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25 years success, certification, support growth, connection, inspiration

ADA Standards of Diabetes Care Annual Update 2023

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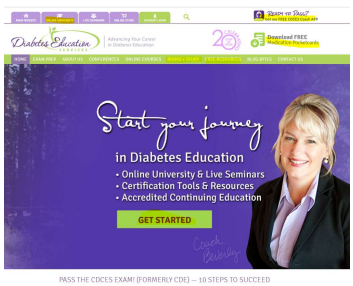
President, Diabetes Education Services
www.DiabetesEd.net

Land Acknowledgment

- We acknowledge and are mindful that Diabetes Education Services stands on lands that were originally occupied by the first people of this area, the Mechoopda, and we recognize their distinctive spiritual relationship with this land, the flora, the fauna, and the waters that run through this area.

MECHOOPDA INDIAN TRIBE OF CHICO RANCHERIA, CALIFORNIA

DiabetesEd.net Website Orientation



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Bryanna is here to Help!

Bryanna Sabourin,
Director of Operations,
Certification Pathway Coach &
Customer Happiness Expert

If you have questions, you can chat with Bryanna at
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or call 530-893-8635
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Welcome to our DiabetesEd Online University

Our goal is to provide an exceptional user experience and build a sense of community.

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Coach Bev has no conflicts of interest

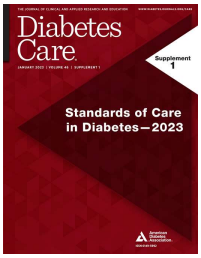
- Not on any speaker's bureau
- Does not invest in pharmaceutical or device companies
- Gathers information from reading package inserts, research and standards

Majority of Content from
ADA Standards
www.Diabetes.org

Diabetes Education SERVICES

Standards of Care Annual Update

- Review critical elements of the 17 ADA Standards of Care with a focus on changes and updates.
- State national goals and targets for glucose, BP, hypertension and more.
- Discuss the importance of social determinants of health and the social context.
- Describe the importance of keeping care person centered.
- List 3 ways you can apply this information to your clinical practice.



Taking exam this year? The 2022 or 2023 Standards, with these updates, will prepare you for success

Type 2 Diabetes in America 2023

- 11.3% with Diabetes - 37 million adults
  - 23% don't know they have it
- 38% with Prediabetes – 96 million adults

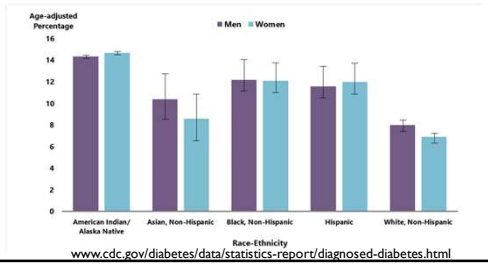
Figure 3. Age-adjusted, county-level prevalence of diagnosed diabetes among adults aged 20 years or older, United States, 2004, 2012, and 2019

Data sources: US Diabetes Surveillance System; Behavioral Risk Factor Surveillance System.

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

1. Improving Care and Promoting Health in Populations

- Population Health measurements include:
  - Outcomes (mortality, morbidity)
  - Disease burden (incidence and prevalence)
  - Behavioral and metabolic factors (A1c, MNT, exercise, etc)
- Diabetes annual cost 2017 - $327 bil

- How many meet Targets?
  - 64% met A1c targets
  - 70% achieved BP targets
  - 57% met LDL target
  - In total, 23% met all targets
- Mean A1C nationally for people with diabetes increased:
  - 2005 mean A1C of 7.3%
  - 2008 mean A1C of 7.5%
  - Younger adults, women, and non-Hispanic Black individuals less likely to meet treatment targets. (NHANES)

American Diabetes Association. 1. Improving Care and Promoting Health in Populations: *Standards of Care in Diabetes—2023*

Social Determinants 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

Tailoring Treatment for Social Context

- "Social determinants of health (SDOH)—*often out of direct control of the individual* and potentially representing lifelong risk—contribute to health care and psychosocial outcomes and must be addressed to improve all health outcomes"

The ADA recognizes this relationship and is taking action.

https://diabetesjournals.org/care/article/46/Supplement_1/S10/148045/1-Improving-Care-and-Promoting-Health-in

Poll Question 1

- LS has type 1 diabetes and has lost weight. LS appears distraught and says that their work hours are dramatically reduced and paying bills has been a struggle. They are on the verge of being evicted. What is the most important action by the diabetes specialist?

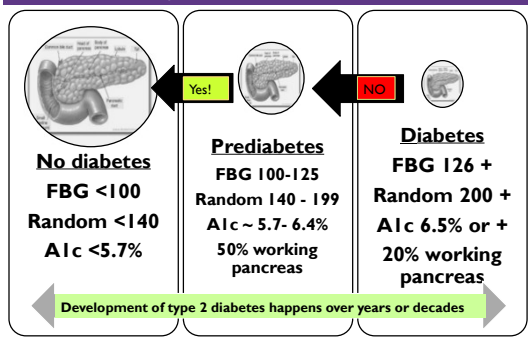
- A. Provide a depression screening.
- B. Connect LS with social services.
- C. Reassure LS that they can do this.
- D. Ask about disordered eating.

Tailor Treatment for Social Context

- Consider individualized care and provide resources
- These factors impair ability to self-manage diabetes.
  - 20% of people with food insecurity have diabetes
  - Financial barriers can lead to less healthy food choices and inability to access medications.
  - Lack of housing – 8% of unhoused people have diabetes.

Need to make more community connections through Community Health Workers

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



Pre Diabetes & Type 2- Screening Guidelines (ADA 2023 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
- PreDiabetes*
- HIV on antiretroviral meds*
- History of heart disease

Diabetes 2 - Who is at Risk?
(ADA Clinical Practice Guidelines)

Screen using A1c, Fasting Blood Glucose or OGTT.

If negative, repeat screening at least every 3 years.

*If prediabetes, on antiretroviral meds, recheck yearly

Risk factors cont'd

- HTN - BP > 140/90
- HDL < 35 or triglycerides > 250
- History of Gestational Diabetes Mellitus
- Polycystic ovary syndrome (PCOS)
- Other conditions assoc w/ insulin resistance:
  - Elevated BMI, acanthosis nigricans (AN)

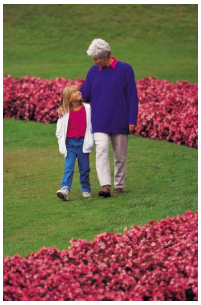
Poll Question 2

JR's mom has type 1 diabetes and JR's dad has type 2 diabetes. JR is 21 years old and in the emergency room with a glucose of 482 mg/dl. Besides checking glucose, ketones and A1C levels, which of the following lab test can be used to determine if someone has immune mediated diabetes?

1. Endogenous insulin titer
2. Glutamic acid decarboxylase
3. Beta cells auto antibodies
4. Langerhan's antibody

How do we know someone has Type 1 vs Type 2?

- Type 1 - Positive antibodies
  - GAD - glutamic acid decarboxylase (primary)
  - IA2 - islet antigen 2, or
  - ZnT8 - zinc transporter 8
- Can also check C-peptide levels to determine endogenous insulin production
- Younger people develop quickly
- Older people take longer to develop
- Genetics - Several alleles of HLA-DQB1 are associated with an increased risk of developing type 1 diabetes



STANDARDS OF CARE | DECEMBER 12 2022
2. Classification and Diagnosis of Diabetes: *Standards of Care in Diabetes—2023*

Type 1 Diabetes Progression

	Stage 1	Stage 2	Stage 3
Characteristics	• Autoimmunity	• Autoimmunity	• Autoimmunity
	• Normoglycemia	• Dysglycemia	• Overt hyperglycemia
	• Presymptomatic	• Presymptomatic	• Symptomatic
Diagnostic criteria	• Multiple islet autoantibodies - GAD, glutamic acid decarboxylase (primary) - islet antigen 2, or - Zinc transporter 8 (ZnT8)	• 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

STANDARDS OF CARE | DECEMBER 12 2022
2. Classification and Diagnosis of Diabetes: *Standards of Care in Diabetes—2023*

Diabetes Education Services 25

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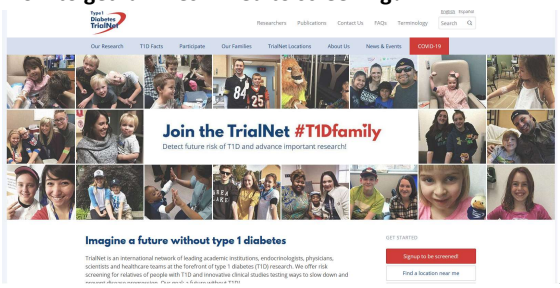
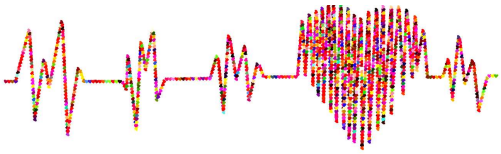
Type 1 (stage 2) Delayed with Teplizumab by 2 years www.DiabetesTrialNet.org

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



3. Finding & Treating PreDiabetes Matters

- Prediabetes is associated with heightened cardiovascular risk; therefore, screening for and treatment of modifiable risk factors for cardiovascular disease is critical.



3. Prevention or Delay of Type 2 Diabetes and Associated Comorbidities: *Standards of Care in Diabetes—2023*

3. Prevent or Delay Type 2 Diabetes

- Prediabetes defined as:
  - A1c 5.7 – 6.4% or fasting BG 100 -125mg/dl
- Action:
  - Screen yearly for diabetes
  - For adults living with overwt/obesity
    - Refer to Diabetes Prevention Program (DPP) CDC approved programs
    - Includes intensive behavioral lifestyle interventions, goal 7% -10% wt reduction
  - Offer in person and DPP technology assisted modalities

American Diabetes Association. 3. Prevention or Delay of Type 2 Diabetes and Associated Comorbidities: *Standards of Care in Diabetes—2023*

3. Prediabetes Pharmacologic Intervention

- Consider Metformin Therapy for Prediabetes
- Especially for ages 25-59
  - BMI of 35+
  - If A1c is ~6.0 or FPG is 110mg/dL
- Women with history of GDM
  - Monitor B12 level
- No FDA approved med for prevention (off label)
- CV Risk Mitigation important.
- Eval and treat BP, Lipids, smoking
- Consider low dose pioglitazone (Actos) if history of stroke.

3. Prevention or Delay of Type 2 Diabetes and Associated Comorbidities: *Standards of Care in Diabetes—2023*

4. Comprehensive Medical Evaluation and Assessment of Comorbidities

- Person centered communication, strength-based language, active listening, literacy, quality of life.
- Take all aspects of life circumstances into account
- Diabetes Care coordinated by multi disciplinary team:
  - CDCES, Providers, nurses, dietitians, exercise specialists, pharmacists, dentists, podiatrists, mental health professionals and other specialists.
- Goal to prevent, delay complications and optimize quality of life.

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: *Standards of Care in Diabetes—2023*

Poll Question 3

The provider referred RT, a 72-year-old with type 2 diabetes and non-alcoholic fatty steatohepatitis (NASH), for an appointment. Which of the following is the most accurate statement regarding NASH and diabetes?

A. About 30% of people with diabetes and extra weight also have NASH.
B. Risk of NASH is greater in people who consume excess alcohol and processed foods.
C. NASH is when intrahepatic fat is equal to or greater than 5% of liver weight.
D. There are standardized medication algorithms to guide treatment of NASH.

Nonalcoholic Fatty Liver Disease

- Recent studies estimate that –
  - NAFLD is prevalent in >70%
  - NASH is present in 50%
  - of adults with type 2 diabetes.
- In type 2 diabetes or prediabetes with cardiometabolic risk factors plus
  - elevated liver enzymes (ALT & AST) or
  - fatty liver on imaging or ultrasound
- Need evaluation for nonalcoholic steatohepatitis and liver fibrosis.

Associated with :
- Increased BMI (30+)
- Larger waist circumference,
- Elevated triglycerides
- Lower HDL cholesterol levels.

- Treatment: exercise, weight loss of 5-10%, GLP-1 RA Pioglitazone (Actos)

4. Comprehensive Medical Evaluation and Assessment of Comorbidities: *Standards of Care in Diabetes—2023*

Immunization Schedule for Diabetes 2023

Vaccine	Who by Age	Series and Frequency
Hepatitis B Vaccine	Less than 60 years*	2-3 dose series
Human papilloma virus (HPV)	Up to 26 years (may be considered for 27-45)*	3 doses over 6 months
Influenza (avoid live attenuated vaccine)	All	Annually
*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.
Pneumonia (PPSV23) Pneumovax	Adults19-64 who received PCV13 or15*	See Standards for schedule and details and for those 65 or older.
Tetanus, diphtheria, pertussis (TDAP)	All adults; extra dose during pregnancy	Booster every 10 years.
Zoster	50+	2 dose Shingrix
COVID	People with diabetes	See Standards for schedule info

December 2022, Vol.46, S68-S96. doi:https://doi.org/10.2337/dc23-S005

*See ADA Standards pgs S68-96 for detailed info/considerations.

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Mr. J - What are Your Recommendations?

Mr. J Profile

67 yr old with newly type 2. History of stroke, BMI 26.

Meds: Metoprolol, metformin, lovastatin 20mg.

Labs:

- A1c 9.3%
- LDL 136 mg/dl
- Triglycerides 260mg/dl
- GFR 58, UACR 32
- B/P 142/79
- Liver enzymes in normal range

Self-Care Skills

- Goes to gym 2-3 times a week
- Plays golf on occasion.
- Eats out 2 times a week.

5. Facilitating Behavior Change and Well-Being to Improve Health Outcomes

STANDARDS OF CARE | DECEMBER 12 2022

5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: *Standards of Care in Diabetes—2023*

Diabetes Self Management Ed Benefits

- Improved knowledge
- Lower weight
- Improved quality of life
- Reduced mortality
- Positive coping
- Reduced cost
- Only 5-7% of Medicare/insured receive DSME)
- Increased primary care, preventive services
- Less frequent us of acute care and inpt admissions
- More likely to follow best practice recommendations (esp those with Medicare)

STANDARDS OF CARE | DECEMBER 12 2022
5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: *Standards of Care in Diabetes—2023*

ADA MNT Standards 2023

Until there is more evidence:

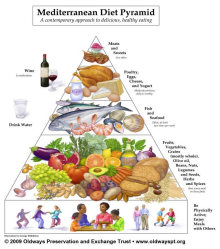
- Emphasize non starchy vegetables
- Minimize added sugars, sugary beverages and refined grains
- Choose whole foods
- Individualized eating pattern that considers
  - health status, food and numeracy skills, resources, food preferences, health goals, and food access.

Referral to RD/RDN
Lowers A1c 1-2%

STANDARDS OF CARE | DECEMBER 12 2022
5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: *Standards of Care in Diabetes—2023*

Healthy Eating Patterns

- Low-Carbohydrate
- Carb Counting
- Diabetes Plate Method
- Mediterranean Diet
- Plant based eating
- DASH (Dietary approaches to address hypertension)



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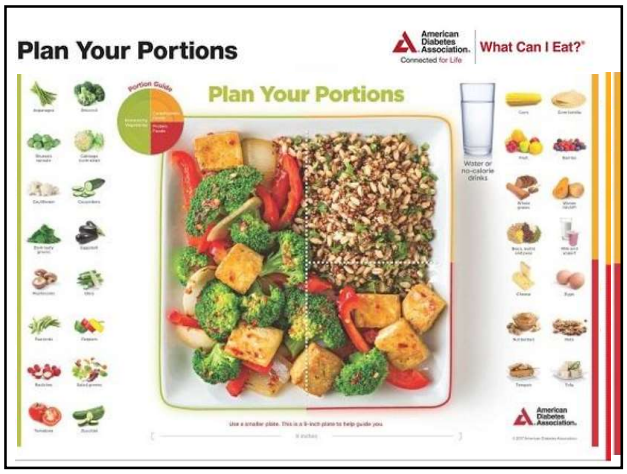
5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: *Standards of Care in Diabetes—2023*



Poll Question 4

- For people with an elevated BMI and new type 2 diabetes, which best reflects ADA Standard recommendations?
  - A. Avoid all desserts and processed foods
  - B. Goal is to lose 5-15% of current body weight
  - C. Eat less than 7% saturated fat
  - D. Consume about 30-45 gms of carb at each meal.

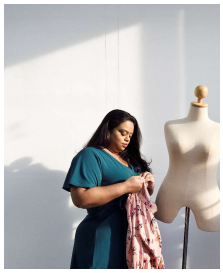
Weight Loss is Helpful

- Prediabetes weight loss goal is 7-10% for preventing diabetes progression.
- Diabetes: Strong evidence that a 5-15% body wt loss:
  - Improves glycemic control
  - Improve triglycerides
  - Reduces need for medications
- Optimal goal is healthy weight maintenance
- Consider Incretin Mimetic therapy to reach goals

5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: *Standards of Care in Diabetes—2023*

8. Obesity and Weight Management for Prevention & Treatment of Type 2 Diabetes

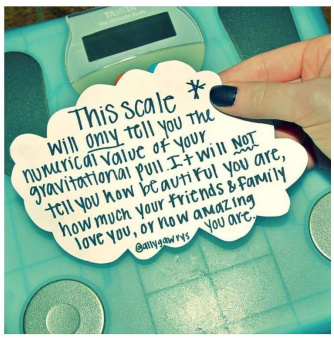
- Use person-centered, nonjudgmental language that fosters collaboration between individuals and health care professionals, including person-first language.
- *Once a year, calculate BMI and assess weight trajectory to inform approach*
- Be sensitive and allow for privacy when weighing
- Individuals with diabetes and overweight or obesity may benefit from modest or larger magnitudes of weight loss of 10% or greater



GLP-1 RAs Approved for Weight Loss

- Liraglutide packaged as Victoza and Saxenda
- Same active ingredient:
  - Victoza 1.8 mg (diabetes)
  - Saxenda 3 mg (wt loss)
  - 6% wt loss, $1619 a month
- Semaglutide packaged as Ozempic and Wegovy
  - Ozempic 2mg (diabetes)
  - Wegovy 2.4mg (wt loss)
  - 6% wt loss, $1619 a month
- Both FDA approved as treatment option for chronic wt management in addition to reduced calorie diet and physical activity.
- Approved for use in adults with a
  - BMI of ≥ 30 or
  - BMI of ≥ 27 or greater who have hypertension, type 2

Weight is a Heavy Issue



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.
- People with diabetes and diagnosable eating disorders have high rates of other psychiatric disorders

5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: *Standards of Care in Diabetes—2023*

6. Glycemic Targets – ADA 2023

- A1c less than 7%
  - Pre-meal BG 80-130
  - Post meal BG <180
  - Time in Range (70-180) 70% of time

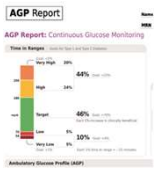
Glycemic targets need to be woven into the overall person-centered strategy.

- 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

American Diabetes Association. 6. Glycemic Targets: *Standards of Care in Diabetes—2023*

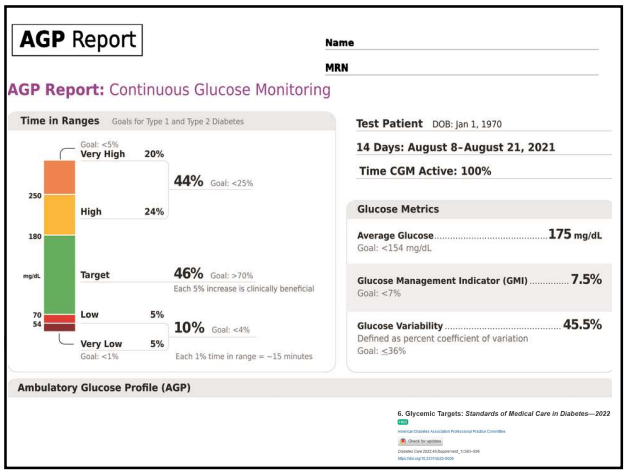
Ambulatory Glucose Profile (AGP)

- Standardized report with visual cues for those on CGM devices
- Evaluate Time in Range (TIR)
  - Target 70-180 mg/dl (70% of time)
  - Target time *below* goal
    - Less than 70 (< than 4% of time)
    - Less than 54 (< than 1% of time)
  - Target time *above* goal
    - Above 180 (< 25% of time)
    - Above 250 (<5% of time)

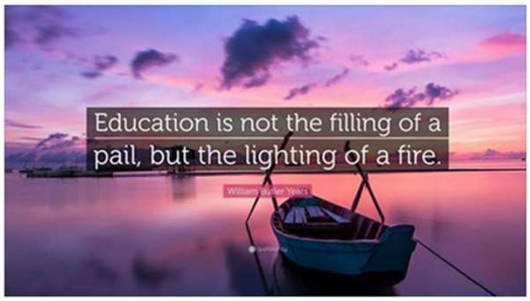


For those with frailty or at high risk of hypoglycemia recommend:
- Target of 50% time in range
- Less than1% time below range

6. Glycemic Targets: *Standards of Care in Diabetes—2023*



Half way there



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- LDL 136 mg/dl
- Triglycerides 260mg/dl
- GFR 58, UACR 32
- B/P 142/79
- Liver enzymes in normal range

Self-Care Skills

- Goes to gym 2-3 times a week
- Plays golf on occasion.
- Eats out 2 times a week.
- Met with RD, signed up for DSMES.

Section 9- Pharmacologic Approaches to Glycemic Treatment

- Updated Algorithm for Oral Meds and Insulin Therapy
- More attention to whole person approach to diabetes management.
- Consider CVD, Heart failure and CKD when choosing diabetes medication

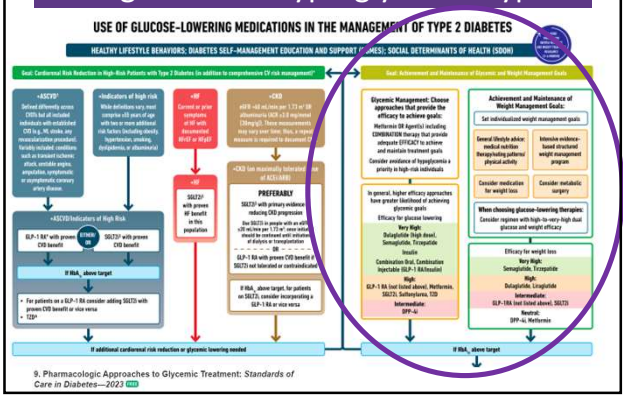
9. Pharmacologic Approaches to Glycemic Treatment: *Standards of Care in Diabetes—2023*

Poll Question 5

Based on the new ADA Management of Hyperglycemia in Type 2 diabetes, which of the following is an accurate recommendation?

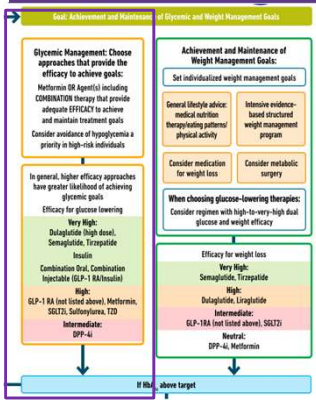
A. Initiate treatment with metformin for most individuals, including those with cardiovascular disease.
B. Prioritize the use of organ protective medications in those with cardiorenal disease.
C. If A1C not at target with 2 or more oral agents, add on basal insulin therapy.
D. Avoid the use of SGLT-2 Inhibitors in those with an eGFR of less than 25.

Management of Hyperglycemia Type 2



9. Pharmacologic Approaches to Glycemic Treatment: *Standards of Care in Diabetes—2023*

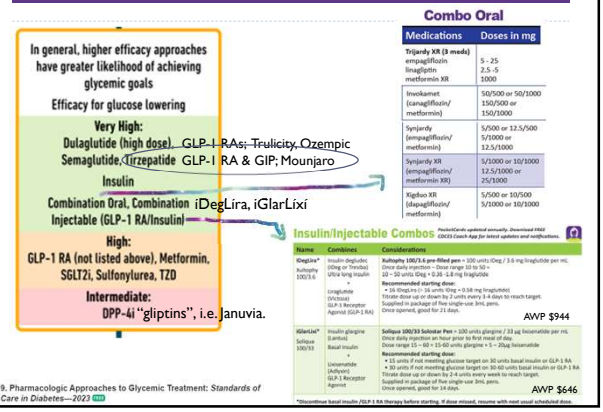
Metformin is "Usually" 1st Line



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

9. Pharmacologic Approaches to Glycemic Treatment: *Standards of Care in Diabetes—2023*

ADA/EASD Meds Algorithm 2023



9. Pharmacologic Approaches to Glycemic Treatment: *Standards of Care in Diabetes—2023*

Common Oral Diabetes Meds

Diabetes Education Services

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Class/Main Action	Name(s)	Daily Dose Range	Considerations
Biguanides • Decreases hepatic glucose output • First line med at diagnosis of type 2	metformin (Glucophage)	500 - 2550 mg (usually BID w/ meal)	**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%.
	Riomet (liquid metformin)	500 - 2550 mg 500mg/5mL	
	Extended Release-XR (Glucophage XR) (Glumetza) (Fortamet)	(1x daily w/dinner) 500 – 2000 mg 500 – 2000 mg 500 – 2500 mg	

Biguanide derived from:
Goat's Rue *Galega officinalis*,
French Lilac
Does NOT harm kidneys
$10 for 3-month supply from Walmart & other pharmacies

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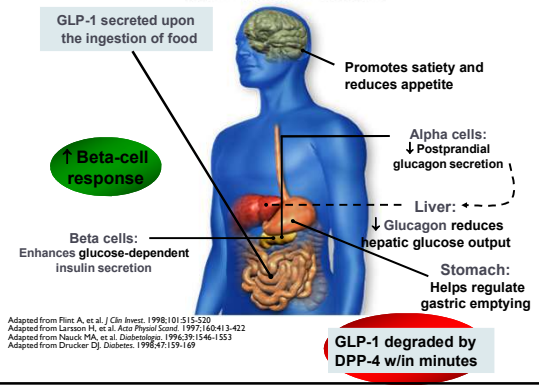
DPP-4 Inhibitors – "Incretin Enhancers"

- **Action:**
  - Increase insulin release w/ meals
  - Suppress glucagon
- **Efficacy:** Decreases A1c by 0.6 -0.8%
- Saxagliptin, alogliptin increased risk of heart failure
- Average Wholesale Price: $550-600 month

DPP – 4 Inhibitors "Incretin Enhancers" • Prolongs action of gut hormones • Increases insulin secretion • Delays gastric emptying	sitagliptin (Januvia)	25 - 100 mg daily – eliminated via kidney*	*If creat elevated, see med insert for dosing. **Side effects:** headache and flu-like symptoms. **Can cause severe, disabling joint pain.** Contact MD, stop med. Report signs of pancreatitis. †Saxagliptin and alogliptin can increase risk of heart failure. Notify MD for shortness of breath, edema, weakness, etc. No wt gain or hypoglycemia. Lowers A1c 0.6%-0.8%.
	saxagliptin (Onglyza)†	2.5 - 5 mg daily – eliminated via kidney*, feces	
	linagliptin (Tradjenta)	5 mg daily – eliminated via feces	
	alogliptin (Nesina)†	6.25 - 25 mg daily – eliminated via kidney*	

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

GLP-1 & GIP Receptor Agonists

Class/Main Action	Name	Dose Range	Considerations
GLP-1 Receptor Agonist (GLP-1 RA) **"Incretin Mimetic"** • Increases insulin release with food • Slows gastric emptying • Promotes satiety • Suppresses glucagon	exenatide (Byetta)	5 and 10 mcg BID	**Side effects for all:** Nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. Increase dose monthly to acheive targets. **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 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	
	lixisenatide (Adlyxin)	10 mcg 1x a day for 14 days 20 mcg 1x day starting day 15	
	semaglutide* (Ozempic)	0.25, 0.5, 1.0 and 2.0 mg 1x a week pen injector	
	(Rybelsus) Oral tablet	3, 7, and 14 mg daily in a.m. Take on empty stomach w/H2O sip	
Dual Incretin Agonist Combines both GLP-1 and GIP Incretins. Same action profile as GLP-1 RA, with more intensive action profile.	Tirzepatide (Mounjaro)	2.5, 5.0, 7.5, 10, 12.5 and 15 mg 1x a week prefilled single dose pen Increase dose by 2.5 mg once monthly to reach targets.	**Side effects include:** Nausea, diarrhea, injection site reactions. Avoid if family history medullary thyroid tumor. Report pancreatitis. Lowers A1C ~ 1.8 - 2.4% Weight loss: 7-13% body weight loss at max dose.

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GLP-1 Receptor Agonist Devices

Byetta

5mcg or 10mcg pen
1 pen/month
Requires Rx for needles

Ozempic

3 pen options: 0.5, 1, 2mg
1 pen/month
Comes with needles

Victoza

1.2mg, 2 pens/mo
- (15 doses per pen)
1.8mg, 3 pens/month
- (10 doses per pen)
Requires Rx for needles

Adlyxin

Contains 14 doses (20mcg)
2 pens/month
Requires Rx for needles

Bydureon

2mg pen
4 pens/month
Shake 15 seconds
Never see needle

Trulicity

0.75, 1.5, 3, 4.5mg pens
4 pens/month
Never see needle

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) exenatide XR† (Bydureon)	5 and 10 mcg BID 2 mg 1x a week Pen injector - Bydureon BCise	**Side effects for all:** Nausea, vomiting, weight loss, injection site reaction. Report signs of acute pancreatitis (severe abdominal pain, vomiting), stop med. Increase dose monthly to acheive targets. **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 for pediatrics 10-17 yrs Lowers A1c 0.5 – 1.6% Weight loss: 4-6% body weight loss.
	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	
	lixisenatide (Adlyxin)	10 mcg 1x a day for 14 days 20 mcg 1x day starting day 15	
	semaglutide* (Ozempic) (Rybelsus) Oral tablet	0.25, 0.5, 1.0 and 2.0 mg 1x a week pen injector 3, 7, and 14 mg daily in a.m. Take on empty stomach w/H2O 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 prefilled single dose pen Increase dose by 2.5 mg once monthly to reach targets.	**Side effects include:** Nausea, diarrhea, injection site reactions. Avoid if family history medullary thyroid tumor. Report pancreatitis or acute gallbladder problems. Lowers A1C ~ 1.8 - 2.4% Weight loss: 7-13% body weight loss at max dose.

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Actions of GLP-1 and GIP

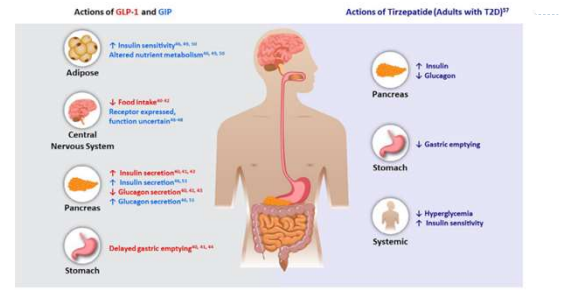


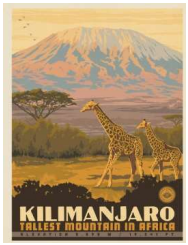
FIGURE 1 Gluco-regulatory actions of GIP and GLP-1 proposed based on preclinical and clinical studies, and actions of tirzepatide in adults with type 2 diabetes. GIP, glucose-dependent insulinotropic polypeptide; GLP-1, glucagon-like peptide-1; T2D, type 2 diabetes

REVIEW ARTICLE WILEY

Tirzepatide for the treatment of adults with type 2 diabetes:
An endocrine perspective

GIP/GLP-1 Receptor Agonist

- Tirzepatide (Mounjaro) is a GIP/GLP-1 Receptor Agonist
  - GIP: glucose-dependent insulinotropic polypeptide
  - GLP-1: glucagon like peptide-1
- Studied in the SURPASS clinical program (T2DM)
- Studied in the SURMOUNT clinical program (Obesity)
- Once weekly injectable disposable pen: abdomen, legs, arms
- AWP - $974 a month

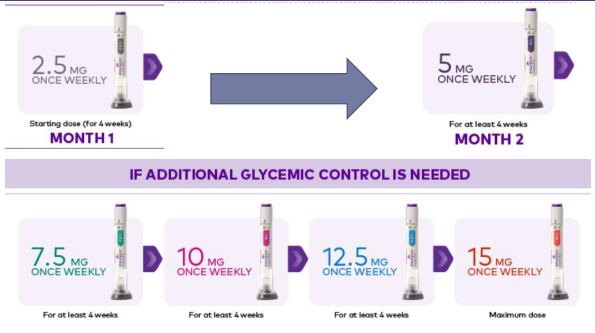


Tirzepatide Wt loss and A1C impact

- A1C drop in Surpass Trials of
- 1.9% to 2.6%

- Weight loss in Surpass Trials of
- 7.8% to 12.9% or
- 13.6 to 28.4 pounds
- Not yet FDA approved as wt loss medication.

Tirzepatide (Mounjaro) Clinical Use



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

- Avoid if personal or family history of medullary thyroid cancer
- Start at lower dose and titrate
- Eat smaller *nourishing* meals to reduce nausea
- Avoid high fat meals -
- Reconsider nausea as feeling full
- Store extra pens in fridge
- Avoid in combo with DPP-4 inhibitors
- Report any sudden abdominal pain or pancreatitis symptoms
- Ask about recent eye exam
  - Potential increase in diabetes retinopathy

SGLT2 Inhibitors- "Glucoretics"

- **Action**: decreases renal reabsorption of glucose proximal tubule of kidneys (reset renal threshold)
- **Preferred** diabetes treatment for people with heart and kidney failure. Decreases BG & CV Risk.
- AWP: ~$650 a month

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:** See Package Insert (PI) for GFR cut-offs, dosing. Limited BG lowering effect if GFR < 45, still benefits kidneys & heart at lower GFR. If CKD & GFR ≥20, use SGLT-2 to reduce CVD, HF, preserve renal function. (ADA/EASD) **Benefits:** SGLT-2s* reduce BG, CV death & HF, slow CKD. Lowers A1c 0.6% -1.5%.

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		Yes w/ Diabetes	Yes
Bexagliflozin (Brenzavvy)	Yes		Yes w/Diabetes	Yes

Mr. J - What are Your Recommendations?

Mr. J Profile

67 yr old with newly type 2. History of stroke, BMI 26.

Meds: Metoprolol, metformin, lovastatin 20mg.

Labs:

- A1c 9.3%
- LDL 136 mg/dl
- Triglycerides 260mg/dl
- GFR 58, UACR 32
- B/P 142/79
- Liver enzymes in normal range

Self-Care Skills

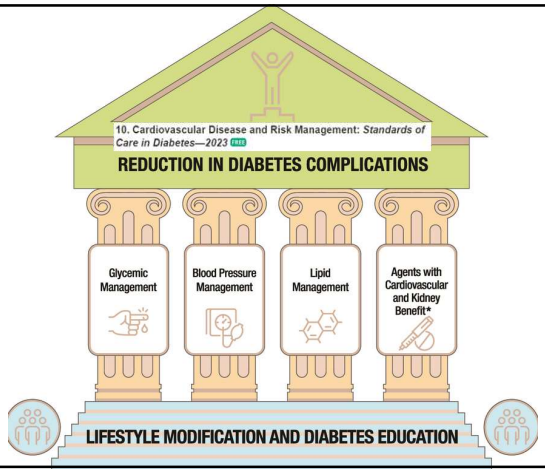
- Goes to gym 2-3 times a week
- Plays golf on occasion.
- Eats out 2 times a week.
- Met with RD, signed up for DSMES.
- Add SGLT-2i

10. Cardiovascular Disease and Risk Management

- Atherosclerotic cardiovascular disease (ASCVD) and Heart Failure are leadings causes of morbidity and mortality in diabetes.
- ASCVD includes:
  - coronary heart disease (CHD),
  - cerebrovascular disease, or
  - peripheral arterial disease
- $37.3 billion in cardiovascular-related spending per year

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

American Diabetes Association. 10. Cardiovascular Disease and Risk Management: *Standards of Care in Diabetes—2023* FREE



Assess ASCVD and Heart Failure Risk Yearly

- Duration of diabetes
- 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—2023*

Poll Question 6

- RJ is a healthy 52 yr old with diabetes. RJ takes an ACE Inhibitor, insulin and a statin. According to ADA Standards of Care 2023, what is the blood pressure target for RJ?
- A. Less than 120/70
- B. Less than 130/80
- C. Less than 140/90
- D. Less than 135 /85

BP and Diabetes Targets – New 2023

- **BP target <130/80 (if it can be safely attained)**
- Confirm systolic BP ≥ 130 or diastolic BP ≥ 80 using multiple readings, including measurements on a separate day, to diagnose hypertension.
- If BP ≥ 180/110, can be diagnosed at single visit
- BP target based on ind assessment, shared decision making and potential adverse effects
- Monitor BP at home and at each visit
- During pregnancy, with previous history of HTN
  - B/P Target of 110 -135/85

10. Cardiovascular Disease and Risk Management: *Standards of Care in Diabetes—2023*

Studies Demonstrate Benefits

- The Systolic Blood Pressure Intervention Trial (SPRINT) demonstrated that treatment to a target systolic BP of <120
  - decreases cardiovascular event rates by 25% in high-risk patients
  - although people with diabetes were excluded from this trial

- The Strategy of Blood Pressure Intervention in the Elderly Hypertensive Patients (STEP) trial included
  - nearly 20% of people with diabetes decreased cardiovascular events with treatment to a BP target of <130

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Cost vs Benefit of Treating HTN

- Consider potential adverse effects of BP medications
  - Hypotension, syncope, falls, acute kidney injury, and electrolyte abnormalities
  - Older people, those with chronic kidney disease, and frailty have been shown to be at higher risk
  - People with orthostatic hypotension, substantial comorbidity, functional limitations, or polypharmacy higher risk and may prefer relaxed B/P targets to enhance quality of life.

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HTN Lifestyle Treatment Strategies

- If BP > 120/80, start with lifestyle
- DASH Diet
- Weight loss if indicated
- Sodium intake <2,300mg/day
- Eat more fruits & veggies (8-10 a day)
- Low fat dairy products (2-3 servings/day)
- Limit alcohol 1-2 drinks a day
- Increase activity level

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BP Treatment in addition to Lifestyle

- **First Line B/P Drugs if 130/80 +**
  - With albuminuria* or ASCVD
    - 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.
  - Avoid ACE and ARB at same time
  - Multiple Drug Therapy often required
- **If B/P ≥ 160 /100 start 2 drug combo**

*Albuminuria = Urinary albumin creatinine ratio of 30+

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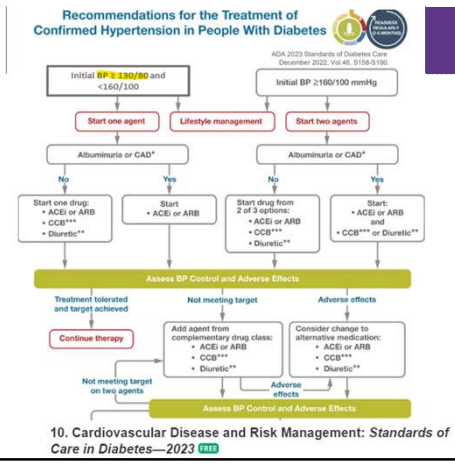

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Poll Question 7

RZ is 47 years old with type 2 diabetes and hypertension. RZ takes metformin 1000 mg BID, plus lisinopril 20mg daily. LDL is 130. 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 30%.

C. LDL target of 65 mg/dL or less.

D. Determine LDL target based on ASCVD risk.

New for 2023
Lipid Goals – Primary Prevention

- For people with diabetes aged 40–75 at higher cardiovascular risk*
  - (*LDL >100, HTN, Smoke, CKD, albuminuria, family hx ACSVD),
  - **High-intensity statin** therapy is recommended
  - **Reduce LDL cholesterol by at least 50% of baseline**
    AND
  - **Target LDL cholesterol <70 mg/dL.**
- For people with diabetes aged 40–75 at higher cardiovascular risk* with **LDL cholesterol of 70 +**
  - it may be reasonable to add ezetimibe or a PCSK9 inhibitor to maximum tolerated statin therapy.

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Statin Therapy

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

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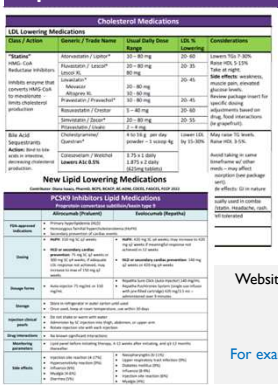
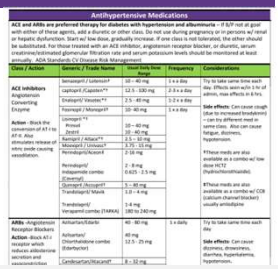
Lipid and HTN Meds Cheat Sheets



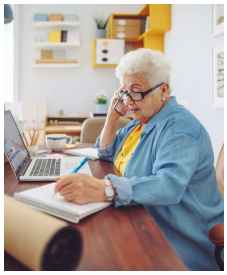


Website: https://diabetesed.net/coach-bevs-diabetes-cheat-sheets/
On CDCES Coach App too

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

New for 2023
Lipid Goals for People *with* ASCVD

- For people of all ages with diabetes and atherosclerotic cardiovascular disease:
  - Add high-intensity statin to lifestyle therapy.
  - **Reduce LDL cholesterol by 50% or greater from baseline with LDL cholesterol goal of <55.**
  - Addition of ezetimibe or a PCSK9 inhibitor with proven benefit in recommended if goal is not achieved on maximum tolerated statin therapy.



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New for 2023
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.

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Lipid Monitoring and Lifestyle Treatment Strategies

- Lipid Goals
  - 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 n-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—2023* FREE

Do Statins Work?

- Meta-analyses, including data from over 18,000 people with diabetes from 14 randomized trials of statin therapy (mean follow-up 4.3 years).

- Statin therapy demonstrated
  - 9% proportional reduction in all-cause mortality and
  - 13% reduction in vascular mortality for each 39 mg/dL reduction in LDL cholesterol

10. Cardiovascular Disease and Risk Management: *Standards of Care in Diabetes—2023*

10 - ADA Antiplatelet Agents

- Use aspirin therapy (75–162 mg/day) as a secondary prevention strategy in those with diabetes and a history of atherosclerotic cardiovascular disease.
  - Aspirin therapy dose (75–162 mg/day)
  - Increased bleeding risk

- Aspirin may be considered as a primary prevention strategy in diabetes (usually over age 50) with increased CV risk (family history of premature ASCVD, hypertension, dyslipidemia, smoking, or CKD/albuminuria)
  - Requires comprehensive discussion w/ person on benefits versus increased risk of bleeding.
  - Aspirin allergy, consider different agent

10. Cardiovascular Disease and Risk Management: *Standards of Care in Diabetes—2023*

Mr. J - What are Your Recommendations?

Mr. J Profile

67 yr old with type 2. History of stroke, BMI 26.

Meds: Metoprolol, metformin, lovastatin 20mg.

Labs:

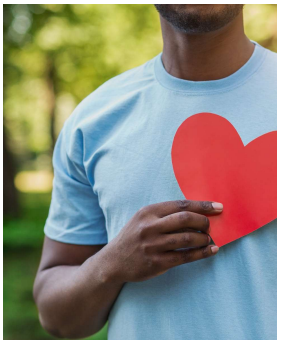
- A1c 7.9%
- LDL 136 mg/dl
- Triglycerides 260mg/dl
- GFR 58, UACR 32
- B/P 142/79
- Liver enzymes in normal range

Self-Care Skills

- Goes to gym 2-3 times a week
- Plays golf on occasion.
- Eats out 2 times a week.
- Met with RD, signed up for DSMES.
- Adding SGLT-2i
- Increase Statin
- Add Aspirin
- Add ACE or ARB
- Consider GLP-1 RA

Diabetes Meds Lower CV Risk

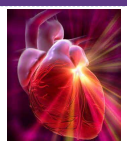
- If diabetes plus ASCVD risk factors
  - SGLT-2s* and GLP-1s* reduce risk of major adverse CV events
  - Plus ACE or ARB
  - Post MI, continue beta blockers for 3 years.
- If type 2 diabetes and heart failure
  - SGLT-2s reduce risk of heart failure and hospitalization.
  - Also consider beta blocker



10. Cardiovascular Disease and Risk Management: *Standards of Care in Diabetes—2023* FREE

Coronary Vessel Disease Meds

- In those with known CVD,:
  - Get blood glucose to goal
  - Statin therapy
  - B/P Med (ACE or ARB)
  - Aspirin (or another agent)
  - Diabetes Meds that significantly decrease CV events:
    - *SGLT-2i's
      - Empagliflozin (Jardiance), canagliflozin (Invokana), dapagliflozin (Farxiga)
    - *GLP-1 RA's
      - Semaglutide (Ozempic), liraglutide (Victoza), dulaglutide (Trulicity)



10. Cardiovascular Disease and Risk Management: *Standards of Care in Diabetes—2023* FREE

Poll Question 9

- PL is newly diagnosed with type 2. A1c is 7.9. GFR is 63. UACR 26 mg/g. History of CHF. According to 2023 ADA Standards, what med along with lifestyle should be started first?

a. Only Metformin, since A1c is close to target.
b. SGLT-2 inhibitor
c. Sulfonylurea
d. GLP-1 or Metformin

New 2023 Standard 11 - Chronic Kidney Disease and Risk Management

- Optimize glucose and B/P Control to protect kidneys
- Screen Urine Albumin Create ratio (UACR) & GFR
  - Type 2 at dx then yearly
  - Type 1 with diabetes for 5 years, then yearly
  - If urinary albumin ≥300 and GFR 30–60 monitor 1-4 times a year to guide therapy.
- Treat hypertension with ACE or ARB and for elevated albumin-to-creatinine ratio of 30 -299.
- Monitor serum creat and K+
  - if on ACE, ARB or diuretics

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—2023*

NEW 2023 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—2023*

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

- **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 higher levels of dietary protein intake since protein energy wasting is a major problem in some individuals on dialysis

11. Chronic Kidney Disease and Risk Management: *Standards of Care in Diabetes—2023*

16. Diabetes Care in the Hospital - ADA Goals and Treatments For Hospitalized Patients

Blood glucose goal is 140-180
- Individualize based on pt status
- Goal of 110 -140 (ie post CABG)
- 100-180 (ie non-critical care)
- Avoid hypo and hyper

- Start subq insulin if BG > 180
  - Stop oral meds
  - Basal bolus therapy if eating
  - Basal + correction scale if higher risk for hypo
- Critical Care:
  - Basal bolus or Insulin drip

ADA Standards 2023

16. Diabetes Care in the Hospital: *Standards of Care in Diabetes—2023*

Preparation for Surgery

- Preoperative risk assess (heart, renal disease, neuropathy)
- A1C target <8% for elective surgeries.
- Perioperative glucose target of 100-180
- Hold diabetes meds day of surgery
- Hold SGLT-2 for 3-4 days before surgery
- Basal Insulin injection or pump:
  - NPH – cut dose by 50% (type 2)
  - Basal insulin - give 75 - 80% (individualize, type 1 may need 100% of basal)
- Bolus insulin:
  - Monitor BG every 4-6 hours while NPO
  - Use mild insulin bolus coverage as needed

16. Diabetes Care in the Hospital: *Standards of Care in Diabetes—2023*

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- Thank you!
- Please email or call us with any questions.
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