition of the gut microbiome may also affect the likelihood of developing type 2 diabetes.

3. Pharmacologic Interventions

- Use more intensive approach for high-risk individuals:
  - BMI of 35+
  - If A1C is ~6.0 or FPG is 110
  - History of GDM
- No FDA approved med for prevention (off label)
- Consider Metformin Therapy for Prediabetes
  - Monitor B12 level (esp with neuropathy or anemia)

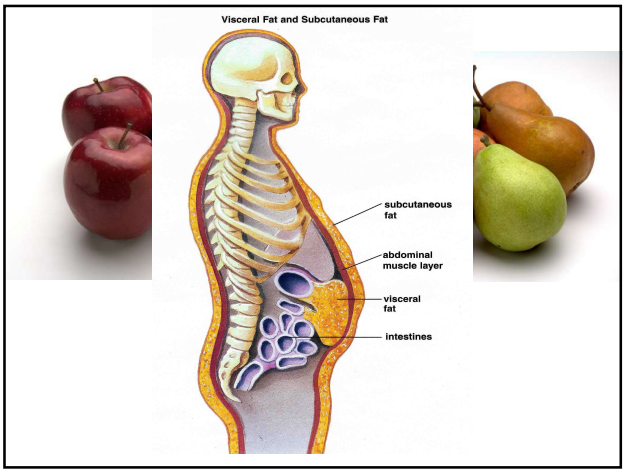
3. Prevention or Delay of Diabetes and Associated Comorbidities: Standards of Care in Diabetes—2025

- CV Risk Mitigation important.
- Statin can increase BG, stop if notice elevation
- Consider low dose pioglitazone (Actos) if history of stroke.

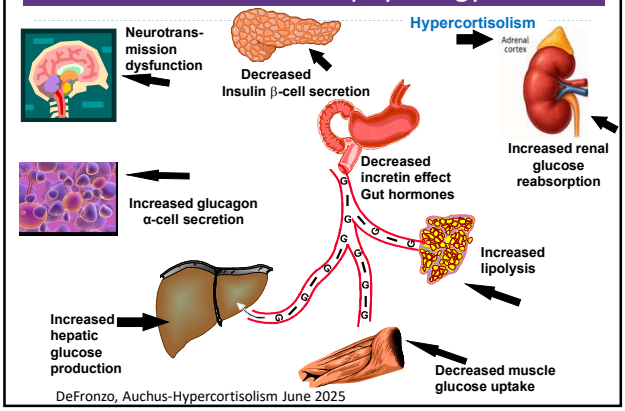
Indications for Insulin Sensitizers
Rosiglitazone (Avandia), Pioglitazone (Actos)

- **Action**: decrease insulin resistance by making muscle and adipose cells more sensitive to insulin. Decrease free fatty acids
- **Names**:
  - pioglitazone (Actos) – bladder cancer warning
    - Dosing: 15-45 mg daily
    - Consider adding low dose if history of stroke or with steatosis
- **Efficacy/ Considerations**
  - Reduce A1C ~0.5-1.0%
  - 6 weeks for maximum effect
  - Pioglitazone $5 a month
  - Can cause fluid retention, not indicated w/ CHF

Class/Main Action	Name(s)	Daily Dose Range	Considerations
Thiazolidinediones "TZDs" • Increases insulin sensitivity	pioglitazone (Actos) rosiglitazone	15 – 45 mg daily 4 – 8 mg daily	Black Box Warning: TZDs may cause or worsen CHF. Monitor for edema and weight gain. Increased peripheral fracture risk. Actos may increase risk of bladder cancer. Lowers A1c 0.5% – 1.0%



The Noxious Nine – Pathophysiology T2D



DeFronzo, Auchus-Hypercortisolism June 2025

POLL Question #4

- AJ is a 52-year-old with type 2 diabetes presents with worsening hyperglycemia despite taking three diabetes medications. AJ says, "No matter what I do, I can't seem to get my blood sugars down".
- Which of the following clusters of physical findings would increase your suspicion that AJ is struggling with hypercortisolism?

A. Dorsocervical fat pad, wide purple striae and bruising.

B. Peripheral muscle hypertrophy, thick hair growth, and flushed skin.

C. Weight loss, skin hyperpigmentation, and generalized muscle wasting.

D. Pallor, brittle nails, and spoon-shaped fingernails.

Signs of Hypercortisolism

- **Other signs**
  - High blood pressure,
  - Hyperglycemia
  - Visceral adiposity
  - Bone loss, fractures
  - muscle weakness,
  - excessive hair growth,
  - acne,
  - mood changes like irritability and depression.

Hypothalamus → CRH → Pituitary → ACTH → Adrenal → Cortisol

- Cortisol effects: gluconeogenesis, insulin resistance, fat redistribution

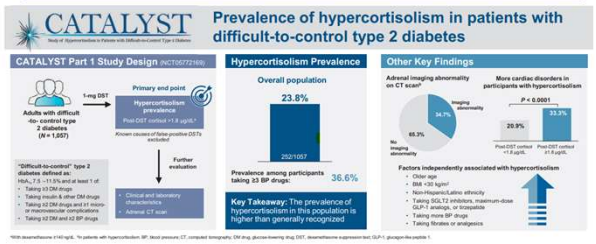
CATALYST Study Findings

- Findings from the CATALYST study, the largest prospective trial of its kind, suggest that hypercortisolism may be a significant contributing factor in as many as one in four patients with difficult-to-control type 2 diabetes.

CATALYST Study: Hypercortisolism & Difficult-to-Control Type 2 Diabetes

- **Study Design Overview** Prospective observational screening of ~1,000 adults with HbA1c 7.5–11.5%, on multiple antihyperglycemic agents.
- Screening tool: Overnight 1 mg dexamethasone suppression test (DST).
- Hypercortisolism defined as post-DST cortisol >1.8 µg/dL with adequate dexamethasone levels.

Study Design & Prevalence

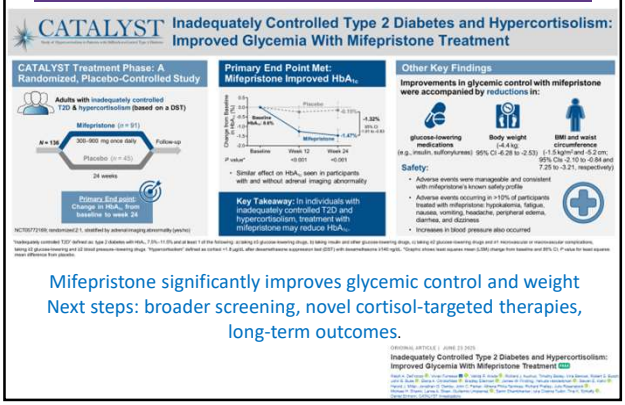


- **Findings**
- 23.8% of study participants had hypercortisolism
  - Prevalence 36.6% in those on ≥3 antihypertensives
  - 34.7% adrenal abnormalities on CT

Study Design – Part 2 (Intervention)

Randomized, double-blind, placebo-controlled intervention	N = 136 participants with confirmed hypercortisolism	Mifepristone: 300 mg daily escalating up to 900 mg over 24 weeks
Primary endpoint: HbA1c reduction; Secondary: weight, meds, safety.	Mifepristone is a glucocorticoid (cortisol) receptor Antagonist.	10% experience adverse side effects from glucocorticoid withdraw.
	SE's include: fatigue, N/V, hypokalemia, edema, HTN	

CATALYST Treatment Outcomes



Mifepristone significantly improves glycemic control and weight

Next steps: broader screening, novel cortisol-targeted therapies, long-term outcomes.

ORIGINAL ARTICLE | JUNE 23 2025
Inadequately Controlled Type 2 Diabetes and Hypercortisolism: Improved Glycemia With Mifepristone Treatment

A1c ↓ ~1.5% vs. 0.2% in placebo group

Weight ↓ ~10 pounds; waist circumference ↓ ~2 inches

Many reduced or stopped other diabetes meds, including insulin.

Intervention Outcomes

Adverse events mostly mild to moderate (glucocorticoid withdrawal symptoms).

Hypokalemia observed; manageable clinically.

Discontinuation ~40%, mostly due to tolerability issues.

Question: How realistic is this to implement in primary care / Endo settings?

Hypercortisolism in Type 2

- Cortisol increases gluconeogenesis in the liver
- Reduces peripheral glucose uptake → insulin resistance
- Stimulates protein catabolism and lipolysis
- Chronic cortisol elevation → persistent hyperglycemia

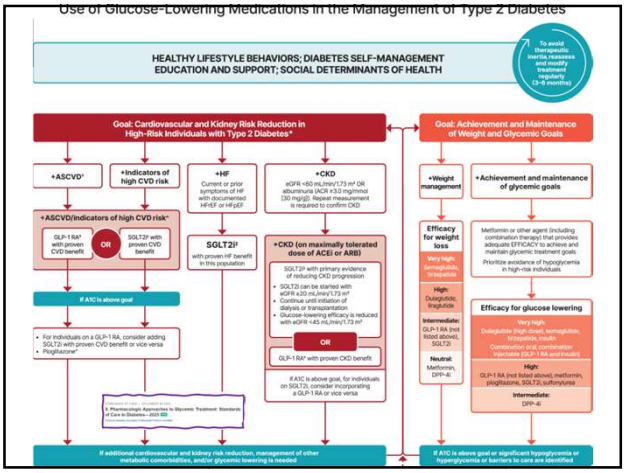
- Can lead to "Difficult to Control Type 2 Diabetes"

- CATALYST study revealed about 24% of people with elevated BG despite meds, may be due to hypercortisolism.
- Treatment with mifepristone decreased weight, waistline, BG.

DeFronzo, Auchus-Hypercortisolism June 2025 pmc.ncbi.nlm.nih.gov+3HCP

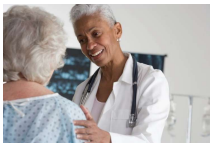
Step Wise Approach to Hyperglycemia 2025

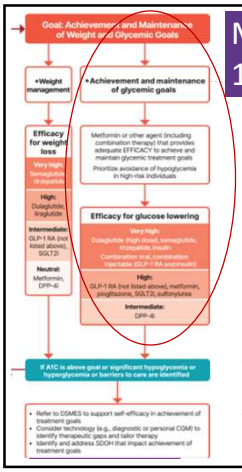
- *Usually, start one medication at a time*
- *However, evidence supports initial combo therapy if A1C 8.5% or more, to quickly reach goals and slow decline of glucose control.*
- Where to start?
  - Individual values
  - CVD, Heart failure or Kidney Disease
  - Minimize Hypoglycemia
  - Minimize wt gain or promote wt loss
  - Consider Cost



Quick Question 5

- RT, a 61-year-old woman with BMI of 28 and type 2 diabetes 3 months. She wanted to try to manage diabetes with diet and exercise. GFR in 90s, UACR 14mg/gm, A1c 7.4%. Based on this info, which medication would you start?
- A. Pioglitazone
- B. Metformin
- C. GLP1-RA
- D. Sulfonylurea





Metformin is "Usually" 1st Line

- Why metformin?
  - Longstanding evidence
  - High efficacy and safety
  - Inexpensive - 3 months for $12
  - Weight neutral
  - Check B12 levels at intervals especially if anemia or neuropathy.
- If ASCVD, HF or CKD or high ASCVD risk, use SGLT2i or GLP-1 RA +/- metformin
- If A1C ≥ 8.5%, consider combo therapy.

Class/Main Action	Name(s)	Daily Dose Range	Considerations
Biguanides • Decreases hepatic glucose output	metformin (Glucophage) Riomet (liquid metformin)	500 - 2550 mg (usually BID w/ meal) 500 - 2550 mg 500mg/5mL	**Side effects:** nausea, bloating, diarrhea, B12 deficiency. To minimize GI Side effects, use XR and take w/ meals. **Obtain GFR before starting.** • If GFR <30, do not use. • If GFR <45, don't start Meformin • If pt on Metformin and GFR falls to 30-45, eval risk vs. benefit; consider decreasing dose. **For dye study,** if GFR <60, liver disease, alcoholism or heart failure, restart metformin after 48 hours if renal function stable. **Benefits:** lowers cholesterol, no hypo or weight gain, cheap. Approved for pediatrics, 10 yrs + Lowers A1c 1.0%-2.0%.
	Extended Release-XR (Glucophage XR) (Glumetza) (Fortamet)	(1x daily w/dinner) 500 – 2000 mg 500 – 2000 mg 500 – 2500 mg	
Sulfonylureas • Stimulates sustained insulin release	glyburide: (Diabeta) (Glynase PresTabs)	1.25 – 20 mg 0.75 – 12 mg	Can take once or twice daily before meals. Low cost generic. **Side effects:** hypoglycemia and weight gain. Eliminated via kidney. **Caution:** Glyburide most likely to cause hypoglycemia. Lowers A1c 1.0% – 2.0%.
	glipizide: (Glucotrol) (Glucotrol XL)	2.5 – 40 mg 2.5 – 20 mg	
	glimepiride (Amaryl)	1.0 – 8 mg	

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Metformin and Kidney Disease – 2025 Update

- Metformin is also a preferred agent in CKD due to well-documented efficacy and safety profile in type 2 diabetes.
  - However, there is no documented direct kidney benefit.
- Don't start metformin if eGFR is <45
- Reduce dose of metformin if eGFR is <45 individual is already on metformin.
- Stop metformin once eGFR is <30

Poll Question 6

- RL is a 43 year old who was on insulin after experiencing GDM. She then was started on a GLP-1, Metformin and an SGLT-2, and stopped the insulin completely. Her daughter told her, "Your breath smells funny". A1C 7.9%. What are you worried about?

a. Euglycemic DKA
b. Dental caries
c. Renal failure
d. Steatosis

SGLT-2 Inhibitors

Common Oral Diabetes Meds

Class/Main Action	Name(s)	Daily Dose Range	Considerations
SGLT2 Inhibitors "Glucoretic" • Decreases glucose reabsorption in kidneys	Canagliflozin* (Invokana) Dapagliflozin*† (Farxiga) Empagliflozin*† (Jardiance) Ertugliflozin (Steglatro) Bexagliflozin (Brenzavvy)	100 - 300 mg 1x daily 5 - 10 mg 1x daily 10 - 25 mg 1x daily 5 – 15 mg 1x daily 20 mg 1x daily	**Side effects:** hypotension, UTIs, genital infections, increased urination, weight loss, ketoacidosis. **Heart Failure, CV & Kidney Protection:** 1st line therapy for Heart Failure (HF), Kidney Disease (CKD), Cardiovascular Disease, before or with metformin **Considerations:** If GFR ≥ 20, use SGLT-2 to reduce CVD, Heart Failure and Chronic Kidney Disease. Limited BG lowering effect if GFR <45. See package insert for GFR cut-offs and dosing. **Benefits:** SGLT-2s* reduce BG, CV death & HF, slow CKD. †Approved for peds, 10 yrs +. Lowers A1C 0.6% to 1.5%.

FDA Warning of DKA – Not approved for Type 1 (but used off-label)
~ increases risk of EDKA by 4-6%
Increased risk for those with type 2 on insulin + SGLT-2 Inhibitor
Decreased insulin dose due to lower BG on SGLT-2 Inhibitors
Can lead to insulin deprivation and ketoacidosis

Benefits of SGLT-2 Inhibitors

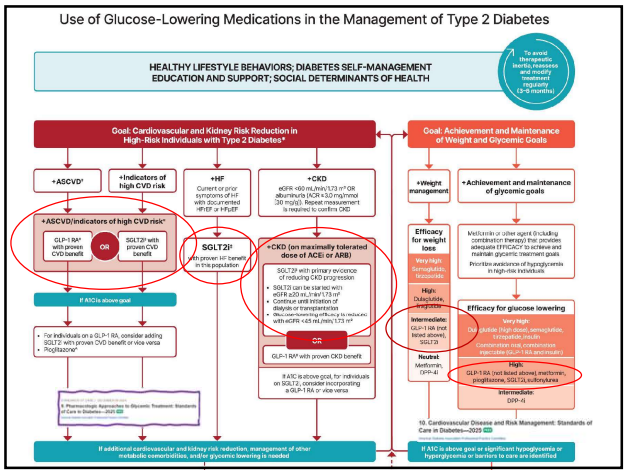
A1C lowering	Weight loss	Cardiovascular
Renal	Heart failure	Blood pressure lowering

Side Effects of SGLT-2 Inhibitors

- Genitourinary infections
- Volume depletion
- Increased urination
- Hypotension
- UTI
- Diabetes ketoacidosis (DKA)

SGLT-2i Indications Summary

Drug	Lower BG	Reduce CV Risk?	Use to treat Heart Failure?	Slow renal disease?
Dapagliflozin (Farxiga)	Yes	Yes	Yes +/- Diabetes	Yes
Empagliflozin (Jardiance)	Yes	Yes	Yes +/- Diabetes	Yes
Canagliflozin (Invokana)	Yes	Yes	Yes w/ Diabetes	Yes
Ertugliflozin (Steglatro)	Yes	No	Yes w/ Diabetes	Yes
Bexagliflozin (Brenzavvy)	Yes	NA	NA	NA

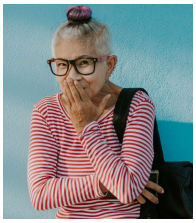


Case Study Question 7

MZ is complaining of nausea, and increased eructation?

What class of medication may be causing these side effects?

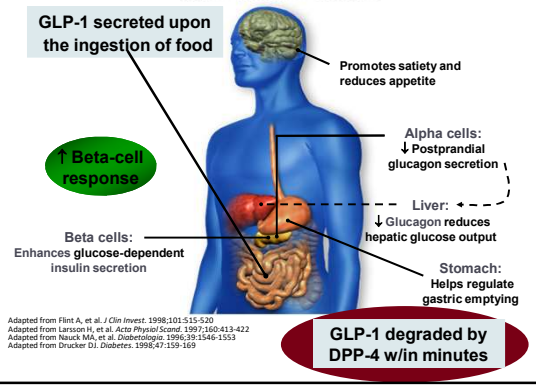
a. GLP-1/GIP Receptor Agonists
b. Metformin
c. SGLT-2 Inhibitor
d. DPP-IV Inhibitor



Incretins: GLP & GIP Receptor Agonists

GLP-1: glucagon like peptide 1
GIP: glucose-dependent insulinotropic polypeptide

GLP-1 Effects in Humans
Understanding the Natural Role of Incretins



Adapted from Flint A, et al. *J Clin Invest*. 1998;101:515-520
Adapted from Larsson H, et al. *Acta Physiol Scand*. 1997;160:413-422
Adapted from Nauck MA, et al. *Diabetologia*. 1996;39:1546-1553
Adapted from Drucker DJ. *Diabetes*. 1998;47:159-169

Pocket Card: GLP-1 & GIP RA

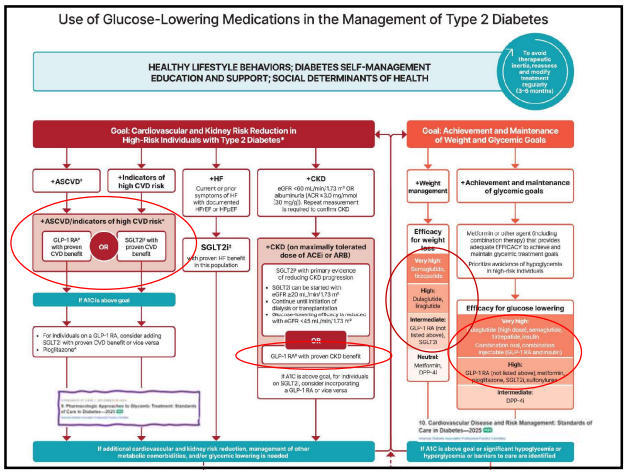
GLP-1 & GIP Receptor Agonists

Class/Main Action	Name	Dose Range	Considerations
GLP-1 RA - Glucagon Like Peptide Receptor Agonist **"Incretin Mimetic"** • Increases insulin release with food • Slows gastric emptying • Promotes satiety • Suppresses glucagon	exenatide (Byetta)	5 and 10 mcg BID	**Side effects:** nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis or intestinal blockage (ileus) and stop med. **Black box warning:** Thyroid C-cell tumor warning (avoid if family history of medullary thyroid tumor). *Significantly reduces risk of CV death, heart attack, and stroke. §Approved to reduce risk of CKD †Approved for pediatrics 10-17 yrs Lowers A1C 0.5 – 1.6% Weight loss: 4-6% body weight loss.
	exenatide XR† (Bydureon)	2 mg 1x a week Pen injector - Bydureon BCise	
	liraglutide*† (Victoza)	0.6, 1.2 and 1.8 mg daily	
	dulaglutide*† (Trulicity)	0.75, 1.5, 3.0 and 4.5 mg 1x a week pen injector	
	semaglutide*§ (Ozempic) (Rybelsus) Oral tablet	0.25, 0.5, 1.0 and 2.0 mg 1x a week pen injector 3, 7, 14 mg - Original dosing. 1.5, 4, 9 mg - New dosing. AM dose, pre-food, w/ water sip	
GLP-1 & GIP Receptor Agonist Activates receptors for GLP-1 (see above) & Glucose-dependent Insulinotropic Polypeptide (GIP).	Tirzepatide (Mounjaro)	2.5, 5.0, 7.5, 10, 12.5 and 15 mg 1x a week injection Single dose via prefilled pen or vial. Adjust dose based on shared decision making and individual goals.	**Side effects:** nausea, diarrhea, injection site reaction. Report pancreatitis, signs of intestinal blockage. **Black box warning:** Avoid if family history of medullary thyroid tumor. Lowers A1C ~ 1.8 - 2.4% Weight loss: 7-13% body weight loss at max dose.

Counseling Points: GLP-1 RA & GLP-1/GIP

- Avoid if personal or family history of medullary thyroid cancer
- Avoid in combo with DPP-4 inhibitors
- Watch for intestinal obstruction
- Use of non-FDA *compounded* products not recommended
- Avoid with history pancreatitis
- If on tirzepitide, use back up contraception for first 4 weeks
- Ask about recent eye exam
  - Potential increase in diabetes retinopathy

Sudden discontinuation of semaglutide and tirzepitide results in regain of one-half to two-thirds of the weight loss within 1 year. Consider trying lowest effective dose, using intermittent therapy, or stopping medication followed by close weight monitoring.



Diabetes Education Services

Indication Chart for GLP/GIP Receptor Agonists - Diabetes, Weight, CVD and Others

Drug	Type 2 Diabetes	Weight Loss Indication	CV Indication	Other Indication
Exenatide IR (Byetta)	Yes	No	No	
Exenatide ER (Bydureon)	Yes, 10 yrs and older	No	No	
Dulaglutide (Trulicity)	Yes, 10 yrs and older	No	Yes	
Liraglutide (Victoza)	Yes, 10 yrs and older	No	Yes	
Liraglutide (Saxenda)	No	Yes, 12 yrs and older	No	
Semaglutide (Ozempic)	Yes	No	Yes	CKD
Semaglutide (Wegovy)	No	Yes, 12 yrs and older	Yes	MASH
Oral Semaglutide (Rybelsus)	Yes	No	CV benefit, indication pending	
Tirzepatide (Mounjaro)	Yes	No	No	
Tirzepatide (Zepbound)	No	Yes	No	Sleep Apnea

Diana Isaacs, PharmD, BCPS, BCACP, BC-ADM, CDCES Beverly Thomassian, RN, MPH, CDES, BC-ADM

DiaBingo

B Frequent skin and yeast infections
B A BMI of ____ or greater indicates increased pre/diabetes risk?
B To reduce complications, control **A**1c, **B**lood pressure, **C**holesterol
B PreDiabetes – fasting glucose level of ___ to ____
B Erectile dysfunction indicates greater risk for ____
B Diabetes – fasting glucose level____ or greater
B Type 1 diabetes is best described as an _____ disease
B People with diabetes are _____ times more likely to die of heart dx
B Elevated triglycerides, < HDL, smaller dense LDL
B Each percentage point of A1C = _____ mg/dl glucose
B At dx of type 2, about __% of the beta cell function is lost
B Diabetes – random glucose ____ or greater

Medication Taking Behaviors

- Adequate medication taking is defined as 80%
- 23% of time, if A1c, B/P, lipids above target - due to med taking behavior
- Assess for barriers
- If taking meds 80% of time and goals not met, consider medication intensification

Barriers include:
Forgetting to fill Rx, forgetting to take, fear, depression, health beliefs, med complexity, cost, knowledge gap, system factors, etc.

Work on targeted approach for specific barrier

Wait, What About Emotions?

Diabetes Admit for Hyperglycemia

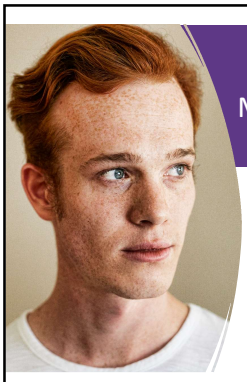
- John is admitted for hyperglycemia because he stopped taking his diabetes meds.
- HCP says, "Don't you realize you are going to get complications, like kidney disease or amputation if you don't take your medications?"
- Door Closed – No Connection made

How Does John Feel?

- Embarrassed
- Ashamed
- Defeated
- Angry
- Unheard

How does HCP feel?

- Frustrated
- Defeated
- Worried



Missed Appointments due to Stigma and Shame

A recent survey of over 2,600 people with diabetes across eight countries revealed that nearly 40% of missed doctor's appointments are due to stigma or shame.

Abbott. (2025, February 4). Abbott's Above the Bias film reveals misconceptions can impact diabetes care. https://abbott.mediaroom.com/2025-02-04-Abbotts-Above-the-Bias-FilmReveals-Misconceptions-Can-Impact-Diabetes-Care

Diabetes Visit – Let's Go *through*

A small adjustment can make a BIG Difference

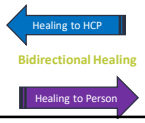
- HCP says, "John, I am worried about you and your elevated blood glucose. Can you share what is going on in your life?"
- Door Open – Connection made

How Does John Feel?

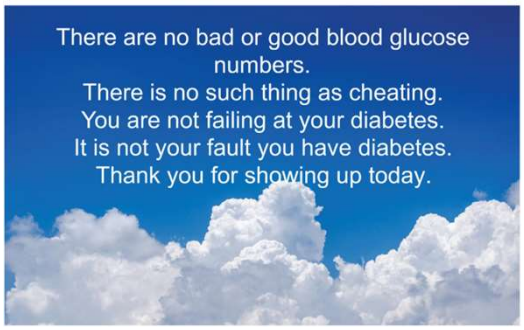
- Heard & Seen
- Recognized
- Connected
- Engaged

How does the HCP feel?

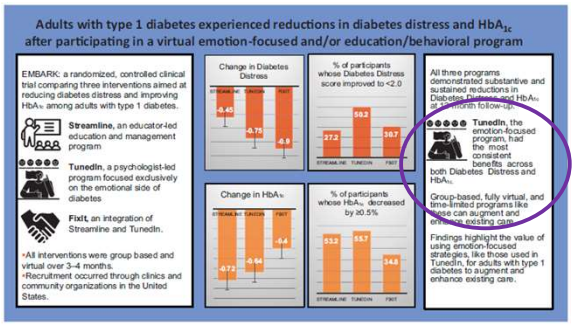
- Connected
- Concerned
- Collaborative



Create a Judgement Free Zone – Roll out the Carpet of Acceptance



EMBARK Trial

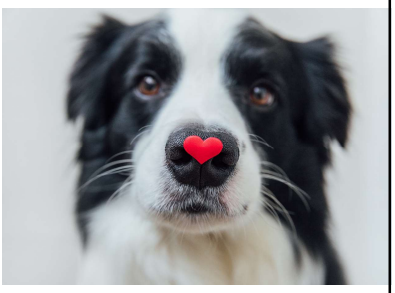


EMBARK: A Randomized, Controlled Trial Comparing Three Approaches to Reducing Diabetes Distress and Improving HbA_{1c} in Adults With Type 1 Diabetes. *Diabetes Care* 2024; dc232452. https://doi.org/10.2337/dc23-2452

Embark Trial – Emotions as Priority

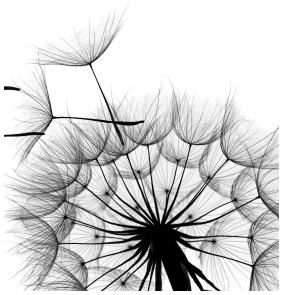
I have finally given myself permission to make addressing the emotional aspects of diabetes a priority.

~Coach Beverly

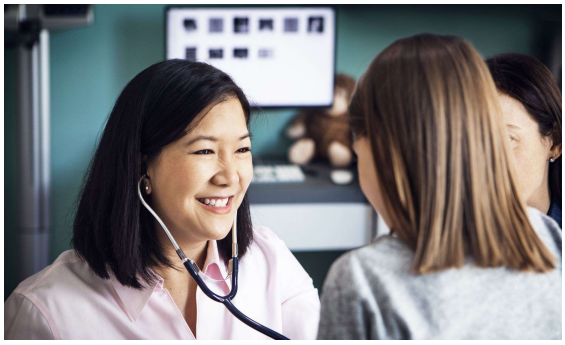


Releasing the Brake

- This strategy recognizes that diabetes distress acts as a brake on the application of existing diabetes knowledge and skills.
- By releasing the diabetes distress brake through emotion-focused intervention, the negative cycle can be efficiently ended.



Commit to Listening at least Half of the Time



Language of Diabetes Education

Old Way	New Way
Control diabetes	Manage
Test BG	Check
Patient	Participant
Normal BG	BG in target range
Non-adherent, compliant	Focus on what they are accomplishing
Refuse	Decided, chose

American Diabetes Association, Diabetes Care
The Use of Language in Diabetes Care and Education, 2017

Diabetes is Complex

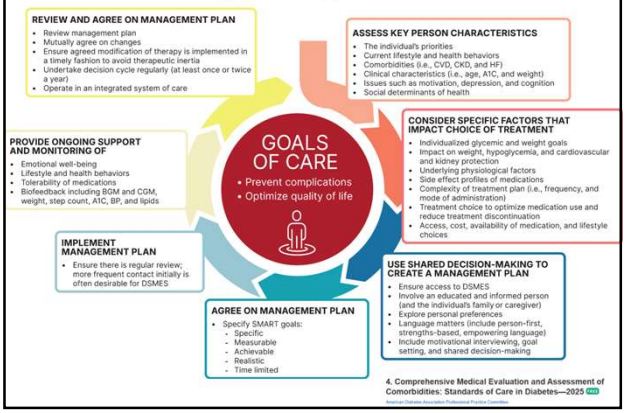
- Goal – achieve well being and negotiated outcomes
- Psychological factors:
  - Environmental
  - Social
  - Behavioral
  - Emotional
- Keep it person centered while integrating care into daily life
  - Consider the individual

4. Comprehensive Medical Evaluation and Assessment of Comorbidities

- Person centered communication, strength-based language, active listening, literacy, quality of life
- It is necessary to take into account all aspects of a person's life circumstance (SDOH)
- It is important to integrate medical eval, engagement and lifestyle changes.
- Interdisciplinary teams provide best care

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Decision Cycle for Person-Centered Glycemic Management in Type 2 Diabetes



Diabetes Goals and Treatment Plan

The goals of treatment for diabetes are to prevent or delay complications and optimize quality of life.

Goals and plans co-created by the care team and individual based on preferences, values, and goals.

Management plan considers the person's:

Age, cognitive abilities, school/work schedule and conditions,	Health beliefs, support systems, social situation, financial concerns, cultural factors, literacy and numeracy	Eating patterns, physical activity, (mathematical literacy)	Diabetes history (duration, complications, and current use of medications), comorbidities, disabilities, health priorities, other medical conditions	Preferences for care, access to health care services, and life expectancy

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Case Study - JR

- 38 yr old male, BMI 28, arrives in clinic for physical. Says he has been feeling tired lately, but attributes that to his job. In office fingerstick reads 228 mg/dl.
- 1. What lab tests are needed?
- 2. What would you include in your physical exam?
- What vaccinations?
- What referrals?
- What tools?

Lab Eval at Initial & Annual Visit

- A1c (each 3-6 mo's)
- Each year
  - Lipids, CBC with platelets
  - Liver function
  - Spot urinary albumin-to-creat ratio (UACR))
  - Serum creat and GFR
  - TSH, celiac (type 1)
  - B12 if on metformin >5yrs
  - Calcium, Vita D, and phosphorus if appropriate
- Serum K
  - If on ACE, ARBs or diuretics

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

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- What referrals?
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Physical Exam

- Height, weight, BMI, pubertal development
- Blood pressure
- Fundoscopic exam, thyroid
- Skin exam –insertion sites, acanthosis, fungus, sores, feet
- Bone health, Hypo
- Depression, Distress Anxiety
- Functional and cognitive issues
- Comprehensive foot exam
  - Visual eval
  - Screen for Peripheral Arterial Disease
  - Monofilament and vibration assessment

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Standard 4 – Diabetes Medical Evaluation

Table 4.1—Components of the comprehensive diabetes medical evaluation at initial, follow-up, and annual visits

	Visit		
	Initial	Every follow-up	Annual
• Vitamin B12 if taking metformin for >5 years	✓		✓
• CBC with platelets	✓		✓
• Serum potassium levels in people with diabetes on ACE inhibitors, ARBs, or diuretics§	✓		✓
• Calcium, vitamin D, and phosphorous for appropriate people with diabetes	✓		✓
Physical examination			
• Height, weight, and BMI; growth and pubertal development in children and adolescents	✓	✓	✓
• Blood pressure determination	✓	✓	✓
• Orthostatic blood pressure measures (when indicated)	✓		✓
• Fundoscopic examination (refer to eye specialist)	✓		✓
• Thyroid palpation	✓		✓
• Skin examination (e.g., acanthosis nigricans, insulin injection or insertion sites, and lipodystrophy)	✓	✓	✓
• Comprehensive foot examination	✓		✓
• Visual inspection (e.g., skin integrity, callous formation, foot deformity or ulcer, and toenails)*	✓	✓	✓
• Check pedal pulses and screen for PAD with ABI testing if a PAD diagnosis would change management	✓		✓
• Determination of temperature, vibration or pinprick sensation, and 10-g monofilament exam	✓		✓
• Screen for depression, anxiety, diabetes distress, fear of hypoglycemia, and disordered eating	✓		✓
• Assessment for cognitive performance if indicated†	✓		✓
• Assessment for functional performance if indicated†	✓		✓
• Consider assessment for bone health (e.g., loss of height and kyphosis)	✓		✓

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Assessment and Treatment Plan

Therapeutic treatment plans

- Lifestyle management
- Pharmacologic therapy: glucose lowering
- Pharmacologic therapy: cardiovascular and kidney disease risk factors
- Weight management with pharmacotherapy or metabolic surgery, as appropriate
- Use of glucose monitoring and insulin delivery devices
- Referral to diabetes education, behavioral health, and medical specialists

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Assessment and Treatment of Disabilities

- Diabetes associated with increased risks of disability due to neuropathy, visual impairment and lower limb complications
- Refer to specialist
- Take preventive action to maximize quality of life.

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Assess for disability at the initial visit and for decline in function at each subsequent. If a disability is impacting functional ability or capacity to manage their diabetes, refer to appropriate specialist.

Lab Test, BP, Family History

- A1C – 9.8%
- Cholesterol - 216
- LDL – 164 mg/dL
- HDL – 46
- Triglycerides – 276
- TSH – 1.43
- GFR - >60
- UACR - <30 mg/gm
- ALT, AST 90 & 85
- Platelets 217
- K+ 3.8
- Family history
  - Dad with type 2, history of stroke
- B/P
  - 156/88 then 148/82
- BMI 31
- Skin – some acanthosis nigricans visible on neck
- Lower extremities okay
- Mouth - gingivitis

Acanthosis Nigricans

- A skin disorder characterized by darkening (hyperpigmentation) and thickening (hyperkeratosis)of the skin
  - mainly in the folds of the skin in the armpit (axilla), groin and back of the neck.
- Acanthosis nigricans is not a skin disease per se but a cutaneous sign of an underlying condition or disease.
  - Associated with extra weight and insulin resistance

Case Study - JR

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- What tools?

Medical Evaluation Goal

- Prioritize components based on time and resources.
- Assess:
  - Diabetes self-management, nutrition, psychosocial health, risk of acute and chronic complications
  - Immunizations
  - Sleep habits
  - Cancer screenings
  - Bone Health
  - Liver Health
  - Cardiovascular disease
  - Smoking cessation
  - Ophthalmological, dental and podiatric referrals

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Poll Question 8

- JR is 38 years old and has new diabetes. Wondering what vaccinations they need this year. **What is the BEST answer?**

A. Influenza vaccine
B. Hepatitis B vaccine
C. Herpes Zoster vaccine
D. Both A and B

Immunization Schedule for Diabetes 2025

Vaccine	Who by Age	Series and Frequency
Hepatitis B Vaccine	Less than 60 years*	2-3 dose series
RSV	Adults ≥ 60 years	Single dose
Influenza (avoid live attenuated vaccine)	All	Annually
Tetanus, diphtheria, pertussis (TDAP)	All adults; extra dose during pregnancy	Booster every 10 years.
Zoster	50+	2 dose Shingrix
COVID-19	Starting at age 6 mo's	Initial vaccination and boosters
Pneumonia (PPSV23) Pneumovax	Adults19-64*	See Standards for schedule and details and for those 65 or older.
*Pneumococcal Conjugate Vaccine (PCV15, PCV20)	19-64 with underlying risk factors or no previous vaccination*.	May need PPSV23 follow-up vaccine ≥1 year.* If 65+, discuss with provider.

2025 ADA Standards, Vol.48, S66-S67
*See Table 4.3 for detailed info/considerations

For a comprehensive list of vaccines, refer CDC & Prevention at cdc.gov/vaccines

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

For educational purposes only. www.DiabetesEd.net

Referrals for Initial Care Mgmt

- Eye professional – annual check
- Family planning
- RD for nutrition therapy
- DSMES - Diabetes Self-Management Education Support
- Dentist for comprehensive dental examination
- Behavioral health professional & audiology, if indicated
- Social worker/community resources
- Rehab medicine for cog/disability eval

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Critical times to provide and modify DSMES

- At diagnosis
- Annually and/or when not meeting treatment goals
- When complicating factors develop (medical, physical, psychosocial) develop
- When transitions in life and care occur.

Powers MA, Bardsley JK, et al. DSMES Consensus Report, The Diabetes Educator, 2020
ADCES AADE7 Self-Care Behaviors, The Diabetes Educator, 2020

5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: Standards of Care in Diabetes—2025

Diabetes Self-Management Topics

- History of DSME attendance
- Individual visit with RD, RN, CDCES
- Hypoglycemia – timing of episodes, awareness, frequency and action
- Pregnancy planning
- Assess & Screen for Psychosocial /Emotional Issues
  - Anxiety
  - Depression
  - Distress
  - Serious mental illness (increases risk of diabetes)

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

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- What referrals?
- What tools?

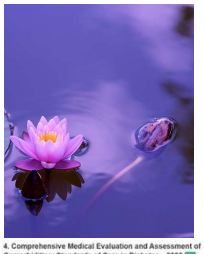
Diabetes Toolkit - Individualize

- Meter
  - Strips that aren't expired?
- List of Meds
- Plan for Lows
- Emergency Plan
- Power back-up

- BG Checks and logging results
- Diabetes ID
  - Phone, medic alert, on person
- Carbohydrate source
  - Granola bar, glucose tabs, GU, gummy bears
- Rescue Meds

Behavioral Factors and Med Taking

- Eating Patterns & weight history, carb counting
- Sleep behaviors – goal 7 hrs
- Tobacco, alcohol, substance use, physical activity
- Social supports and coping skills, daily routine
- Medication taking behaviors
  - How many times a day/week are you taking this medication?
  - Complimentary meds
  - Evaluate for hyper and hypo glycemia



4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Cost Related Barriers

- Among people with chronic illnesses, 2/3 of those who reported not taking medications as prescribed due to CRB never shared this with their physician.
- Especially associated with diabetes medications and insulin.

JR Returns in 1 month

- Blood glucose improved
- B/P 142/94 Pulse 86
- Meds started include:
  - Metformin 1000 mg
  - Glipizide 10 mg BID (sulfonylurea)
  - Lovastatin 40 mg
  - Lisinopril 20mg (ACE Inhibitor)

Provider increases metformin/glipizide and adds SGLT-2 Empagliflozin 10 mg

- JR checks BG 4-7 x's a week.
  - Lowest 152, Highest 289
- What other issues do we need to evaluate?
  - Activity – mostly sedentary
  - Sleep: 6-7 hrs a night
  - Pain issues – knees
  - Brushing – once daily
  - Alcohol and other drug use
    - Drinks a few beers on weekends
  - Coping - okay
  - Steatosis – elevated LFTs
  - Affordability
  - Met with CDCES and RD

JR Return Visit 3 months

- A1c 8.6% (was 9.8)
- TSH 1.9 mIU/L
- B/P 136/84 Pulse 76
- Has gained about 4 pounds
- Meds include:
  - Metformin 2000 mg
  - Empagliflozin 10 mg
  - Glipizide 20 mg BID
  - Lovastatin 40 mg
  - Lisinopril 20mg (increase to 40)

Provider increases lisinopril & empagliflozin to 25mg and adds 10 units basal insulin
Would you suggest a different approach?

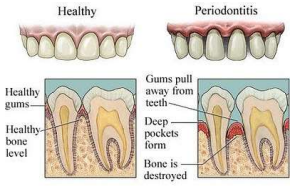
- JR checks BG each morning and sometimes at hs
  - Lowest 68 after taking meds (usually around 140ish)
  - Highest 249
- Has started walking after dinner.
- Is trying to eat healthier, but upset he gained wt.
- Says the meds are affordable so far.
- Made dental appt and is trying to brush 2x day

ADA – Follow-up Visit to include:

- **Interval medical history**
  - Psychosocial Status
  - Assess med taking behavior
- **Physical exam**
  - Skin appearance
  - Ambulation and gate
  - Lower extremities, feet
  - Activity levels strengthening and cardiovascular workout
- **Health**
  - Dental health
  - Eye check
  - Mammogram
  - Vaccinations
  - RDN, CDCES, Diabetes Ed Program
- **Nutritional status and relationship with food**
  - GI health (constipation, diarrhea, gastroparesis, liver)
  - GU health – continence, creat, GFR, UACR
  - Menstruation and contraception
  - Thyroid – Symptoms + TSH
  - Heart – blood pressure, chest pain, heart rate, cholesterol

Periodontal Disease

- More severe and prevalent with diabetes and elevated A1C levels.
  - periodontal treatment associated with better glycemic control
    (A1C 8.3% vs. 7.8%)
  - Benefits lasted for 12 mo's
- People with periodontal disease have higher rates of diabetes.
- Bidirectional



Oral Care Matters
- See dentist at least yearly
- Dental hygienist twice yearly
- Brush twice daily
- Floss daily

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Hypoglycemia (Glucose) Alert Values

- **BG <70mg/dl – Level 1**
- Follow 15/15 rule and contact provider make needed changes

- **BG < 54mg/dl – Level 2**
- Indicates serious hypo. Contact provider for med change. Glucagon Emergency Kit
- **Severe Hypoglycemia – Level 3**
- Requires external assistance – no threshold

Tx of Level 2 & 3 Hypoglycemia

- If can swallow w/out risk of aspiration, try gel, honey, etc. inside cheek
- If unable to swallow, D50 IV or Glucagon

- Glucagon injection (need Rx)
  - Inform and instruct caregivers, school personnel, family, coworkers of hypo signs and appropriate action
  - Dosing: Adults 1mg, Children <20kg 0.5mg
  - Glycemic effect 20 - 30mg, short lived
  - Must intake carb as soon as able
- If on Insulin or level 2 or 3 hypo, (<54), get Glucagon ER Kit and Sensor. Re-evaluate diabetes med treatment plan.

Glucagon Rescue Medications for Diabetes-Related Hypoglycemia

Name/Delivery	Supplied	Dose Range		Age / Route / Storage
		Adult	Peds / Age WT Dosing	
Glucagon Emergency Kit Injection requires mixing glucagon powder	1mg / 1mL vial + syringe	1mg	0.03mg/kg or < 6yrs or < 25 kgs | 0.5mg ≥ 6yrs or > 25kgs | 1mg	All ages approved SubQ or IM admin Expires in 2 years at room temp.
Baqsimi Nasal glucagon powder	3 mg intranasal device	3 mg	< 1 yrs: not recommended 1 yr or older | 3mg dose	Approved Age 1+ Nasal admin Expires ~ 2 years at room temp (keep in shrink-wrapped tube).
Gvoke Injectable liquid stable glucagon solution	0.5mg or 1.0mg in -Prefilled syringe -HypoPen auto-injector -Kit with vial and syringe	1 mg	< 2yrs: not recommended 2- 12 yrs < 45kg | 0.5mg ≥ 45kg | 1mg 12 yrs or older | 1mg	Approved Age 2+ SubQ admin in arm, thigh, abdomen Expires in 2 years at room temp (keep in foil pouch).
Dasiglucagon (Zegalogue) Stable liquid glucagon analog	0.6mg/0.6mL Prefilled syringe Autoinjector	0.6mg	< 6yrs: not recommended 6 yrs or older | 0.6mg	Approved Age 6+ SubQ in abdomen, buttocks, thigh outer upper arm Expires in 1 year at room temp. (store in red protective case).

**All raise BG 20+ points. Can cause nausea, vomiting. After admin, roll person on side. Seek medical help. If no response after 1st dose, give 2nd dose in 15 mins. When awake, give oral carbs ASAP when safe to swallow. Please consult package insert for detailed info.*

All PocketCard content is for educational purposes only. Please consult prescribing information for detailed guidelines.

Assess for Hypo

Review history of hypoglycemia at every clinical encounter for all individuals at risk for hypoglycemia

Evaluate hypoglycemic events

Screen for impaired hypoglycemia awareness at least annually.

Consider individual's risk for hypoglycemia when selecting diabetes medications and glycemic goals.

Use of CGM is beneficial and recommended for individuals at high risk for hypoglycemia.

6. Glycemic Goals and Hypoglycemia: Standards of Care in Diabetes—2025

Hypoglycemia: Identify, Treat, & Prevent

PocketCards are updated twice yearly. Scan QR code to download or order the latest version.

Step 1

Identify your signs of hypoglycemia or low blood sugar:

- Sweaty
- Shaky
- Hungry
- Can't think straight
- Headache
- Irritated, grouchy
- Other

Step 2

If have signs of hypo, treat with carbs until glucose reaches 70+, then eat usual meal.

- Sugary drink, 4–8oz
- Piece of fruit
- Raisins, handful
- Glucose tabs, 4+
- Honey/glucose gel
- Skittles candy, 15+

Step 3

Have glucagon rescue meds available.

In case of severe hypo, identify someone (ahead of time) who can get medical help & give a glucagon rescue medication.

Notify your provider of low blood sugar events.

Hypoglycemia Levels:

Level 1 – Glucose less than 70
Level 2 – Glucose less than 54
Level 3 - Severe, needs assistance

Identify Causes of Hypo & Problem Solve to Prevent Future Episodes

» Low carb meal
» Extra activity
» Drinking alcohol
» Delayed, missed meal
» Too much insulin/meds
» Insulin timing

www.DiabetesEd.net

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SDOH and Hypoglycemia

Food insecurity, housing instability, underinsured, under-resourced living areas is associated with increased risk of hypoglycemia-related emergency department visits

Identify if fasting part of religious observances

Young children and older adults at highest risk

Insulin pumps with automated low-glucose suspend and automated insulin delivery systems have been shown to be effective in reducing hypoglycemia in type 1 diabetes

6. Glycemic Goals and Hypoglycemia: Standards of Care in Diabetes—2025

If on insulin or sulfonylurea – special precautions required

- Carb source on person, car, by bed at all times
- Identification
  - Phone (ICE)
  - Wallet Card
  - Bracelet
- If pattern of lows, med adjustment required
- Pre-meal target
  - 100-130?
- Post meal
  - Less than 180
- Bedtime
  - 110 - 180

JR Return Visit 6 months

- A1c 7.3% (was 8.6)
- TSH 1.9 mIU/L
- B/P 132/82 Pulse 76
- Denies any low blood sugar
- Lost 2 pounds

- Meds include:
  - Metformin 2000 mg
  - Empagliflozin 25 mg
  - Glipizide 20 mg BID
  - Lovastatin 40 mg
  - Lisinopril 40mg
  - 10 units basal insulin

- JR checks BG each morning and sometimes at hs
  - Lowest 112 (usually around 130ish)
  - Highest 230
- Still walking after dinner.
- Hasn't seen dentist
- Sometimes forgets to take meds at night
- Sleeping better
- Worried if meds are causing harm
- Started taking cinnamon capsules

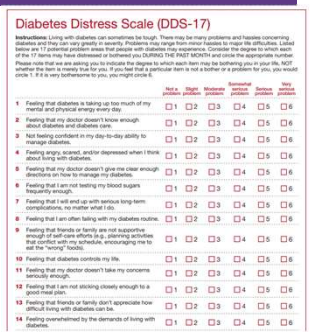
Diabetes Distress

- High levels of diabetes distress significantly impact medication-taking behaviors and are linked to higher A1C, lower self-efficacy, and poorer dietary and exercise behaviors

- Assess for Diabetes Distress yearly
- Mindful Self-Compassion is important
- Counseling and DSME can help

Diabetes Distress Scale cont.

- Feeling that diabetes is taking up too much of my mental and physical energy every day.
- Feeling that my doctor doesn't know enough about diabetes and diabetes care/ doesn't give me clear enough directions.
- Feeling angry, scared, and/or depressed … think about living with diabetes
- 4. Feeling that I am not testing my blood sugars frequently enough.
- 5. Feeling that I am often failing with my diabetes routine.
- Feeling that friends or family are not supportive enough of self-care efforts (planning activities that …, encourage me to eat the "wrong" foods).
- 7. Feeling that diabetes controls my life.
- 8. *Not feeling motivated* to keep up my diabetes self management.



Diabetes Distress Scale (DDS-17)

Instructions: Living with diabetes can sometimes be tough. There may be many problems and hassles concerning diabetes and they can vary greatly in severity. Problems may range from minor hassles to major life difficulties. Listed below are 17 potential problem areas that people with diabetes may experience. Consider the degree to which each of the 17 items may have distressed or bothered you DURING THE PAST MONTH and circle the appropriate number. Please note that we are asking you to indicate the degree to which each item may be bothering you in your life, NOT whether the item is merely true for you. If you feel that a particular item is not a bother or a problem for you, you would circle 1. If it is very bothersome to you, you might circle 6.

		Not a problem	Slight problem	Moderate problem	Somewhat serious problem	Serious problem	Very serious problem
1	Feeling that diabetes is taking up too much of my mental and physical energy every day.	☐1	☐2	☐3	☐4	☐5	☐6
2	Feeling that my doctor doesn't know enough about diabetes and diabetes care.	☐1	☐2	☐3	☐4	☐5	☐6
3	Not feeling confident in my day-to-day ability to manage diabetes.	☐1	☐2	☐3	☐4	☐5	☐6
4	Feeling angry, scared, and/or depressed when I think about living with diabetes.	☐1	☐2	☐3	☐4	☐5	☐6
5	Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.	☐1	☐2	☐3	☐4	☐5	☐6
6	Feeling that I am not testing my blood sugars frequently enough.	☐1	☐2	☐3	☐4	☐5	☐6
7	Feeling that I will end up with serious long-term complications, no matter what I do.	☐1	☐2	☐3	☐4	☐5	☐6
8	Feeling that I am often failing with my diabetes routine.	☐1	☐2	☐3	☐4	☐5	☐6
9	Feeling that friends or family are not supportive enough of self-care efforts (e.g., planning activities that conflict with my schedule, encouraging me to eat the "wrong" foods).	☐1	☐2	☐3	☐4	☐5	☐6
10	Feeling that diabetes controls my life.	☐1	☐2	☐3	☐4	☐5	☐6
11	Feeling that my doctor doesn't take my concerns seriously enough.	☐1	☐2	☐3	☐4	☐5	☐6
12	Feeling that I am not sticking closely enough to a good meal plan.	☐1	☐2	☐3	☐4	☐5	☐6
13	Feeling that friends or family don't appreciate how difficult living with diabetes can be.	☐1	☐2	☐3	☐4	☐5	☐6
14	Feeling overwhelmed by the demands of living with diabetes.	☐1	☐2	☐3	☐4	☐5	☐6

https://professional.diabetes.org/sites/default/files/media/ada_mental_health_toolkit_questionnaires.pdf.

Initial Eval – Looking for Comorbidities

- Other conditions that may appear
  - Cancer
  - Cognitive impairment
  - Hyper/Hypoglycemia
  - Psychosocial/Emotional Issues
  - Obstructive sleep apnea
  - Steatosis
  - Pancreatitis
  - Low Testosterone in Men
  - Sexual Health
  - Hearing Impairment
  - Fractures
  - Periodontal disease
  - Cardiovascular disease

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

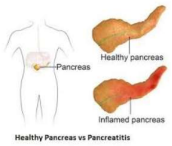
Type 3c Diabetes (Pancreatogenic)

- Includes both structural and functional loss of insulin secretion in the context of exocrine pancreatic dysfunction.
- About 5-10% of diabetes, often misdiagnosed as type 2 diabetes.
- The diverse set of etiologies includes:
  - pancreatitis (acute and chronic) ~70%
  - trauma or pancreatectomy
  - neoplasia
  - cystic fibrosis
  - hemochromatosis
  - fibrocalculous pancreatopathy
  - rare genetic disorders, and idiopathic

2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes—2025

Pancreatitis

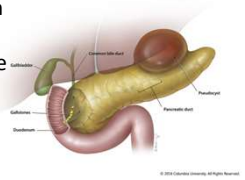
- People with diabetes 2xs risk of acute pancreatitis
- After episode of pancreatitis, one third of people will get prediabetes or diabetes
- Pancreatitis is an exocrine dysfunction:
  - Disrupts global architecture or physiology of pancreas
  - Results in both exocrine and endocrine dysfunction



Healthy Pancreas vs Pancreatitis

Pancreatitis

- Pancreatitis caused by digestion of the organ from pancreatic enzymes normally carried to the SI through pancreatic duct.
- Detected through elevated Amylase levels & pain
- Causes:
  - HIV meds and other meds
  - Alcohol ingestion
  - Gallstones blocking pancreatic enzyme flow to SI
  - Elevated triglycerides
  - Cancer, injury and other

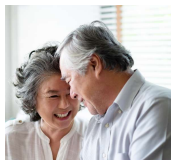


The American Cancer Society's estimates for pancreatic cancer in U.S. for 2023 are:
• About 64,050 people will be diagnosed with pancreatic cancer.
• About 50,550 people will die of pancreatic cancer.
• Pancreatic cancer accounts for about 3% of all cancers in the US and about 7% of all cancer deaths.

https://pancan.org/

Cancer and Diabetes

- Diabetes is associated with increased risk of cancers of:
  - liver, pancreas, endometrium, colon and rectum, breast, and bladder.
- Association may result from shared risk factors between type 2 diabetes and cancer
  - Older age, obesity, and physical inactivity
  - May also be due to diabetes-related factors such as underlying disease physiology
  - Encourage people with diabetes to undergo recommended age-and sex-appropriate cancer screenings



4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Fractures

- Hip fractures:
  - Type 1 - 6.3 relative risk associated w/ osteoporosis
  - Type 2 – 1.7 relative risk
- Health care professionals can:
  - Assess risk fracture risk and history, esp with older clients
  - Recommend bone mineral density assessment
  - Assess if would benefit from vita d supplement
  - Home health/ Physical Therapy
  - Use TZDs and SGLT's with caution

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Bone Mineral Density Testing

- People aged ≥65 years
- Postmenopausal women and men aged ≥50 years with history of adult-age fracture or with diabetes–specific risk factors:
  - Frequent hypoglycemic events
  - Diabetes duration >10 years
  - Diabetes medications: insulin, thiazolidinediones, sulfonylureas
  - A1C >8%
  - Peripheral or autonomic neuropathy, retinopathy, nephropathy
  - Frequent falls
  - Glucocorticoid use

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

If at Risk for Fracture - Advise people with diabetes on their intake of calcium (1,000–1,200 mg/day) and vitamin D to ensure it meets the recommended daily allowance through their diet or supplemental means.

Sensory Impairment

- Hearing impairment 2xs as common in diabetes
  - Due to oxidative stress + hyperglycemia
  - Leads to cochlear microangiopathy and auditory neuropathy
- Risk factors
  - Low HDL cholesterol, coronary heart disease, peripheral neuropathy, and general poor health have been reported as risk factors for hearing impairment

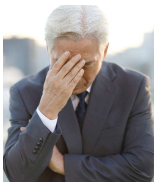
4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Cognitive Impairment

- Meta-analysis showed individuals with diabetes had
  - 43% higher risk of all types of dementia,
  - 43% higher risk of Alzheimer dementia
  - 91% higher risk of vascular dementia
  - compared with individuals without diabetes

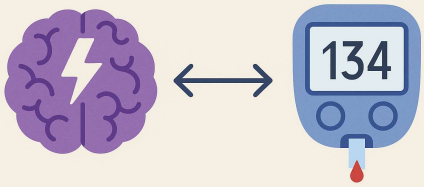
4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

- People with Alzheimer dementia are more likely to develop diabetes than people without Alzheimer dementia.



Diabetes Type 3

TYPE 3 DIABETES



The link between insulin resistance and neurodegeneration

What is 'Type 3 Diabetes'?

- A term linking Alzheimer's disease to insulin resistance in the brain.
- Not an official diagnostic category.
- Still an emerging field with ongoing studies
- Suggests that Alzheimer's may be a form of brain-specific diabetes.

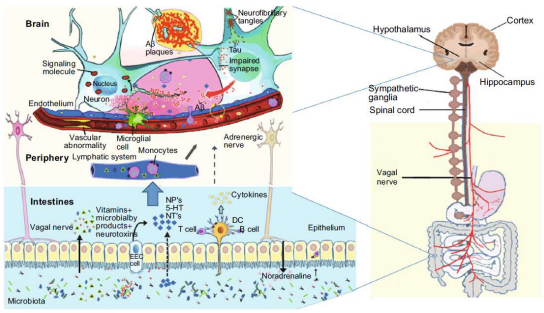
• Int J Mol Sci. 2020 Apr 30;21(9):3165. doi: 10.3390/ijms21093165

Type 3 Diabetes and Its Role Implications in Alzheimer's Disease

Alzheimer's & Diabetes Link

- Type 2 Diabetes increases Alzheimer's risk by 60–80%
- Reduced insulin receptors in brains of people with Alzheimer's
- Insulin signaling is crucial for clearing amyloid beta plaques from brain.
- The brain uses insulin for memory and learning- neuromodulator.
- Insulin resistance contributes to cognitive decline.
- Amyloid beta plaques and tau tangles are influenced by insulin signaling and availability.
- Lead to neurodegeneration.

Link Between Gut and Brain



Review

The Microbiota–Gut–Brain Axis and Neurological Disorders: A Comprehensive Review

Potential Interventions

- Lifestyle: Mediterranean diet, physical activity.
- Optimize glucose and blood pressure.
- Investigational: Intranasal insulin, GLP-1 agonists
- Reduce systemic inflammation.
- Improved nutrition and gut health.

'Type 3 Diabetes' reflects the link between metabolic and brain health

Early intervention can support cognitive function

Encourages whole-person, compassionate care

Summary

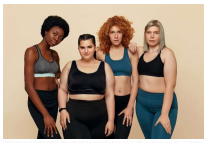
Assess Sexual Health

- In men with diabetes or prediabetes:
  - 52.5% in men with diabetes have ED.
  - inquire about sexual health (e.g., low libido and erectile dysfunction [ED].
  - If symptoms and/or signs of hypogonadism are detected (e.g., low libido, ED, and depression), screen with a morning serum total testosterone level.
  - Best predictors of ED are age (>40 years), CVD, diabetes, hypertension, obesity, dyslipidemia, metabolic syndrome, hypogonadism, smoking, depression, and use of medications such as antidepressants and opioids.
  - ED is also a predicator of heart disease.
  - Assess, treat and refer

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Assess Sexual Health

- In women with diabetes or prediabetes, assess sexual health:
- 33% reported female sexual dysfunction (FSD)
- Screen for desire (libido), arousal, orgasm difficulties, particularly in those with depression and/or anxiety and those with recurrent urinary tract infections.
- In postmenopausal women - screen for symptoms and/or signs of genitourinary syndrome of menopause, including vaginal dryness and dyspareunia.



4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Obstructive Sleep Apnea - OSA

- OSA affects ~25% of people with type 2
  - Up to 60% of those with type 2 have disordered sleep
- Associated with increased CVD risk
- Signs include excessive daytime sleepiness, snoring and witnessed apnea
- Treatment:
  - Lifestyle modification
  - Continuous positive oral airway pressure and devices
  - Surgery

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Liver Nomenclature Update

Old Terms	New Terms
Fatty Liver Disease	Steatotic Liver Disease
Non-Alcoholic Steatohepatitis (NASH)	Metabolic Dysfunction-Associated Steatohepatitis (MASH)
Non-Alcoholic Fatty Liver Disease (NAFLD)	Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD)

Poll Question 9

- What best describes diabetes and Metabolic dysfunction–associated steatotic liver disease (MASLD)?

A. More than 60% of people with diabetes have MASLD.

B. MASLD likely to be found in individuals with type 2 diabetes and BMI < 25

C. Children don't exhibit MASLD.

D. Almost all people with diabetes have MASLD.

MASH & Steatohepatitis

Adults with type 2 diabetes.

- >70% have MASLD
  - Of those 50% have MASH*
  - 12-20% have fibrosis
- Adults with type 1
  - 20% have MASLD
- **Associated with :**

- Increased BMI (30+)
- Cardiometabolic risk factors
- Over 50 yrs
- *ALT & AST 30 units/L +

***ALT & AST**
(Eval if more if 30+ for 6 mo's - ADA)

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Metabolic Associated Steatohepatitis

MASH is when fat reaches 5% of the liver's weight

Without consumption of significant amounts of alcohol defined as:

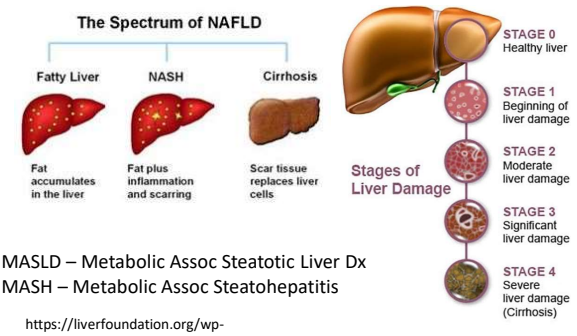
- Ingestion of less than 21 standard drinks per week in men and
- Less than 14 standard drinks per week in women

over a 2-year period preceding evaluation) or the presence of other secondary causes of Steatosis disease.

Metabolic dysfunction–associated steatotic liver disease (MASLD)

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Natural History of MASLD to MASH



MASLD – Metabolic Assoc Steatotic Liver Dx
MASH – Metabolic Assoc Steatohepatitis

https://liverfoundation.org/wp-content/uploads/2020/11/StagesFibrosis.jpg

Symptoms of Steatosis

If symptoms do appear, they may include:

- A feeling of fullness in the middle or upper right side of the abdomen
- Abdominal pain, nausea
- Loss of appetite or weight loss
- Weakness
- Jaundice

https://dermcollective.com/palmar-erythema/

- Swelling of the abdomen and legs
- Mental confusion
- Extreme fatigue or tiredness
- Signs of advanced disease include:
  - Portal hypertension, spider angiomas, reddening of palms, declining platelet counts

Mayo Clinic

Poll Question 10

- AR lives with type 2 diabetes, and their waistline is 41 inches. Since their ALT and AST levels are elevated, you know they are at risk for steatosis (MASH). You quickly calculate their Fibrosis-4 Index (FIB-4), by plugging in AR's Age, AST, ALT, platelet count into the FIB-4 calculator. AR's result is 2.83. According to the ADA Standards, with a FIB-4 value of 2.83, which action is required?

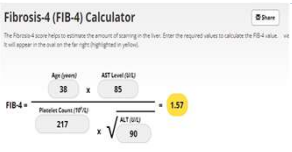
A. Start AR on pioglitazone and recheck FIB-4 in 3 months.

B. Encourage AR to see a RDN and stop consumption of alcohol immediately.

C. Suggest increased high intensity activity coupled with a GLP-1 to reduce body weight.

D. Refer AR to liver specialist for further evaluation.

Screening for NASH – FIB-4



- The American College of Gastroenterology considers Upper limit of normal ALT levels:
- 29–33 units/L for males
- 19–25 units/L for female individuals

(mdcalc.com/calc/2200/fibrosis-4-fib-4-index-liver-fibrosis).

FIB-4 estimates risk of hepatic cirrhosis (age 35+):

- Calculated by imputing:
  - Age
  - plasma aminotransferases (AST and ALT)
  - and platelet count
- FIB-4 Risk Levels
  - Lower risk is <1.3
  - Intermediate 1.3 to 2.67
  - High risk >2.67
    - considered as having a high probability of advanced fibrosis (F3–F4).

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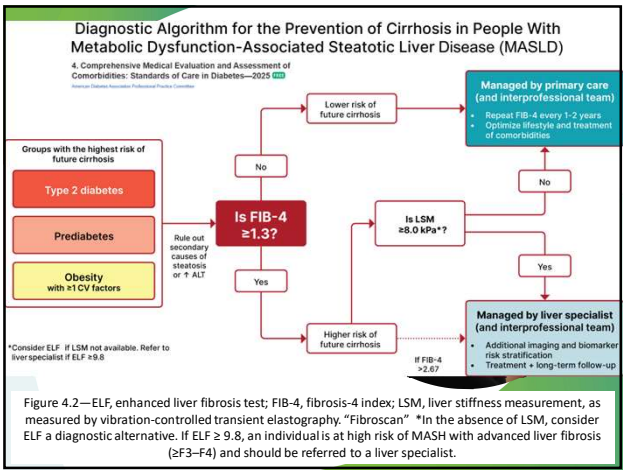
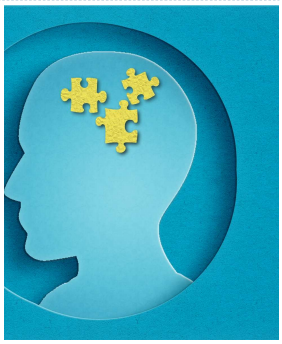


Figure 4.2—ELF, enhanced liver fibrosis test; FIB-4, fibrosis-4 index; LSM, liver stiffness measurement, as measured by vibration-controlled transient elastography. "Fibroscan" *In the absence of LSM, consider ELF a diagnostic alternative. If ELF ≥ 9.8, an individual is at high risk of MASH with advanced liver fibrosis (≥F3–F4) and should be referred to a liver specialist.

Question : What does a Liver Elastography reveal?

The provider is sending JR for a Liver Elastography or FibroScan test since JR has elevated ALT and AST levels along with an elevated Fib-4 score. Which of the following are measured during this liver ultrasound procedure?

A. Liver diameter and density.
B. Liver scarring and ductal health.
C. Hepatocyte density and distribution.
D. Liver stiffness and fat density.



Other Treatments for NAFLD and NASH

- Meds that lower glucose, cholesterol and weight
- Bariatric surgery
- Pioglitazone (Actos)
  - Improves lipid and glucose metabolism
  - Reverses steatohepatitis in prediabetes/diabetes
  - Causes 1-2% wt gain at 15 mg
  - 3-5% wt gain at 45 mg
- GLP-1 Receptor Agonists (semaglutide)

Support lifestyle changes

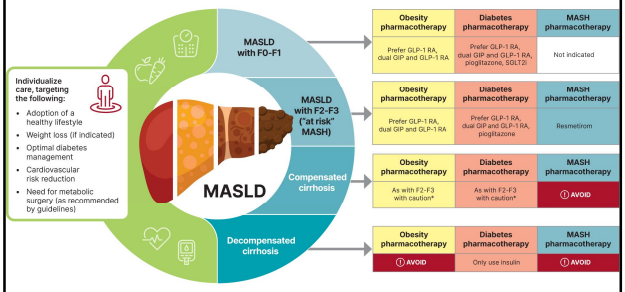
4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Actions To Decrease Steatosis

- Increase activity
  - Strength training
  - Yoga or Thai Chi
  - Walking & aerobics
- Thoughtful eating
  - More fiber
  - Less processed foods & less added sugar
  - Avoid alcohol
- Treatment
  - Pioglitazone
  - GLP-1 – semaglutide
  - Resmetirom
  - Statin
- Prevention
  - Cancer Screenings
  - Decrease inflammation

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Metabolic Dysfunction–Associated Steatotic Liver Disease (MASLD) Treatment Algorithm



*Individualized care and close monitoring needed in compensated cirrhosis given limited safety data available.

F0-F1, no to minimal fibrosis; F2-F3, moderate fibrosis; F4, cirrhosis;

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

JR Return Visit 1 Year – Big Strides

- A1c 6.6%
- LDL 104 (was 164), Trig 169
- B/P 128/76
- UACR < 30, GFR >60
- Liver enzymes below 30
- Saw dentist
- Exercising regularly

- Meds include:
  - Metformin 2000 mg
  - Empagliflozin 25 mg
  - Pioglitazone 15mg (for liver)
  - ~~Glipizide 20 mg BID~~
  - ~~Basal insulin 15 units~~
  - Lovastatin 40 mg (increase?)
  - Lisinopril 40 mg

- JR checks BG 7 -10 times a week.
  - Experiencing 2-3 lows a week
  - Lowest BG was 54
  - Highest 198

Decide to hold insulin and stop glipizide. If BG levels increase, add GLP-1 to plan. Return in 3 mo's

6. Glycemic Goals & Hypo

A1C

Blood Pressure

Cardiovascular risk reduction

ADA 2025 Summary

A1c less than 7% (individualize)	Blood Pressure <130/80	Cholesterol
• Pre-meal BG 80-130 • Post meal BG <180 • Time in Range (70-180) 70% of time		• Statin therapy based on age & risk status • If 40+ with ASCVD Risk, decrease LDL by 50%, LDL <70 • If 40+ with ASCVD, decrease LDL by 50%, LDL <55

Poll Question 11

- Which of the following methods can be used to assess glycemic status?
  - A. A1C
  - B. Blood glucose monitoring
  - C. Time in Range
  - D. Fructosamine
  - E. All of the above

Assess Glycemic Status

- A1C measurement
- Blood glucose monitoring (BGM)
  - by capillary (finger-stick) devices
- Continuous glucose monitoring (CGM)
  - using time in range (TIR) or
  - mean CGM glucose.
- Fructosamine – 2-4 wk glucose average
  - glycated albumin for those with anemia or hemoglobinopathies

6. Glycemic Goals and Hypoglycemia: Standards of Care in Diabetes—2025

A1c and Estimated Avg Glucose (eAG)

A1c (%)	eAG
5	**97** (76-120)
6	**126** (100-152)
7	**154** (123-185)
8	**183** (147-217)
9	**212** (170 -249)
10	**240** (193-282)
11	**269** (217-314)
12	**298** (240-347)

eAG = 28.7 x A1c-46.7 ~ 29 pts per 1%
Translating the A1c Assay Into eAG – ADAG Study

6. Glycemic Targets: *Standards of Medical Care in Diabetes—2020*

American Diabetes Association
Diabetes Care 2020 Jan; 43(Supplement 1): S66-S76.
https://doi.org/10.2337/dc20-S006

Ambulatory Glucose Profile

- Standardized report with visual cues for those on CGM devices
- For most with type 1 or type 2 diabetes
  - > 70% of readings within BG range of 70-180mg/dL
  - < 4% of readings < 70 mg/dL
  - < 1% of readings < 54 mg/dL
  - < 25% of readings > 180 mg/dL
  - < 5% of readings > 250 mg/dL

For those with frailty or at high risk of hypoglycemia recommend:
- Target of 50% time in range
- Less than1% time below range

6. Glycemic Goals and Hypoglycemia: Standards of Care in Diabetes—2025 FREE

Time in Range (TIR)

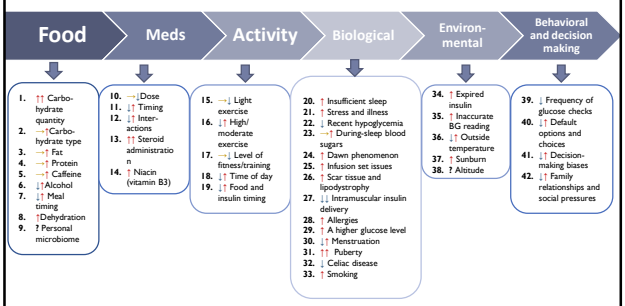
- Strong correlation between TIR and A1C, with a goal of 70% TIR aligning with an A1C of ~7%
- For older adults using CGM, the recommended percent time spent in target range of 70–180 mg/dL is 50%, Hypo < 1%
- *Critical that the glycemic goals be woven into an individualized, person-centered strategy*

6. Glycemic Goals and Hypoglycemia: Standards of Care in Diabetes—2025

Time In Range – Person Centered

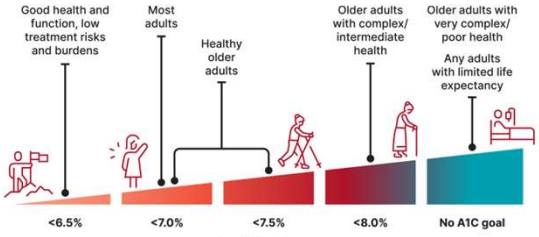
- "Hyperglance-emia"
- Each 1% is 15 minutes (4% an hour)
- There is 24 hours in a day.
  - Goal is 17 hours in range = 70% TIR = A1C of 7%
  - You get 7 hours outside of range.
- You are not defined by your blood glucose.
- What range feels safe for you?
- Try and step back and take in the whole picture.
- Sometimes you need a donut!

At least 42 factors affect glucose!



Adapted from Brown A. DiaTribe Learn: Making sense of diabetes… diatribe.org/42factors

"The highest form of wisdom is kindness."
The Talmud



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

Table 6.2

6. Glycemic Goals and Hypoglycemia: Standards of Care in Diabetes—2025

Cardiac and Renal Disease

- The combination of 3 comorbidities has been termed *cardiorenal metabolic disease* or *cardiovascular-kidney-metabolic* health
  - ASCVD, heart failure, and chronic kidney disease (CKD)
- Recognized interrelationship of cardiometabolic risk factors leading to cardiovascular disease and adverse kidney outcomes in people with diabetes.
  - 3 comorbidities frequently associated with metabolic risk factors & extra weight
  - Incidence of all three conditions rises with *increasing* A1C levels.

10. Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025

Diabetes Meds Lower CardioRenal Risk

- If diabetes plus ASCVD risk factors
  - SGLT-2s* and GLP-1s* reduce risk of major adverse CV events
  - Plus ACE or ARB
  - Post MI, continue beta blockers for 3 years.
- If type 2 diabetes and heart failure
  - SGLT-2s reduce risk of heart failure and hospitalization.
  - Also consider beta blocker

10. Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025

Poll Question 12

- Evaluating kidney function is important to determine most beneficial treatment interventions. Which of the following measurements would indicate that JR has healthy kidney function?

A. Urinary albumin creatinine ratio of 30-299 mg/g with GFR of 45.
B. GFR of 60 or greater and urinary albumin creatinine ratio of 12 mg/g.
C. Urinary albumin creatinine ratio less than 30 mg/g and GFR of 30-45.

- Creatinine of 1.5 and urinary albumin creatinine ratio of 300 mg/g or greater.

CKD– 2025 Update

- Optimize glucose and BP to protect kidneys
- Use SGLT-2 with demonstrated benefit to reduce CKD and CVD*
- To reduce CV risk and CKD, use a GLP-1* with demonstrated benefit.
- In people with CKD and albuminuria, a nonsteroidal MRA effective if GFR 25+
- Aim to reduce urinary albumin by ≥30% in people with CKD
  - *SGLT-2i's
    - Empagliflozin, canagliflozin, dapagliflozin
  - *GLP-1 RA's
    - Semaglutide has indication, liraglutide dulaglutide

Albuminuria Categories	Urinary Albumin Creatine Ratio (UACR)
Normal to mildly increased – A1	< 30 mg/g
Moderately increased – A2	30 – 299 mg/g
Severely increased – A3	300 mg/g +

Kidney Disease Stage	GFR
Stage 1 – Normal	90+
Stage 2 – Mild loss	89 - 60
Stage 3a – Mild to Mod	59 - 45
Stage 3b – Mod to Severe	44 - 30
Stage 4 – Severe loss	29 -15
Stage 5 – Kidney failure	14 - 0

11. Chronic Kidney Disease and Risk Management: Standards of Care in Diabetes—2025

Standard 11 – Protect Kidneys

- Diabetes with a
  - GFR ≥20 and
  - UACR ≥200 mg/g
- Start SGLT2 to reduce chronic kidney disease progression and cardiovascular events.

- If type 2 diabetes and established Chronic Kidney Disease (CKD)
  - Start nonsteroidal mineralocorticoid receptor antagonist (Finerenone) and/or GLP-1 RA recommended for cardiovascular risk reduction.

11. Chronic Kidney Disease and Risk Management: *Standards of Care in Diabetes—2024*

Finerenone Resource

New nonsteroidal MRAs for Type 2 and Chronic Kidney Disease

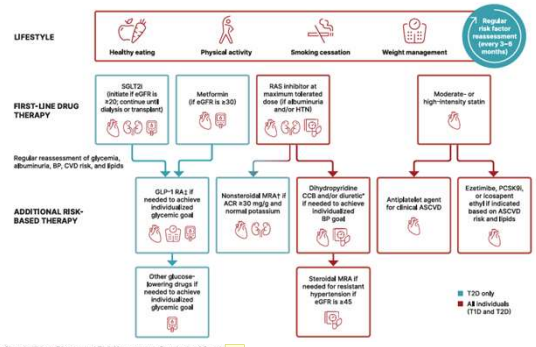
Nonsteroidal Selective Mineralocorticoid Antagonist

Indicated for people with chronic kidney disease (CKD) associated with Type 2 diabetes. Reduces the risk of kidney function decline, kidney failure, cardiovascular death, non-fatal heart attacks, and hospitalization for heart failure in adults with chronic kidney disease associated with type 2 diabetes. The mineralocorticoid receptor antagonist blocks the effects of aldosterone and reduces the risk of kidney function decline as well as heart failure.

Class / Action	Generic / Trade Name	Daily Dose	Frequency	Considerations
Nonsteroidal, selective mineralocorticoid antagonist. Blocks mineralocorticoid receptor mediated sodium reabsorption and mineralocorticoid overactivation in epithelial (for example kidneys) and nonepithelial (for example heart, blood vessels) tissues.	**Finerenone / Kerendia**	**10-20 mg**	**Once daily**	Monitor potassium 4 weeks after initiation or dose adjustment (although impact on potassium is much less than non-slective mineralocorticoid antagonists like spironolactone). Since medication is a CYP3A4 substrate, avoid taking with other strong cype3A4 inhibitors. Avoid grapefruit or grapefruit juice. May take with or without food.

Contributor: Diana Isaacs, PharmD, BCPS, BCACP, BC-ADM, CDCES, FADCES, FCCP 2022

Figure 11-12 Holistic Approach to Diabetes + CKD



11. Chronic Kidney Disease and Risk Management: Standards of Care in Diabetes—2025 DI1

Slide 156

DI1 New slide

Diana Isaacs, 2025-08-25T02:19:23.837

Risk of CKD Progression, CVD

11. Chronic Kidney Disease and Risk Management: Standards of Care in Diabetes—2025

CKD is classified based on:
- GFR (G)
- Albuminuria (A)

GFR categories (mL/min/1.73 m²) Description and range				Albuminuria categories Description and range A1 Normal to mildly increased <30 mg/g <3 mg/mmol	A2 Moderately increased 30-299 mg/g 3-29 mg/mmol	A3 Severely increased ≥300 mg/g ≥30 mg/mmol
	G1	Normal or high	≥90	Screen 1	Treat 1	Treat and refer 2
	G2	Mildly decreased	60-89	Screen 1	Treat 1	Treat and refer 2
	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

Kidney Goals and MNT

- In people with chronic kidney disease with UACR ≥300 mg/g
- Goal is a reduction of 30% or greater in mg/g urinary albumin to slow chronic kidney disease progression

11. Chronic Kidney Disease and Risk Management: Standards of Care in Diabetes—2025

- Nutrition Recommendations
- For people with non–dialysis-dependent stage 3 or higher chronic kidney disease
  - dietary protein intake aimed to a target level of 0.8 g/kg body weight per day.
- For those on dialysis,
  - consider protein intake of 1.0–1.2 g/kg/day since protein energy wasting is a major problem in some individuals on dialysis
- Refer to nephrology
  - If GFR < 30 or uncertain CKD etiology

10. Cardiovascular Disease and Risk Management

- Higher risk of Atherosclerotic cardiovascular disease (ASCVD):
  - history of acute coronary syndrome,
  - myocardial infarction (MI),
  - stable or unstable angina,
  - coronary or other arterial revascularization,
  - stroke, transient ischemic attack,
  - or peripheral artery disease (PAD) including aortic aneurysm.
- 2x high risk of Heart Failure
- Leading cause of morbidity and mortality in people with diabetes

Large benefits are seen when multiple CV risk factors are addressed simultaneously

With more aggressive goals, rates of CVD have decreased.
CV Risks predicted to increase in future.

10. Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025

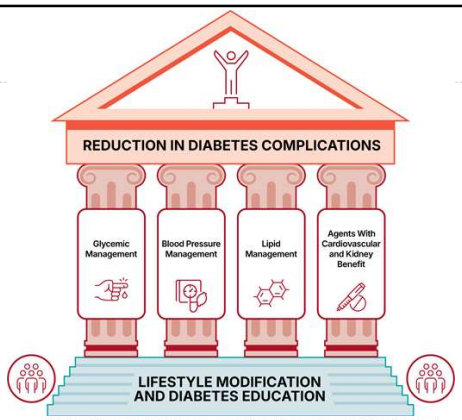
Assess ASCVD and Heart Failure Risk Yearly

- Duration of diabetes & 55+
- BMI
- Hypertension
- Dyslipidemia
- Smoking
- Family history of premature coronary disease
- Chronic kidney disease – presence of albuminuria

Treat modifiable risk factors as described in ADA guidelines.

10. Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025 FREE

American Diabetes Association Professional Practice Committee



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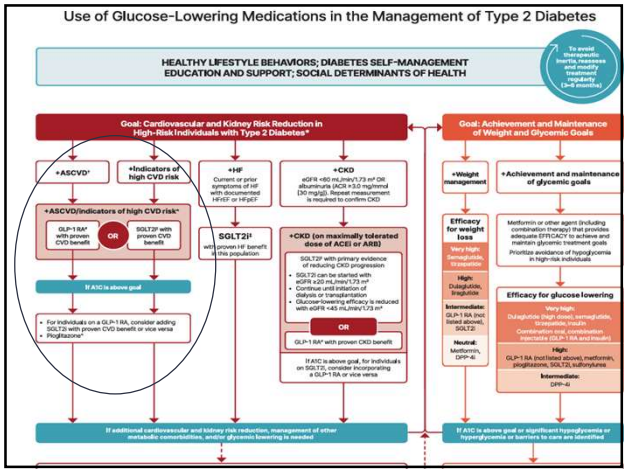
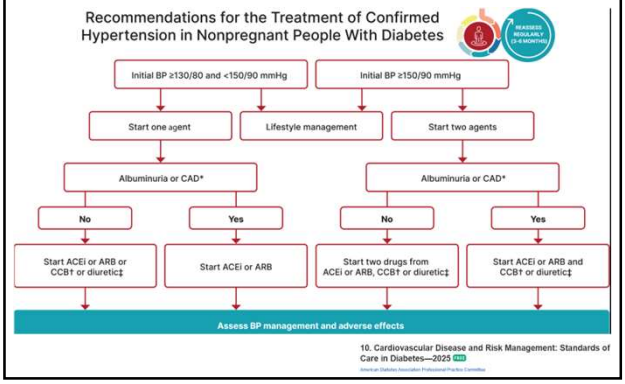


Poll Question 13

- RJ is a 57 yr old with diabetes. RJ takes an ACE Inhibitor, insulin and a statin. They smoke a pack of cigarettes a day.
- According to ADA Standards of Care, what is the blood pressure target for RJ?
- A. Less than 120/80
- B. Less than 130/80
- C. Less than 140/90
- D. Less than 135 /85

Hypertension Management



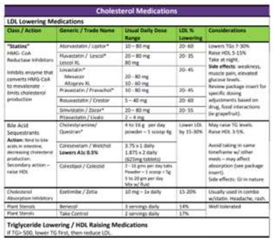
BP Treatment in addition to Lifestyle

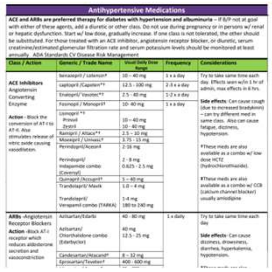
- **First Line BP Drugs if 130/80 +**
  - With albuminuria or CAD
    - Start either ACE or ARB*
  - No albuminuria - Any of the 4 classes of BP meds can be used:
    - ACE Inhibitors, ARBs, thiazide-like diuretics or calcium channel blockers.
    - Monitor K+/Scr 7-14 days after initiation and dose increase for diuretics, ACEI/ARB
  - Avoid ACE and ARB at same time
  - Multiple Drug Therapy often required
- **If BP ≥ 150 /90 start 2 drug combo**

*Albuminuria = Urinary albumin creatinine ratio of 30+

10. Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025

Lipid and HTN Meds Cheat Sheets





Website: https://diabetesed.net/coach-bevs-diabetes-cheat-sheets/
On CDCES Coach App too

For exam, know major classes, when used, side effects and considerations.

Poll Question 13

RZ is 47 years old with type 2 diabetes and hypertension. RZ takes metformin 1000 mg BID, plus lisinopril 20mg daily. RZs LDL is 130 mg/dL. Based on the most recent ADA Standards, what is the LDL Cholesterol target for RZ?

A. LDL less than 100 mg/dL.
B. Lower LDL by 50%.
C. LDL target of 70 mg/dL or less.
D. Determine LDL target based on ASCVD risk.

Lipid Monitoring and Lifestyle Treatment Strategies

- Lipid Goals
  - LDL < 70 or 55 based on risk
  - HDL >40
  - Triglycerides <150

Monitoring:
If **not** taking statins and underage of 40.
- check at time of diagnosis and every 5 yrs.
On statin
Monitor lipids at diagnosis and yearly.
Monitor lipids 4-12 weeks after statin dose adjustment.

- Weight loss if indicated
- Mediterranean or DASH Diet
- Reduction of saturated fat intake
- Increase of omega-3 fatty acids, viscous fibers and plant stanols/sterols
- Increase activity level
- BG lowering helps lower triglycerides and increase HDL

10. Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025

Statin Therapy

- High intensity statins (lowers LDL 50%):
  - atorvastatin (Lipitor) 40-80mg
  - rosuvastatin (Crestor) 20-40mg

- Moderate intensity (lowers LDL 30-50%)
  - atorvastatin (Lipitor) 10-20mg
  - rosuvastatin (Crestor) 5-10mg
  - simvastatin (Zocor) 20-40mg
  - pravastatin (Pravachol) 40 – 80mg
  - lovastatin (Mevacor) 40 mg
  - fluvastatin (Lescol) XL 80mg
  - pitavastatin (Livalo) 1-4mg

10. Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025

New Lipid Lowering Medications

Contributor: Diana Isaacs, PharmD, BCPS, BCACP, BC-ADM, CDCES, FADCES, FCCP 2022

PCSK9 Inhibitors Lipid Medications
Proprotein convertase subtilisin/kexin type 9

	Alirocumab (Praluent)	Evolocumab (Repatha)
FDA-approved indications	• Primary hyperlipidemia (HLD) • Homozygous familial hypercholesterolemia (HoFH) • Secondary prevention of cardiac events	
Dosing	• **HoFH**: 150 mg SC q2 weeks • **HLD or secondary cardiac prevention**: 75 mg SC q2 weeks or 300 mg SC q4 weeks; if adequate LDL response not achieved, may increase to max of 150 mg q2 weeks	• **HoFH**: 420 mg SC q4 weeks; may increase to 420 mg q2 weeks if meaningful response not achieved in 12 weeks • **HLD or secondary cardiac prevention**: 140 mg q2 weeks or 420 mg q4 weeks
Dosage forms	• Auto-injector 75 mg/mL or 150 mg/mL	• Repatha Sure Click (auto-injector) 140 mg/mL • Repatha Pushtronex System (single use infusor with pre-filled cartridge) 420 mg/3.5 mL – administered over 9 minutes
Storage	• Store in refrigerator in outer carton until used • Once used, keep at room temperature, use within 30 days	
Injection clinical pearls	• Do not shake or warm with water • Administer by SC injection into thigh, abdomen, or upper arm • Rotate injection site with each injection	
Drug interactions	• No known significant interactions	
Monitoring parameters	• Lipid panel before initiating therapy, 4-12 weeks after initiating, and q3-12 months thereafter	
Side effects	• Injection site reaction (4-17%) • Hypersensitivity reaction (9%) • Influenza (6%) • Myalgia (4-6%) • Diarrhea (5%)	• Nasopharyngitis (6-11%) • Upper respiratory tract infection (9%) • Diabetes mellitus (9%) • Influenza (8-9%) • Injection site reaction (6%) • Myalgia (4%)

From Meds Cheat Sheet Page

Lipid Therapy in Diabetes by Age

- All ages 20+ *with* ASCVD, add high-intensity statin to lifestyle
- 20–39 and additional ASCVD risk factors
  - may be reasonable to initiate statin therapy in addition to lifestyle.
- 40-75 years
  - Moderate to high intensity statin based on risk (see previous slides)
- 75 years or older and already on statin
  - it is reasonable to continue statin treatment.
- 75 years or older
  - it may be reasonable to initiate moderate-intensity statin therapy after discussion of potential benefits and risks.

10. Cardiovascular Disease and Risk Management: Standards of Care in Diabetes—2025

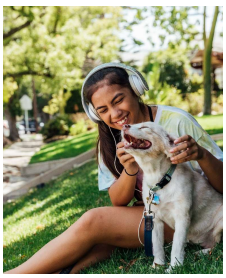
Tobacco, Electronic Cigarettes, Alcohol, and Cannabis

Advise all youth with diabetes not to use cannabis recreationally in any form.

- 2 to 3 times higher risk of developing DKA.
- Can lead to cannabis hyperemesis syndrome

- Screen adolescents and young for tobacco or nicotine, electronic cigarettes, substance use, and alcohol use at diagnosis and regularly thereafter.

- Discourage smoking in youth who do not smoke and encourage smoking cessation in those who do smoke (including electronic cigarette use or vaping)



14. Children and Adolescents: Standards of Care in Diabetes—2025

RL needs your help

- A1C 8.9% (down from 10.4%)
- B/P 139/76 AM BG 100, 2 hr pp 190
- Chol – TG 54, HDL 46, LDL 98
- GFR 47, UACR 34 mg/g

- Meds:
  - Insulin – 28 units glargine insulin
  - Losartan 25mg – ARB for blood pressure
  - Metoprolol 50mg – Beta blocker
  - Glyburide 5mg BID - Sulfonylurea

Any special instructions?
Any meds missing?
Stop any meds?

RL Needs Your Help

- A1c 8.9% (down from 10.4%)
- B/P 139/76 AM BG 100, 2 hr pp 190
- Chol – TG 54, HDL 46, LDL 98
- GFR 47, UACR 34 mg/g

- Meds:
  - Insulin – 28 units glargine insulin
  - Losartan 25mg – ARB for blood pressure
  - Metoprolol 50mg – Beta blocker
  - Glyburide 5mg BID - Sulfonylurea

Special instruction – sweating may indicate hypoglycemia

Any special instructions?
Any meds missing?
- Statin
- SGLT 2
- Aspirin?
Stop any meds?

ABC's of Diabetes

- A1c less than 7% (individualize)
  - Pre-meal BG 80-130
  - Post meal BG <180
  - AGP - Time in Range (70-180) 70% of time
- Blood Pressure < 130/80
- Cholesterol
  - Statin therapy based on age & risk status
  - If 40+ with ASCVD Risk, decrease 50%, LDL <70
  - If 40+ with ASCVD, decrease 50%, LDL <55

DiaBingo- G

G ADA goal for A1c is less than ____%

G People with DM need to see their provider at least every month

G Blood pressure goal is less than

G People with DM should see eye doctor (ophthalmologist) at least

G The goal for triglyceride level is less than

G Goal for LDL cholesterol for people 40+ with diabetes is _____

G The goal for blood sugars 1-2 hours after a meal is less than:

G People with DM should get this shot every year

G People with DM need to get urine tested yearly for _____

G Periodontal disease indicates increased risk for heart disease

G The goal for blood sugar levels before meals is:

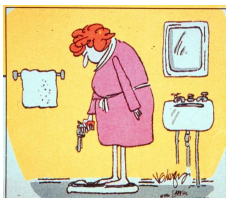
G The activity goal is to do ___ minutes on most days

Stretch and Reflect

- Let's take what we have learned and apply it to some different case studies.

Gaining Weight

- 68 yr old complains of 4 lb wt gain a week for past month. Wt 140lbs, BMI 27. BG levels 200-300s. B/P 142/96
- **Reported** daily meds include:
  - Glyburide 10mg ac breakfast
  - Pioglitazone 30mg ac breakfast
  - Glargine 30units at night
  - Lispro sliding scale with meals
  - Levothyroxine (not sure of dose)
  - Furosemide 20mg a day
  - A new med for "mental health"



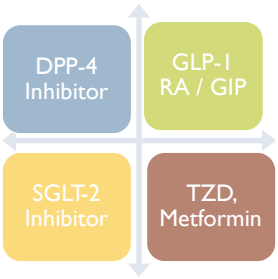
Sulfonylureas - Squirters

- Mechanism: Stimulate beta cells to release insulin
- Dosed 1-2x daily before meals
- Adverse effects
  - Hypoglycemia, Weight gain, watch renal function
- Low cost, $12 for 3 months supply
- Can help with glucose toxicity, lowers A1C 1-2%

Sulfonylureas • Stimulates sustained insulin release	glyburide: (Diabeta) (Glynase PresTabs)	1.25 – 20 mg 0.75 – 12 mg	Can take once or twice daily before meals. Low cost generic. **Side effects**: hypoglycemia and weight gain. Eliminated via kidney.
	glipizide: (Glucotrol) (Glucotrol XL)	2.5 – 40 mg 2.5 – 20 mg	**Caution**: Glyburide most likely to cause hypoglycemia.
	glimepiride (Amaryl)	1.0 – 8 mg	Lowers A1c 1.0% – 2.0%.

Hypoglycemia & Next Steps

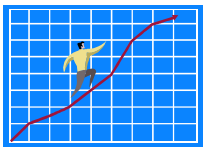
Do NOT Cause Hypoglycemia



Can Cause Hypoglycemia

- Sulfonylurea
- Meglitinides
- Insulin

Fluid Weight Gain



- People with diabetes at greater risk for Congestive Heart Failure (CHF) due to increased CVD risk factors.
- Pioglitazone, (TZD's), can cause fluid weight gain and CHF.
- SGLT2 indicated in people with CHF

Novel/ Atypical Antipsychotics
Linked to Hyperglycemia

- Zyprexa – olanzapine
- Geodon - ziprasidone
- Seroquel – quetiapine
- Risperdal - risperidone
- Clozaril - clozapine
- Abilify – aripiprazole
- Latuda - lurasidone

Consensus Development Conference on Antipsychotic Drugs and

Novel / Atypical Antipsychotics
Linked to Hyperglycemia

- Severe cases of hyperglycemia – even death reported
- Monitor BG regularly for DM individuals started on this class of med
- If at risk for DM, determine fasting glucose before initiating therapy and monitor closely during treatment
- Weight gain may require increased dosing of diabetes therapies.

Summary of FDA warning statement for atypical antipsychotics

ADA Standards 2025 – Section 5

"People eat food, not nutrients, nutrient recommendations need to be applied to WHAT people eat"

STANDARDS OF CARE | DECEMBER 05 2024

5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: Standards of Care in Diabetes—2025

American Diabetes Association Professional Practice Committee

Weight is a Heavy Issue

Weight Stigma

- Weight stigma, fat bias, and anti-fat bias are ways to describe the bias toward people living in larger bodies.
- Fat bias is prevalent among health care professionals and general public.
- Health care professionals are strongly encouraged to increase their awareness of implicit and explicit weight-biased attitudes.
- Increasing empathy and understanding about the complexity of weight management among health care professionals is a useful avenue to help reduce weight bias.

8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes: Standards of Care in Diabetes-2025

Health Behavior Change: Shifting Focus

Health at Every Size (HAES) Principles

- Weight Inclusivity
- Health Enhancement
- Eating for Well-being
- Respectful Care
- Life-Enhancing Movement

"People might think they can tell who's fit and who's not by looking at them, but in fact, it's trickier than that."

Health at Every Size: The Surprising Truth About Your Weight. Dr. Bacon holds a Ph.D. in physiology with a focus on nutrition and weight regulation.

"Lots of people are fat and fit—many avid dancers, runners, lifters, and sports team members are big to start with and stay that way. They tend to be far healthier than thin people who don't move around much or eat a nutritious mix of foods."

"Health at Every Size is about taking care of your body without worrying about whether you're 'too' big or small."

Get a Tape Measure & Other Assessments

Overall - assess individual's
- adipose tissue mass
- using waist circumference
  - 35" woman, 40" man
- waist-to-hip ratio
  - Waist smaller than hips
  - ght ratio
  - alf height
  - ssociated health
  - nsequences:
  - ical, or
  - ell-being

What your Waist-to-Hip Ratio Means

WOMEN	HEALTH RISK	BODY SHAPE
0.80 or below	Low	Pear
0.81 to 0.85	Moderate	Avocado
0.85+	High	Apple
MEN	**HEALTH RISK**	**BODY SHAPE**
0.95 or below	Low	Pear
0.96 to 1.0	Moderate	Avocado
1.0+	High	Apple

Prevention and Treatment of Type 2 35

Interested in Weight Loss?

- Ask Permission
  - Assess readiness/willingness to engage in changes for weight loss
- Use non-judgmental language
- Action-Based Goals
  - Use shared-decision making for weight-loss goals & intervention strategies
  - Strategies may include dietary changes, physical activity, behavioral therapy, pharmacologic therapy, medical devices, & metabolic surgery

STANDARDS OF CARE | DECEMBER 09 2024

8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes: Standards of Care in Diabetes–2025

Limit Highly Processed Carbs and Added Sugars Eat more HIGH Fiber foods:

- Choose High fiber carbs loaded with vitamins, minerals and phytonutrients
- "Power Carbs" include:
  - Beans/Lentils
  - Veggies
  - Whole Fruits
  - Low-fat, low sugar milk/yogurt
  - Whole Grain foods
    - as culturally appropriate

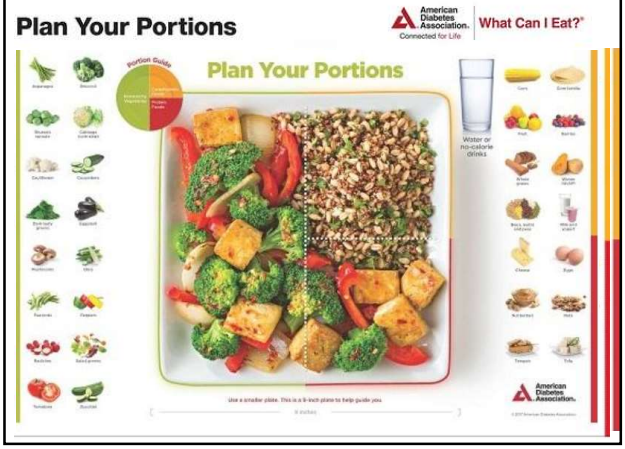
Fiber – the New "F" Word

- Goal: minimum
  - 14 gms / 1000 calories, ~ 30 gms a day
- How?
  - Avoid highly processed foods
  - Choose > 3 gm fiber per serving
  - Foods: Whole intact grains, legumes, fruits, veggies, nuts/seeds, avocados
- Why?
  - Lower all cause mortality and reduced risk of type 2 diabetes
  - Increased microbiome diversity

Nutrition Facts
Serving Size 1 cup (236g)
Servings Per Container about 2

Amount Per Serving	
Calories 260 Calories from Fat 130	
	% Daily Value*
Total Fat 14g	**22%**
Saturated Fat 5g	**25%**
Trans Fat 0g	
Cholesterol 35mg	**12%**
Sodium 990mg	**41%**
Total Carbohydrate 19g	**6%**
Dietary Fiber 3g	**12%**
Sugars 4g	
Protein 15g	**29%**
Vitamin A 10% • Vitamin C 0%	
Calcium 4% • Iron 8%	

*Percent Daily Values are based on a 2,000 calorie diet.



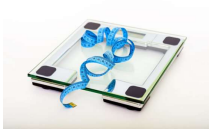
Poll Question 14

AR is 36 years old with type 2 diabetes and a BMI of 41kg/m^2. Current diabetes medications include: metformin, sitagliptin (Januvia) and empagliflozin (Jardiance) at maximum doses. AR is prescribed tirzepatide (Mounjaro). Based on this information, what action do you recommend to the provider?

A. Verify kidney function first.
B. Stop the sitagliptin when initiating tirzepatide.
C. Decrease the dose of metformin to prevent hypoglycemia.
D. Evaluate thyroid function before starting tirzepatide.

Metabolic (Bariatric) Surgery

- Consider for adults with:
  - BMI >30 (> 27.5 for Asian Americans) who are otherwise good surgical candidates
- Perform at high volume center with an experienced team
- Need lifelong medical & behavioral support & monitoring
- Screen psychological & behavioral health prior to & ongoing
- Monitor for post surgery hypoglycemia



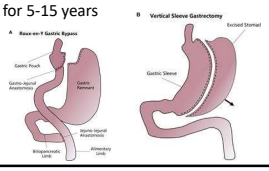
8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes: Standards of Care in Diabetes-2025

Metabolic Surgery Benefits

More likely to have remission*:

- Younger age, duration of diabetes (< 8 yrs), no pre-surgical insulin, greater visceral fat to lose (Asian Americans)
- **Year 5 Remission: 86.1% (RYGB) & 83.5% (VSG)**
- 35 – 50% re-developed diabetes
- Average remission time 8.3 years
  - Majority maintain improved glycemia for 5-15 years

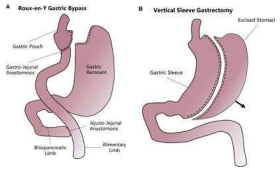
*complete remission = A1c levels <6.5% without meds



8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes: Standards of Care in Diabetes-2025

Metabolic Surgery Benefits

- Superior glycemic mgmt & CVD risk reduction for people w/T2DM & Obesity compared to non-surgical interventions.
  - reduces microvascular disease
  - Improves quality of life
  - cancer risk reduction
  - Improved MASH
  - All cause mortality



8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes: Standards of Care in Diabetes–2025

Assessing Malnutrition

- At Risks Groups:
  - Individuals on GLP-1 or GIP RA or after metabolic surgery
  - Individuals with multiple chronic conditions
  - Older age groups
  - Food insecurity and poverty
- Screen:
  - For malnutrition and sarcopenia
- Recommend:
  - Whole- food-based eating pattern
  - Adequate protein
  - Resistance training

Malnutrition is defined by the World Health Organization as "deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients."

5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: Standards of Care in Diabetes—2025

SR is Losing Weight

- SR, 49 yr old w/ lean "type 2" 7 yrs.
- Monitors BG 1 x daily
- A1c 13.9%
- Insulin: 14u basal insulin at hs (uses pens)
- Bolus analog if BG > 200 (says too expensive)
- Also on Metformin 500mg BID
- At 5'7, her usual wt is 120, but now 106 lbs
- C/O of nausea, fullness, fatigue
- No health insurance

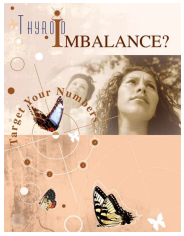
BT1

Prevalence: Hypothyroidism in Diabetes

- **Type 1**
  - Overt hypothyroidism **~4–10%**
  - Subclinical hypothyroidism **~10–15%**
  - Up to **30% of people with T1D** will develop autoimmune thyroid disease in their lifetime.
- **Type 2 diabetes:**
  - Overt hypothyroidism **~10–30%**
  - Higher prevalence of **subclinical hypothyroidism (~5–10%)** than the general population.
- **More Women > men.**
- **Hashimoto's thyroiditis – autoimmune thyroid**
  - most common cause of hypothyroidism w/ diabetes

NIH https://pmc.ncbi.nlm.nih.gov/articles/PMC3647563/

Thyroid & TSH* Levels



AACE Guidelines

- *Thyroid Stimulating Hormone - secreted by pituitary gland
  - controls thyroid hormone thyroxine production
  - first and best test
  - TSH Norm = up to 4.5 mIU/mL
  - Treatment based on TSH plus symptoms.
    - 4.5 – 10 based on risk, s/s
    - 10 or more = treat
  - Lower = hyperthyroidism
  - Higher = hypothyroidism

A TSH above 10 mIU/L, in combination with a subnormal free T4 characterizes overt hypothyroidism.

If TSH in range, but person is symptomatic, Check for thyroid peroxidase atb or TPO antibodies

A low TSH indicates hyperthyroidism (0.1 ish)

Slide 199

BT1 Updated slide with new stats
Beverly Thomassian, 2025-08-24T22:57:23.464

Poll question 15

- Which of the following is a true statement?

a. Atypical antipsychotics are contraindicated for people with diabetes.
b. Hyperthyroidism is more common than hypothyroidism.
c. Depression can be associated with weight gain or weight loss.
d. Hypothyroidism causes LDLs to decrease.

Diabetes Detective

- What other comorbidities are you suspecting?
- Any labs you would like to check?
- What type of diabetes?
- Social situation?
- Consider her lack of insurance and low income level during your discussion.
- Medication and Insulin changes

Type 1 ~ Immune Mediated 5-10% of Diabetes

ADCES In Practice - March 2024
Recent Advances in Type 1 Diabetes: Teplizumab (Tzeild®)
Karen S. Fiano, PHARMD, BCACP, Devada Singh-Franco, PHARMD, CDCES, Young M. Kwon, BS, PHD

1.5 Million people have type 1 in U.S.

Prevalence increasing:

2001 – 1.48 per 1000 youths diagnosed with diabetes

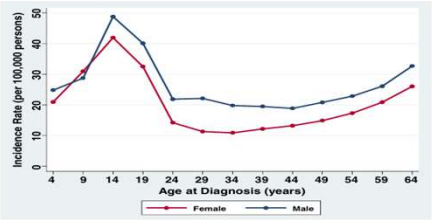
2017 - 2.15 per 1000 youths diagnosed with diabetes

Incidence & Prevalence increasing

Highest incidence in Finland or Northern Europe.

Clinical onset of T1D can occur at any age

DI1



* A longitudinal study comprising 32,476 commercially insured Americans aged 0-64 years who developed T1D between 2001 and 2015.
Rogers MAM, et al. BMC Med. 2017;15(1):199.

T1D is Often Misdiagnosed as T2D in Adults

DI1

TYPE 1 Diabetes

~40% of adults with T1D are initially misdiagnosed

75% of those are misdiagnosed as T2D[1*†]

TYPE 2 Diabetes

Poor disease management from **misdiagnosis** can have **severe outcomes**[2,3]

- Inadequate glucose control[2]
- Diabetic ketoacidosis (DKA)[2]
- Poor quality of life[3]

*Three quarters of T1D is misdiagnosed as T2D. †Based on a US retrospective online survey of 2526 adults (aged >18 years) with T1D or caregiver of child with T1D.
T1D=type 1 diabetes; T2D=type 2 diabetes.
1. Muñoz C, et al. *Clin Diabetes*. 2019;37(3):276–281. 2. Manov AE, et al. *Cureus*. 2023;15(7):e42459. 3. The Lancet Regional Health-Europe. *Lancet Reg Health Eur*. 2023;29:100661.

Type 1 is 5- 10% of all Diabetes

- Auto-immune pancreatic beta cells destruction
- Most commonly expressed at age 10 – 14
- Insulin sensitive (require 0.5 - 1.0 units/kg/day)
- Expression due to a combo of genes and environment:
  - Autoimmunity tends to run in families
  - Exposure to virus or other environmental factors

Slide 205

DI1 The diagram was messed up, so I went back to the original source and replaced.
Diana Isaacs, 2025-07-20T20:04:33.070

Slide 206

DI1 New slide
Diana Isaacs, 2025-07-20T20:15:42.458

Type 1 Diabetes Features?

Misdiagnosis is common and can occur in ~40% of adults with new type 1 diabetes

- For JR, a 28 admitted to the ICU with a blood glucose of 476 mg/dl, pH of 7.1, anion gap of 15. Recently lost 13 pounds.

Type 1 Most Discriminative Features

- Younger than 35 years at diagnosis
- Lower BMI (<25 kg/m^2)
- Unintentional weight loss
- Ketoacidosis
- Glucose 360 mg/dl or greater.

2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes—2025

Antibody Testing for Type 1

- 5–10% of people with type 1 diabetes do not have antibodies.
  - In those diagnosed at <35 years of age who have no clinical features of type 2 diabetes or monogenic diabetes, a negative result does not change the diagnosis of type 1 diabetes,
- Rate of type 1 progression depends on:
  - age at first detection of autoantibody,
  - number of autoantibodies,
  - autoantibody specificity, and autoantibody titer.
  - Glucose and A1C levels may rise well before the clinical onset of diabetes

2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes—2025

Recommendations for Diagnosis and Classification of Diabetes – 2025

Criteria for Screening for Diabetes and PreDiabetes in Asymptomatic Adults – Table 1

DIABETES TYPE	RISK FACTORS and FREQUENCY OF SCREENING and TESTING FOR DIABETES
Type 1	Screen those at risk for presymptomatic type 1 diabetes, by testing autoantibodies to insulin, GAD, islet antigen 2 or ZnT8. Also test antibodies for those with type 1 phenotypic risk (younger age, weight loss, ketoacidosis , etc.)

	Stage 1	**Stage 2**	**Stage 3**
Characteristics	• Autoimmunity	• Autoimmunity	• Autoimmunity
	• Normoglycemia	• Dysglycemia	• Overt hyperglycemia
	• Presymptomatic	• Presymptomatic	• Symptomatic
Diagnostic criteria	• 2 or more islet autoantibodies Glucose levels are in normal range FBG<100mg/dL A1C<5.6% 2-h PG <140mg/dL	• 2 or more islet autoantibodies Dysglycemia: Elevated IFG and/or IGT • FPG 100–125 mg/dL • 2-h PG 140–199 mg/dL • A1C 5.7–6.4% or ≥10% increase in A1C	• Autoantibodies may disappear over time (5-10% may not express antibodies) • Diabetes diagnosed by standard criteria

2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes—2025

DT

Ordering Autoantibodies

AAbs are currently the only available serum immune marker to identify T1D prior to hyperglycemia and/or symptom onset

	GADA	IAA	IA-2A	ZnT8A	ICA	Blood draw location	Sampling method
Local laboratories (e.g, Guest diagnostics, Labcorp)	✓	✓	✓	✓	✓	Local laboratory or healthcare provider's office	Blood draw
Online ordering, delivery to doctor's office	✓	✓	✓			Testing kits from vendors such as Enable Biosciences through online ordering	In-clinic finger poke blood test
TrailNet			✓	✓	✓	TrailNet-sponsored event, health fair, at-home kit (by mail)	Blood draw or at- home finger poke
Autoimmunity screening for kids	✓	✓	✓	✓		Barbra Davis Center, Children's Hospital Colorado, UC Health Laboratory, at-home kit (by mail)	Blood draw or at-home finger poke

Glutamic acid decarboxylase 65 autoantibody (GADA)
Zinc transporter 8 autoantibody (ZnT8A) Insulin autoantibody (IAA)
Islet cell autoantibody (ICA) Insulinoma-associated antigen 2 autoantibody (IA-2A)

Poll Question 16

JR's mom has type 1 diabetes and JR's dad has type 2 diabetes. JR is 28 years old and in the emergency room with a glucose of 482 mg/dl. Besides checking glucose, ketones and A1C levels, what else needs to be evaluated?

A. Endogenous insulin titer
B. Glutamic Acid Decarboxylase
C. Beta cells auto antibodies
D. Langerhan's antibody

Determine if Type 1 - Use AABBCC Approach

- **A**ge
  - e.g., for individuals <35 years old, consider type 1 diabetes
- **A**utoimmunity
  - e.g., personal or family history of autoimmune disease or polyglandular autoimmune syndromes
- **B**ody habitus
  - e.g., BMI <25 kg/m2
- **B**ackground
  - e.g., family history of type 1 diabetes
- **C**ontrol
  - e.g., level of glucose control on noninsulin therapies
- **C**omorbidities
  - e.g., treatment with immune checkpoint inhibitors for cancer can cause acute autoimmune type 1 diabetes or presence of other autoimmune conditions

Slide 211

DI1 Added the abbreviations for AA at the bottom.
Diana Isaacs, 2025-08-24T01:55:16.461

Pharmacologic Intervention to Delay Symptomatic Type 1 (in Stage 2)

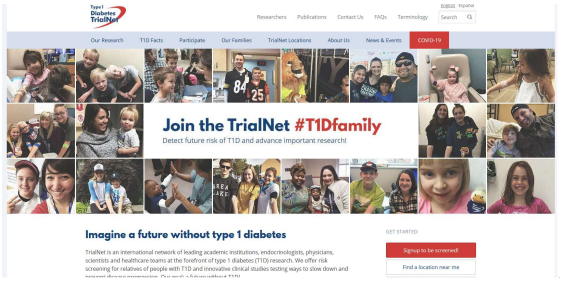
- Teplizumab (CD3-monoclonal antibody)
- 14-day infusion can delay the onset of symptomatic type 1 diabetes (stage 2)
- An option in selected individuals aged ≥8 years with stage 2 type 1 diabetes.
- In a single trial, 44 individuals received 14-day course of teplizumab vs 32 placebo.
- The median time to stage 3 diagnosis of type 1
  - 48.4 months in tep group
  - 24.4 months placebo
- Cost: $193,000
- Financial assist programs available.

126. Herold KC, Bundy BN, Long SA, et al.; Type 1 Diabetes TrialNet Study Group. An anti-CD3 antibody, teplizumab, in relatives at risk for type 1 diabetes. *N Engl J Med* 2019;381:603–613

3. Prevention or Delay of Diabetes and Associated Comorbidities: *Standards of Care in Diabetes—2024*

Type 1 (stage 2) Delayed with Teplizumab by 2 years www.DiabetesTrialNet.org

- **How to get families linked to screening?**



Medalist Study – Harvard Joslin Diabetes Center

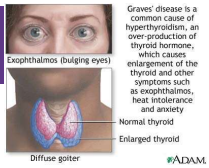
- After 50 years with diabetes
  - Many still produced some insulin
  - Many had no eye disease

Initial Eval – Looking for Autoimmunity

- Type 1 - Autoimmune Co -Conditions
  - Hashimoto Thyroiditis
  - Graves disease
  - Addison's disease
  - Celiac disease
  - Vitiligo
  - Autoimmune hepatitis, gastritis
  - Myasthenia gravis
  - Pernicious anemia
  - Dermatomyositis

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Hyperthyroidism

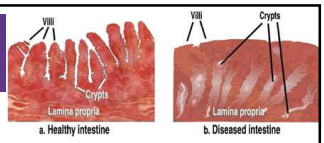


Graves' disease is a common cause of hyperthyroidism, an over-production of thyroid hormone, which causes enlargement of the thyroid and other symptoms such as exophthalmos, heat intolerance and anxiety

- Graves Disease (most common)
- 0.5 – 2.0% risk in type 1
- Autoimmune disorder:
  - Symptoms: wt loss, hypermetabolism, tremor, exopthalmus, palpitations, tachycardia, heat intolerance, nervousness, hyperglycemia
  - Diagnosis: Dx: low TSH, then check T3 & T4, autoantibodies, and thyroid scans
  - Treatment: antithyroid drugs, surgery, radioactive iodine. After treatment, may need thyroid replacement therapy.

AACE Thyroid Guidelines

Celiac Disease



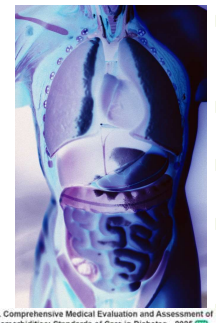
- Type 1 – Affects 1-16%
- Screen at diagnosis of type 1 and if symptoms.
- Immune reaction to gluten - affects function of villi in intestine, decreasing nutrient absorption
- S/S: bloating, malabsorption, wt loss, fatty stools, diarrhea, muscle tenderness, failure to thrive
- Diagnosis: measure either anti-endomysial antibodies (EMA) titers or tissue transglutaminase.
- If positive, refer to GI specialist for endoscopy and biopsy of small intestine to confirm diagnosis.

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Celiac Disease Treatment

- Treatment for celiac disease is a lifetime gluten-free diet
  - Eliminate all wheat (including durum, semolina, spelt, and farro) and the related grains of rye, barley, and triticale.
  - Caution with oats – may be contaminated with wheat
  - Remember "BROW" – Barley, Rye, (some) Oats, Wheat
- Refer to a dietitian for help with food selection/label reading

Gastroparesis



4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

- Gastroparesis: affects 20 – 30% of individuals with longstanding diabetes
- Delayed emptying of stomach contents due to nerve damage
- S/S include early satiety, fullness, postprandial hypo, vomiting
- Diagnosis: gastric emptying studies, post-prandial hypoglycemia
- Tx: improve BG, small, low fat & fiber meals & meds

Disordered Eating

- For people with type 1
  - insulin omission causing glycosuria in order to lose weight is the most reported disordered eating behavior
  - Have high rates of diabetes distress and fear of hypoglycemia.

- For people with type 2
  - bingeing excessive food intake with an accompanying sense of loss of control most reported.
  - If treated with insulin, intentional omission is also frequently reported.

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Care in Diabetes—2025

Disordered Eating

- People with diabetes give themselves less insulin than needed to lose weight
- Tends to start in adolescence, more likely to occur in women than men.
- Signs: unexplainable spikes, A1c, weight loss, lack of marks from fingerpricks, lack of prescription refills for diabetes meds, records that don't match A1C.
- Treatment – Mental health specialist and team

Insulin - Suggested changes

- Bolus insulin 2- 3 times a day – 3 units if don't check BG (eat 45 gms of carb) – Stop metformin
- If check BG, add 1 unit for each 50 pts above 150
- Try and eat 3 times a day – use liquid calories as needed, low fiber
- Check BG at least once a day
- Weekly phone call check in

Insulin PocketCard™ Diabetes Education Services 25 — Download Success! Get Our Free CDCES Coach App

Action		Insulin Name	Onset	Peak	Duration	Considerations
			Effective			
Bolus	Very Rapid Acting Analogs	Aspart (Fiasp)	16 - 20 min	1 - 3 hrs	5 - 7 hrs	Bolus insulin lowers after-meal glucose. Post meal BG reflects efficacy. Basal insulin controls BG between meals and nighttime. Fasting BG reflects efficacy.
		Lispro-aabc (Lyumjev)	15 - 17 min	2 - 3 hrs	5 - 7 hrs	
	Rapid Acting Analogs	Aspart (Novolog / Merilog)	20 - 30 min	1 - 3 hrs	3 - 7 hrs	
		Lispro (Humalog*/ Admelog)	30 min	2 - 3 hrs	5 - 7 hrs	
		Glulisine (Apidra)	15 - 30 min	1 - 3 hrs	3 - 4 hrs	
	Short Acting	Regular*	30 - 60 min	2 - 4 hrs	5 - 8 hrs	
Basal	Intermediate	NPH	2 - 4 hrs	4 - 10 hrs	10 - 16 hrs	Side effects: hypoglycemia, weight gain. Typical dosing range: 0.5-1.0 units/ kg body wt/day. Discard most open vials after 28 days. For pen storage guidelines, see package insert.
	Long Acting	Glargine (Lantus*/Basaglar/Semglee/Rezvoglar)	2 - 4 hrs	No Peak	20 - 24 hrs	
		Degludec (Tresiba)*	~ 1 hr		< 42 hrs	
Basal + Bolus	Intermediate + short	Combo of NPH + Reg 70/30 = 70% NPH + 30% Reg 50/50 = 50% NPH + 50% Reg	30 - 60 min	Dual peaks	10 - 16 hrs	
	Intermediate + rapid	Novolog® Mix - 70/30 Humalog® Mix - 75/25 or 50/50	5 - 15 min		24 hrs	

Concentrated insulins available - see Concentrated Insulin Card for details. Insulin action times vary; time periods are general guidelines only. All PocketCard content is for educational purposes only. Please consult prescribing information for detailed guidelines. © 2/2025

What kind of Diabetes?

- 58 yr old, states she has had type 1 diabetes for 18 years. Quit smoking a year ago and gained about 20 lbs. BMI 25.
- Meds
  - Humalog 18-23 units before each meal
  - Glargine 28 units at bedtime
  - Metformin 500mg TID
- What tests would you recommend?

25% of ind's with Type 1 also have type 2 diabetes.
ADA Post Grad, 2010

Type 5 Diabetes

- Form of diabetes linked to chronic malnutrition or prolonged starvation
- This condition primarily affects young, undernourished individuals in low- and middle-income countries, particularly in regions like Asia and Africa.
- Estimates suggest that up to 25 million people worldwide may be affected with type 5 diabetes.

- Mechanism:
  - Severe beta-cell dysfunction from malnutrition
  - Impaired insulin secretion (not autoimmune)
  - May present with hyperglycemia & ketosis
  - Genetic component

Features and Management

- Typical features:
  - Onset in adolescents/young adults
  - History of prolonged malnutrition
  - Thin body habitus with muscle wasting
  - Hyperglycemia + recurrent ketosis, but not autoimmune
- Management:
  - High-protein, low-carbohydrate diet
  - Micronutrient supplementation
  - Careful monitoring of insulin therapy, as inappropriate insulin administration can be harmful.
- Improving nutrition and addressing poverty/food insecurity are central to treatment.

Diabetes Visit – Let's Go *through*

A small adjustment can make a BIG Difference

- John arrives at the clinic with a Time in Range slightly above 60%.
- HCP says "You do know that the goal for TIR is 70% " (Door closed)

How Does John Feel?

- Reassured
- Heard & Seen
- Recognized
- Confident
- Connected

How does the HCP feel?

- HCP smiles and says, "Wow John, I can see you are making an effort to improve your time in range."
- Door Open – Connection made

- Ask about their life (SDOH)
- Assess current self-management behaviors
- Assess your feelings
- Accept without judgement
- Acknowledge one thing they are doing right
- Advocate for needed resources

- Beliefs about health and diabetes
- Barriers can be confused with non-compliance
- Burnout lookout. On extended diabetes vacation due to diabetes distress?
- Bouncing back – leaning into resilience

- Having the Conversation
- Coaching that highlights *their* knowledge and resilience.
- Carrots – problem solve together and dig for solutions that are meaningful in everyday life.
- Compassion for the people in our care and ourselves.
- Connection through – opening the door.

DiaBingo - N

N DPP demonstrated that exercise and diet reduced risk of DM by__%
N Average A1c of 7% = Avg BG of ____
N The goal is to eat 14 gms per 1000 cals of this nutrient a day
N Rebound hyperglycemia
N Scare tactics are effective at motivating behavior change
N Get LDL less than ____for most people with diabetes 40 years+
N Drugs that can cause hyperglycemia
N 2/3 cups of rice equals _____ serving carbohydrate
N 1% A1c = how many points of blood sugar _____
N One % drop in A1c reduces risk of complications by ___ %
N 1 gm of fat equal _____kilo/calories
N Metabolic syndrome = hyperinsulinemia, hyperlipidemia, hypertension
N Average American consumes 15 teaspoons of sugar a day.
N Medication derived from the saliva of the Gila Monster

Thank You

- Questions?
- Email: info@diabetesed.net
- Web: www.diabetesed.net
- Phone 530-893-8635

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Instructions for Claiming Credit

To receive CE credit, learners must follow these steps:

1. Visit https://cme.partnersed.com/BTB1029 or scan the QR Code:
2. Sign Up or Log in.
3. Complete the activity evaluation.
4. Upon completion of all evaluation questions your credit will be made available for download immediately.

For Pharmacists: Upon successfully completing the activity evaluation, your credit will be submitted to CPE Monitor. Please check your NABP account within thirty (30) days to make sure the credit has posted.

Diabetes: Back to the Basics & Beyond

Partners for Advancing Clinical Education

Diabetes Education Services

Diabetes: Back to the Basics and Beyond

October 29,2025

Learning Objectives

- Review the changes & updates to the annual ADA Standards of Medical Care in Diabetes.
- Identify the key elements of the standards that improve clinical care for people with diabetes.
- Discuss appropriate use of the latest medications that address hyperglycemia and cardiorenal health.
- Describe strategies to incorporate lifestyle changes into diabetes self-management.