DiabetesEd Training Conference Syllabus

Live in San Diego

October 11th-13th, 2023

www.DiabetesEd.net

DiabetesEd Training Conference in San Diego
October 11– 13, 2023

Welcome

We are proud to welcome you to our 25th Annual DiabetesEd Training Conference. Your attendance demonstrates a commitment to advocating for best diabetes care for the 37 million people with this manageable condition. We encourage you to share the new ideas and information garnered from this conference with your community and colleagues. As advocates, specialists and coaches, we believe that we can make a dramatic difference in improving the quality of life for people living with prediabetes and diabetes. We thank you for your participation and invite you to enjoy the program.

Faculty Biographies

Beverly Dyck Thomassian, RN, MPH, BC-ADM, CDCES
As president of Diabetes Education Services for the past 25 years, Beverly Thomassian, RN, MPH, CDCES, BC-ADM, believes that we can improve diabetes care through education, advocacy and curiosity. As a diabetes coach, she promotes excellence in care through her live courses and webinar presentations. As a Diabetes Nurse Specialist who is Board Certified in Advanced Diabetes Management, Beverly has a history of being an innovator, leader and mentor.

In addition to running her company, she is an Associate Clinical Professor at the University of California, San Francisco, (UCSF) and a visiting professor at California State University, Chico (CSU Chico). As a Diabetes Nurse Specialist at a local Indian Health Services Health Center, she keeps her clinical skills fresh through one-on-one consultation, provider collaboration and quality improvement initiatives.

Diana Isaacs, PharmD, BCPS, BCACP, CDCES, BC-ADM, FADCES, FCCP
Diana Isaacs was 2020 ADCES Diabetes Educator of the Year for her educational platform promoting the use of CGM for people with diabetes and other innovations. Dr. Isaacs was awarded the Ohio Pharmacists Association Under 40 Award in 2019. She serves in leadership roles for several pharmacies and diabetes organizations. She has numerous diabetes publications and research projects with a focus on medications, CGM and diabetes technology. Dr. Isaacs is a contributing author for the 2023 ADA Standards of Care.

For the past three years, Dr. Isaacs has served as a contributing author for the ADA Standards of Care. As the Program Coordinator and clinical pharmacist specialist in the Cleveland Clinic Diabetes Center, Dr. Isaacs brings a wealth of clinical knowledge combined with extensive research and speaking experience to this program.

Ashley LaBrier, MS, RD, CDCES
Ashley is an educator, dietitian, and Diabetes Education Program Coordinator at the Salinas Valley Medical Clinic's Diabetes & Endocrine Center. Her work with people living with diabetes focuses on the value of healthy nutrition and movement to improve well-being.

Ashley is passionate about providing person-centered education to empower those who live with diabetes. Having been diagnosed with type 1 diabetes herself nearly 20 years ago, she combines her professional knowledge with personal experience and understanding.

Faculty and Staff Biographies (cont'd)

Lonnie Vaughn, RNC, BSN, CDCES – Onsite Program Manager
As a leader in the field of diabetes management, Lonnie has been championing best care practices at Doctor's Hospital in Modesto for over 30 years. As a certified diabetes educator, trainer, mentor and advocate, her passion and commitment to improving diabetes care is valued by patients and professionals alike. Lonnie's expertise and experience uniquely qualify her to speak on a multitude of diabetes related topics that not only inform but inspire.

Bryanna Sabourin - Director of Operations and Customer Happiness
For the past three years, Bryanna has made significant contributions to improve our customer experience as the Director of Operations & Customer Happiness. Bryanna is excellent at problem solving and helping students find the courses and resources that best match their needs! Bryanna has worked in healthcare operations for nearly a decade with a strong emphasis on customer experience and satisfaction.

Andrew Jackson – Assistant to the Director of Operations and Customer Happiness
Andrew is currently studying to become a Registered Nurse in hopes of being a healthcare advocate for those in his community. Andrew has extensive experience in quality control and customer service, with customer satisfaction being the primary objective. In his free time, he enjoys reading, music, art, & long walks. He will be helping us with quality improvement and managing our websites.

Accreditation Info.
This program is approved for Contact Hours for Nurses and CA Pharmacists and 18 CPE, Level III for RDs. Provider is approved by the California Board of Registered Nursing, Provider # 12640 and Commission on Dietetic Registration (CDR), Provider # DI002. Need hours for your CDCES? We have great news. This program is accredited by the CDR so all hours of instruction can be used to renew your CDCES regardless of your profession.

We are overjoyed that you are joining us! Please let us know how we can be of more service!

Sincerely,

Beverly Thomassian

Beverly Thomassian, RN, MPH, CDCES, BC-ADM
President and Founder, Diabetes Education Services
DiabetesEd.Net

Bryanna Sabourin

Bryanna Sabourin
Director of Operations, Customer Happiness
Diabetes Education Services

Diabetes Education SERVICES™ | 25 years growth, connection, inspiration

www.DiabetesEd.net| 530-893-8635
info@diabetesed.net

DiabetesEd Specialist Training Conference – Day 1

Beverly Thomassian, RN, MPH, BC-ADM, CDCES
President, Diabetes Education Services

Oct 11-13, 2023

Diabetes Education SERVICES

25 years growth, connection, inspiration

Class starts at 8:00am

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- Enjoy Breakfast & Beverage
- Submit Raffle Ticket (in PocketCard Packet in bag)
- Download CDCES Coach App
  - Evals & OnSite Shopping
- Join party mixer tonight at 5:45
  - Celebrate 25 Years, food & cake too
- Store open all 3 days (tax added)
- Make yourself at home

DiabetesEd.net Website Orientation

PocketCards

CDCES Coach App

Beverly Thomassian, RN, MPH, CDCES, BC-ADM
CEO, coach, instructor, cheerleader, mentor

www.DiabetesEd.net | info@diabetesed.net | 530-893-8635

Our Customer Happiness Team

My Family

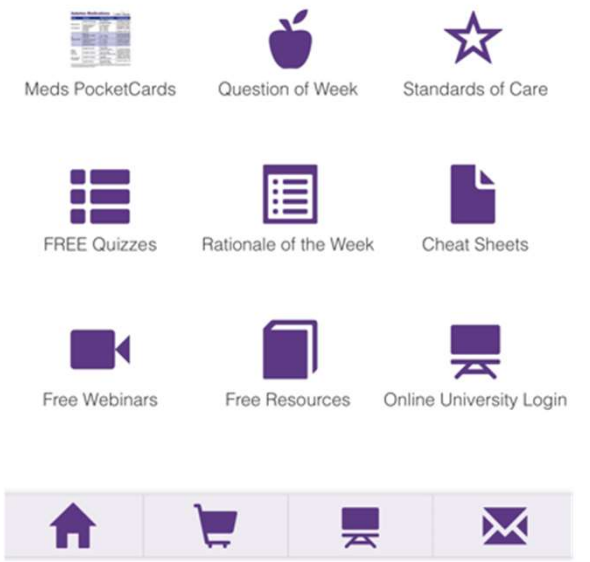
- Jackson 18 years
- Kris, my husband for 25 yrs
- Robert 21 years

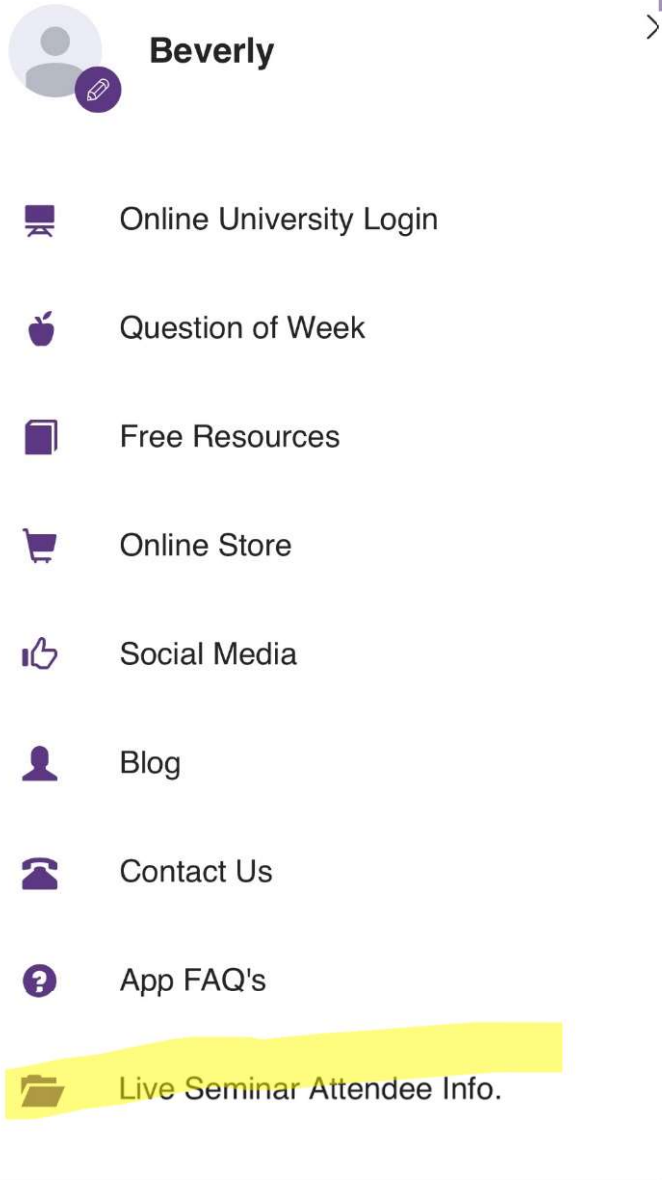
Bryanna

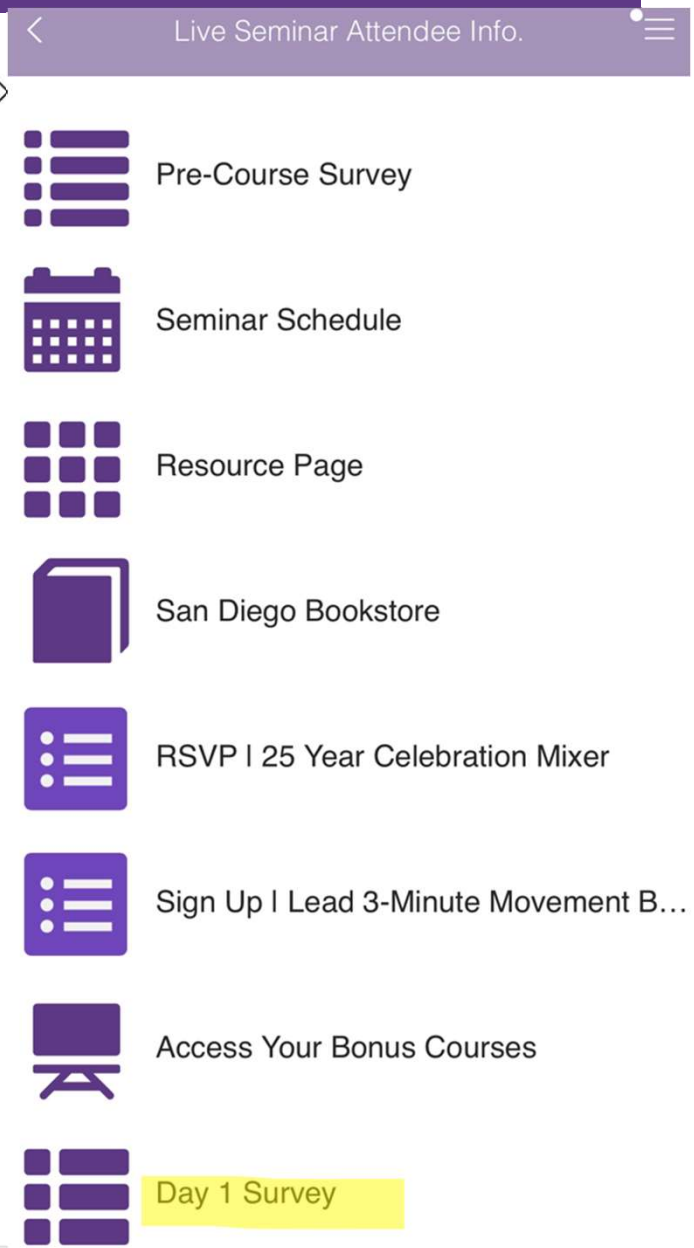
Andrew

Lonnie

Program Survey on CDCES Coach App







Look in your Inbox for Resource Page

Handouts & Resources Page

Click here for Resource Page →

Conference Bookstore

Pre-Order Merch to hold materials for easy pick up at the conference. Plus, save on shipping!

Click here for Bookstore →

For this email with lots of helpful links and resources, including one- page versions of charts and cheat sheets and evals.

Resource Page

SCAN ME

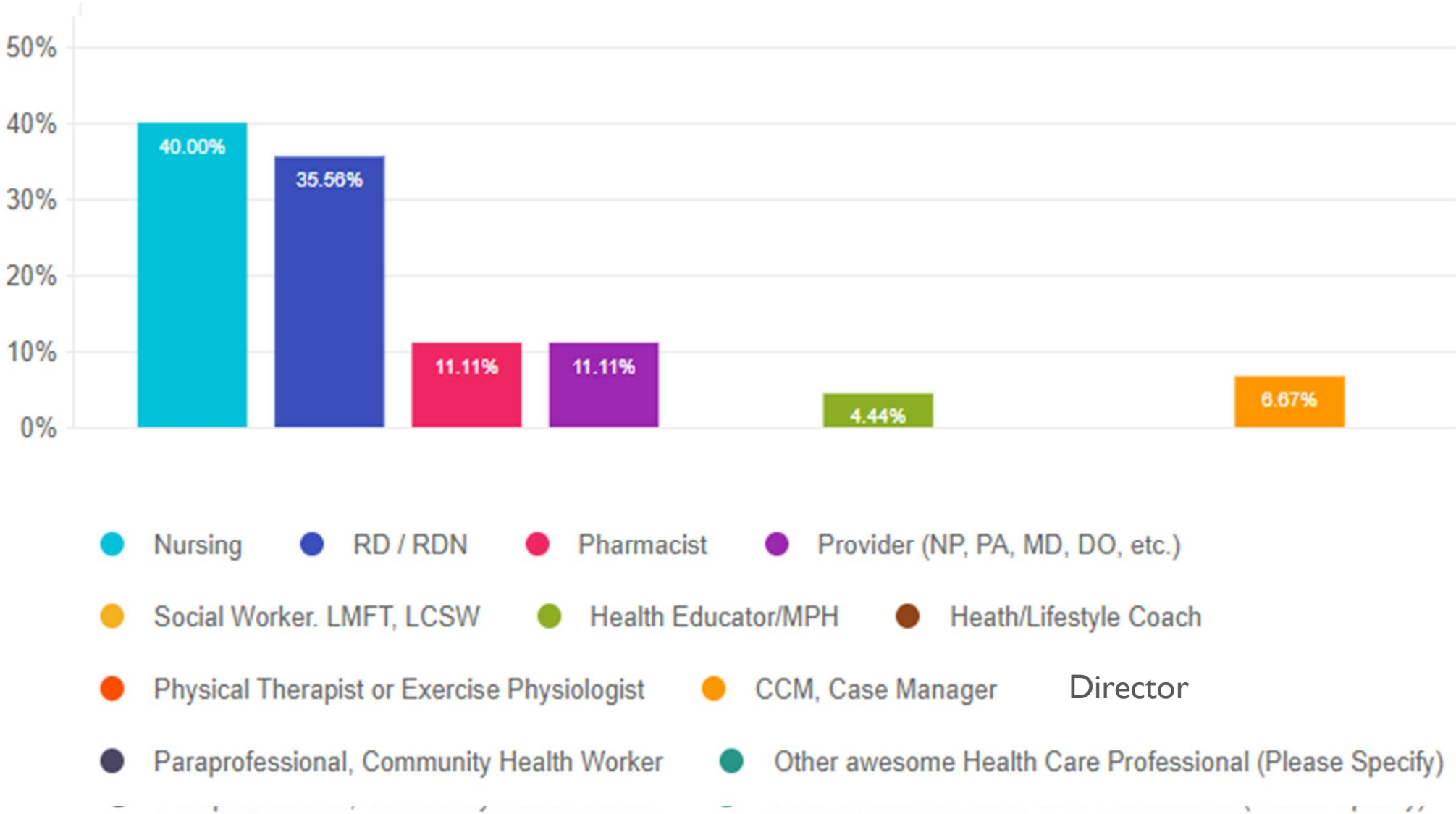
Important Stuff

- Sign in each day please
- Breakfast & lunch provided!
  - Vegetarian options for those who requested
- PocketCard Bundle
  - Sticker, Bryanna 411, Raffle Ticket
- Resource page has PDF of all Slides
- Syllabus overview & Eval QR Code
- Team Names & Quick Quizzes– Note your table number

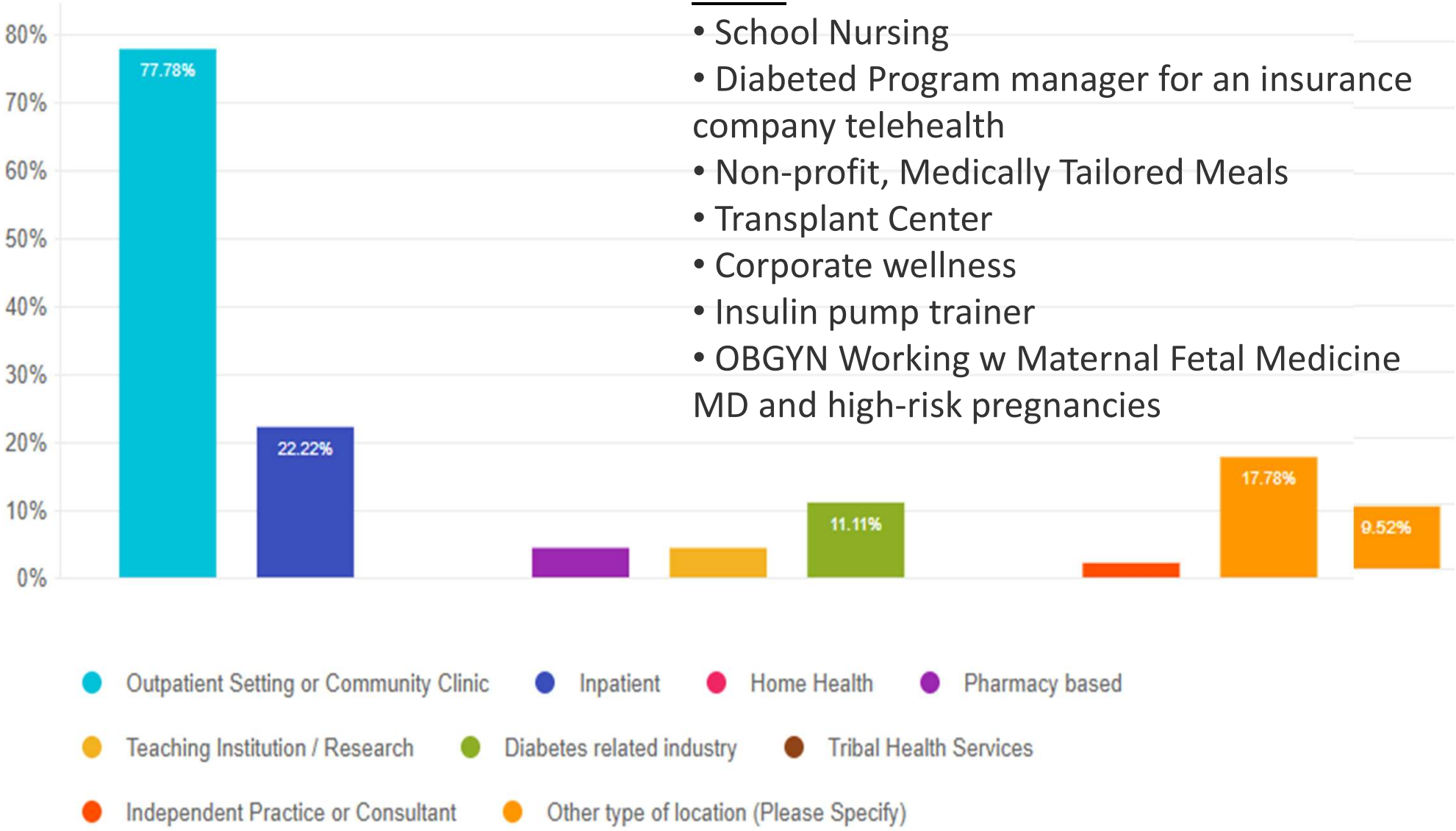
We Love Giving Out Prizes

- BINGO
- Raffle Prizes
- Best Team Name
- Who made the longest journey?

Who is attending this conference?



What is your job setting?

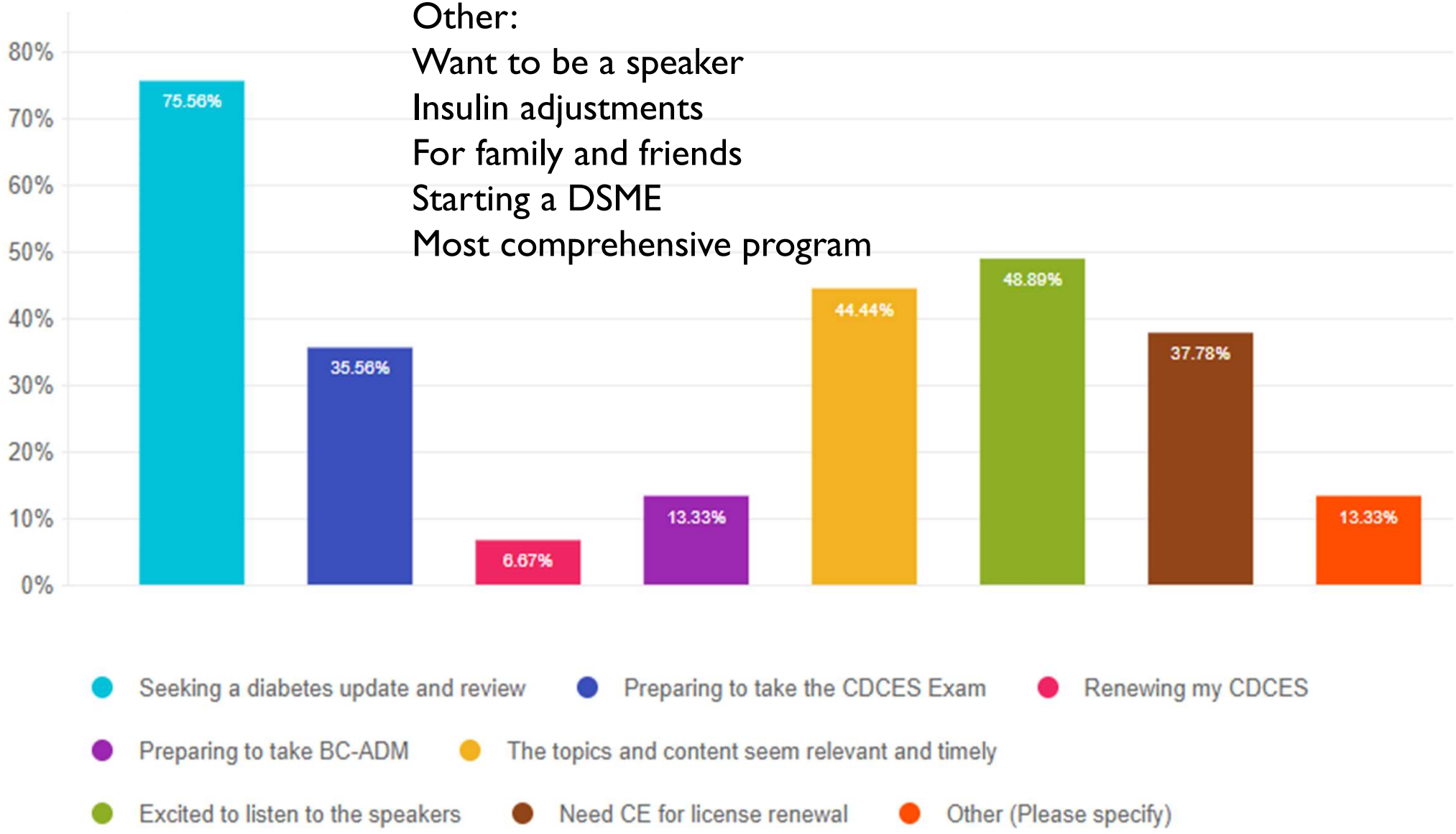


Other

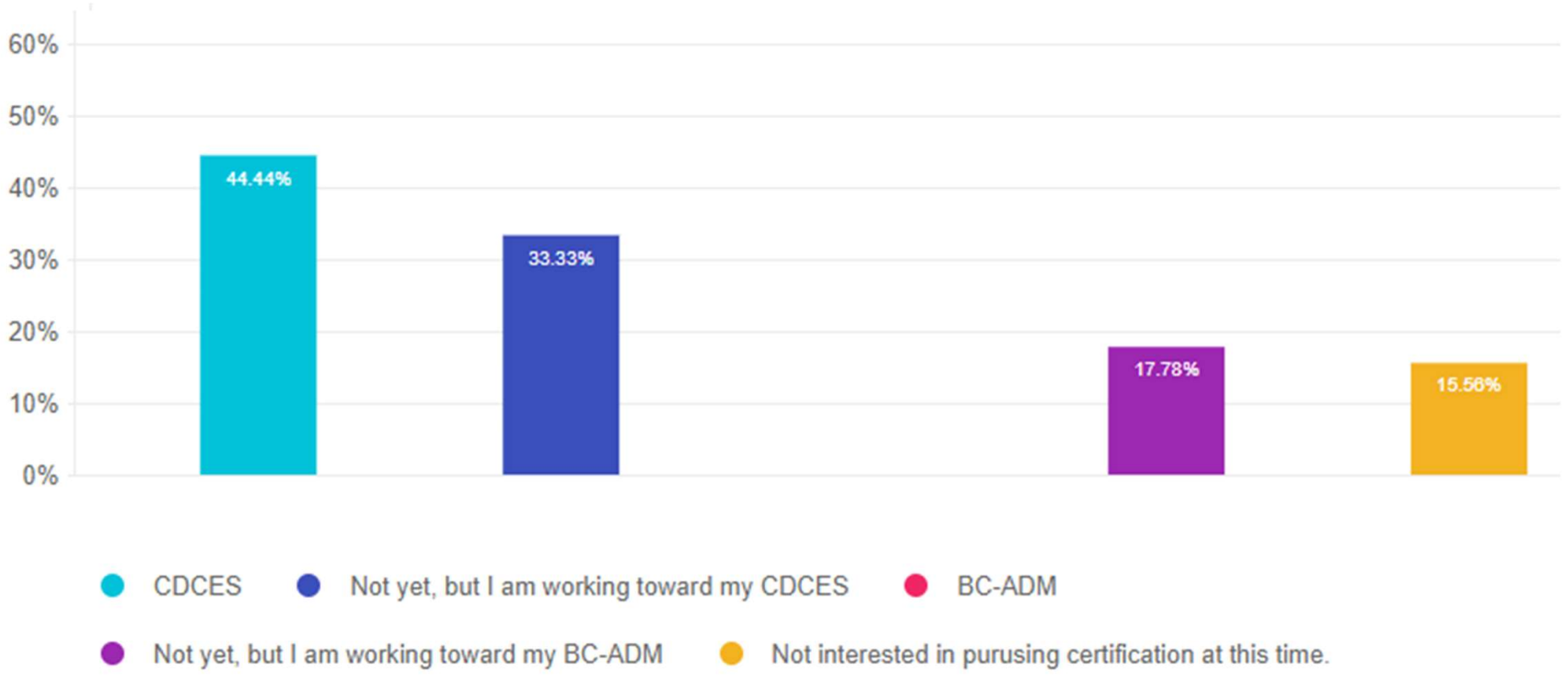
- School Nursing
- Diabeted Program manager for an insurance company telehealth
- Non-profit, Medically Tailored Meals
- Transplant Center
- Corporate wellness
- Insulin pump trainer
- OBGYN Working w Maternal Fetal Medicine MD and high-risk pregnancies

What motivated you to attend?

Other:
Want to be a speaker
Insulin adjustments
For family and friends
Starting a DSME
Most comprehensive program



Certifications?



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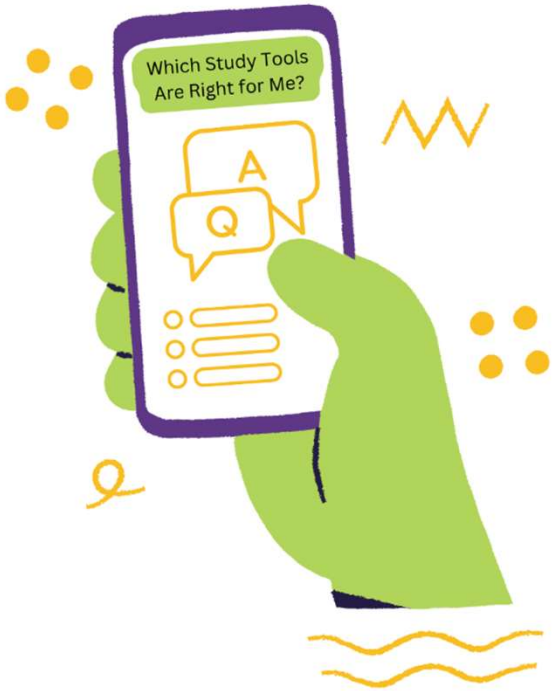
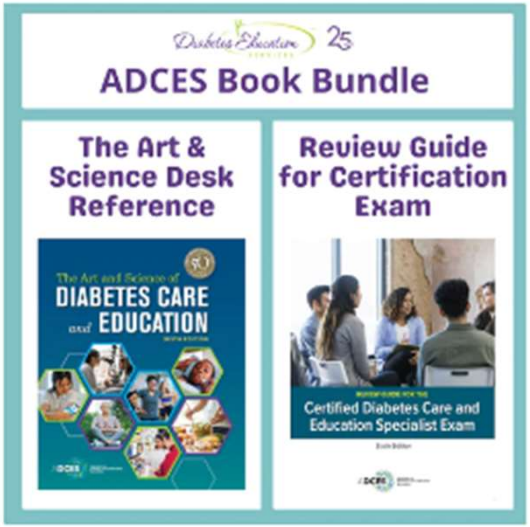
Growth • Connection • Inspiration
25 years

Start Your Journey

Like



Diabetes Education SERVICES



Future CDCES – Click Here!

Prep for CDCES Webinars
Nov 14, 2023

Preparing for BC-ADM Exam?

Future BC-ADM – Click Here!

Prep Course for BC-ADM – Recorded and Ready

- Preparing for Exam Webinars
- BONUS Online Courses – Login to Online University
- Take practice tests
- Study what you DON'T know
- New 2023 ADCES Books here!

FREE Bonus Courses on Online University

- We can't cover it all in this live course.
- So, we provide supplemental courses.
- Now includes "Learning Theories made Easy"

Studying to Achieve a CDCES or BC-ADM?

- MOST important of ALL

Thank YOU for Being a Part of This Awesome Community

DiabetesEd Training Conference |San Diego *

Day One | October 11, 2023 (Pacific Time)

Standards of Care, Medications for Type 2 & Addressing Cardiovascular Disease

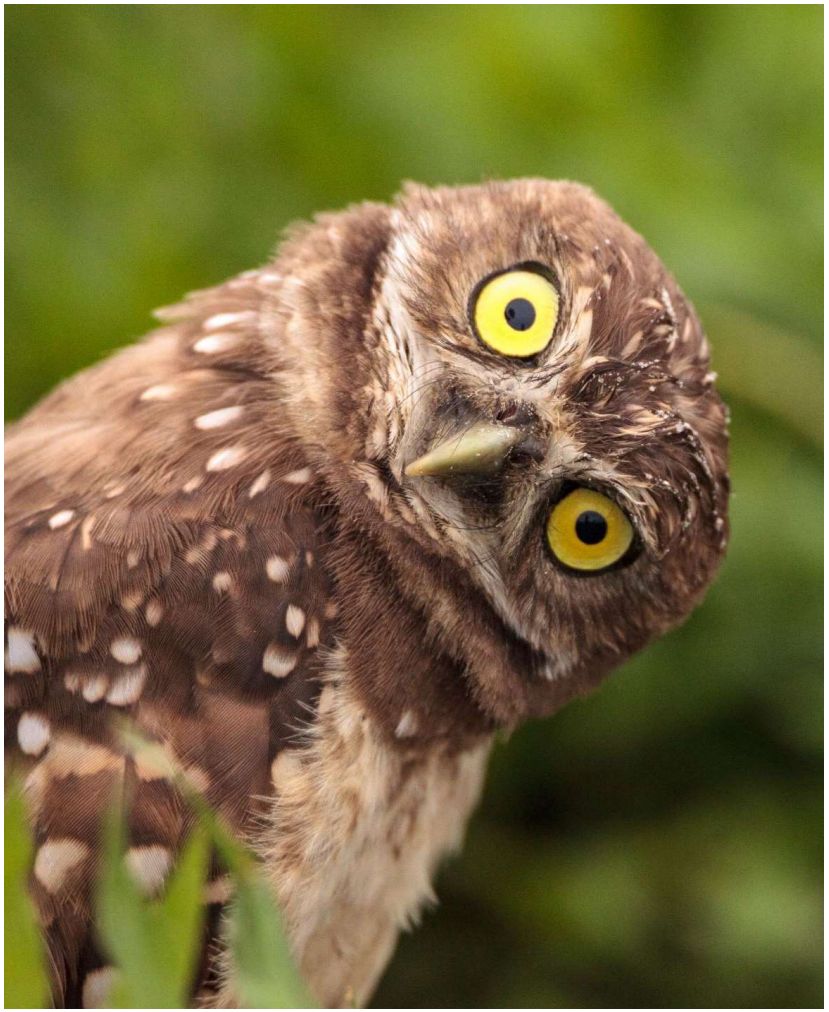
Time	Topic	Speakers
7:30 – 8:00am	**Breakfast & Welcome**	
8:00 – 10:00	**Current State of Diabetes ADA Standards of Care** **Person Centered Care for Type 1, Type 2, LADA, GDM**	Beverly Dyck Thomassian, RN, BC-ADM, MPH, CDCES and
10:00 – 10:15	**Break**	Diana Isaacs, PharmD, BCPS, BCACP, CDCES, BC-ADM, FADCES, FCCP
10:15 – 12:00	**Medical Evaluation, Risk Identification** **Diabetes Prevention** **Glycemic targets across the Lifespan**	
12:00 – 1:00	**Lunch Break**	
1:00 – 2:30	**Hypoglycemia prevention & treatment** **Landmark Studies** **Medications for Type 2**	
2:30 – 2:45	**Break**	
2:45– 3:15	**Pharmacology Algorithms - AACE and ADA**	
3:30 – 4:45	**Cardiovascular Monitoring and Management**	
5:45 – 7:15	**25 Year Waterside Party**	

Diabetes Education Services 25

Virtual Course Schedule – Day 1 October 11

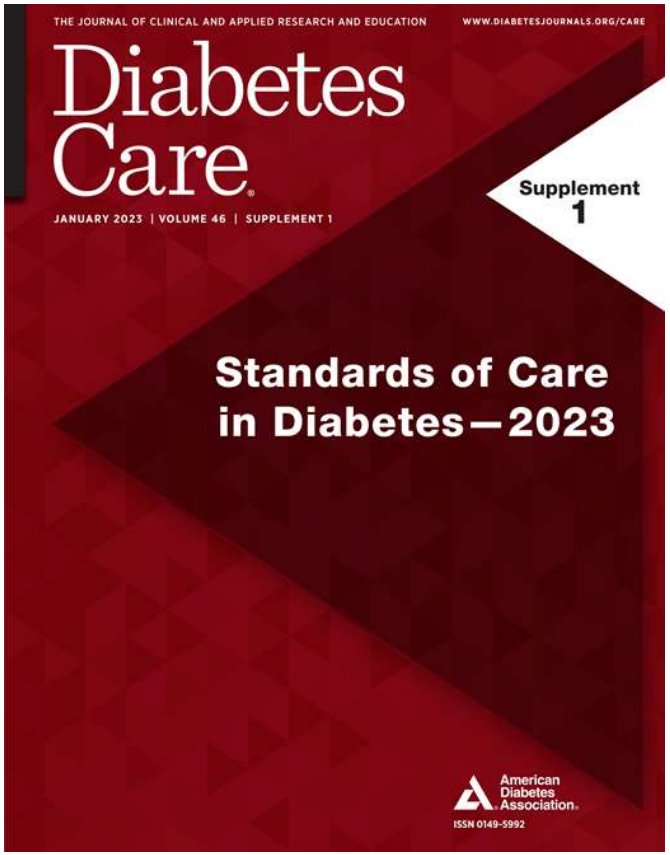
Speaker Question and Answer

- If you have a burning question, that will benefit the group, please raise your hand.
- Other questions will be answered as time allows.
- Write question on post-its and bring up front during break. Please top with speaker's name!



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

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

- Provides diabetes care at the Cleveland Clinic
- Provides care to specialized populations including transplant, pregnancy and other high-risk individuals.
- Usually sees about 10 clients a day
- Author & contributor

Endocrine Clinical Pharmacy Specialist
Director, Education & Training in Diabetes Technology
Co-Director Endocrine Disorders in Pregnancy
Cleveland Clinic Endocrinology and Metabolism Institute
ADCES Educator of the Year in 2020

Disclosures for Dr. Isaacs

- Diana Isaacs, PharmD, BCPS, BCACP, CDCES, BC-ADM, FADCES, FCCP declares the following disclosures:
- Speaker: Abbott, Dexcom, Novo Nordisk, Insulet, Medtronic, Lilly, Cequr
- Consultant: Sanofi, Undermyfork
- CBDCES Credentialing Committee
- ADCES Board Member

Diabetes Overview and Glycemic Goals

Objectives:

1. Discuss current Diabetes ADA Standards
2. Describe person-centered care for Type 1, Type 2, LADA, GDM
3. List steps for Medical Evaluation, Risk Identification and Prevention
4. State glycemic targets across the lifespan
5. Discuss hypoglycemia prevention & treatment
6. Describe significance of Landmark Diabetes Studies
7. List medications considerations for Type 2
8. Describe the pharmacology Algorithms
9. Discuss most recent cardiovascular risk mitigation strategies and goals.

17. Diabetes Advocacy

- People living with diabetes should not face discrimination
- We need to all be a part of advocating for the best care and the rights of people living with diabetes.
- Insulin should be affordable for all

Diabetes Care should meet standards in all standards.

- In school setting
- Young children in childcare
- For occupational drivers
- In work settings
- In Correctional Institutions

Global Epidemic

537 million adults are living with diabetes

3 in 4 adults with diabetes live in low- and middle-income countries

Diabetes around the world in 2021

International Diabetes Federation

www. DiabetesAtlas.org

- World Diabetes Day is November 14

Poll Question 1

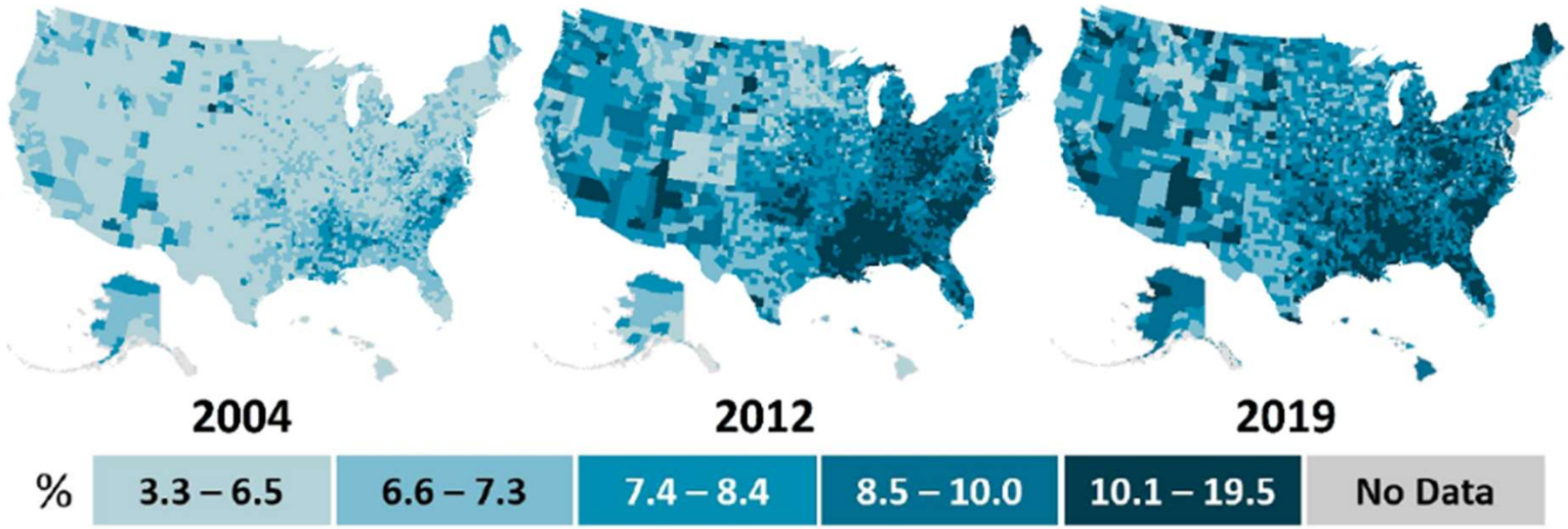
- According to the CDC, what best describes the current prevalence of prediabetes and diabetes in the U.S.?

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 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.

Centers for Disease Control and Prevention. National Diabetes Stats Report https://www.cdc.gov/diabetes/data/statistics-report/index.html. Accessed 1/23

CDC Announces

35% of Americans will have Diabetes by 2050

Boyle, Thompson, Barker, Williamson

2010, Oct 22:8(1)29

www.pophealthmetrics.com

Geography of Diabetes, SES, Weight

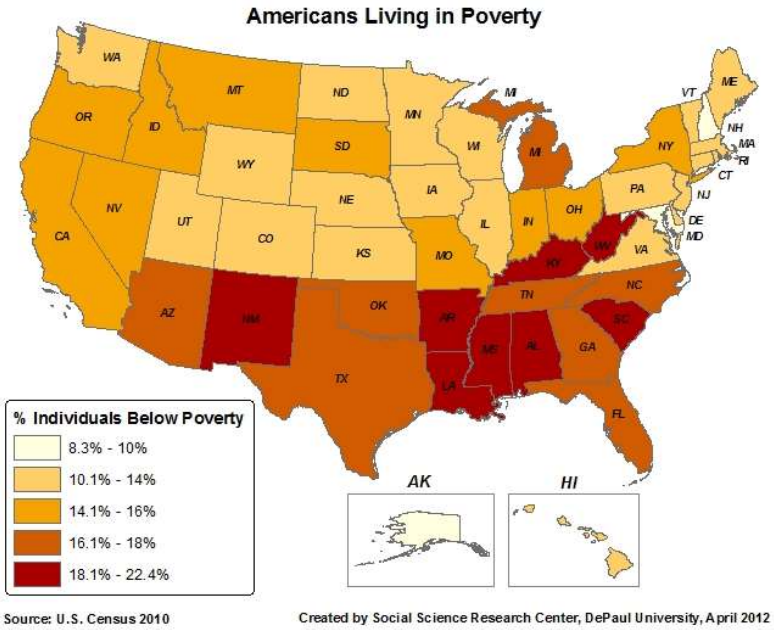
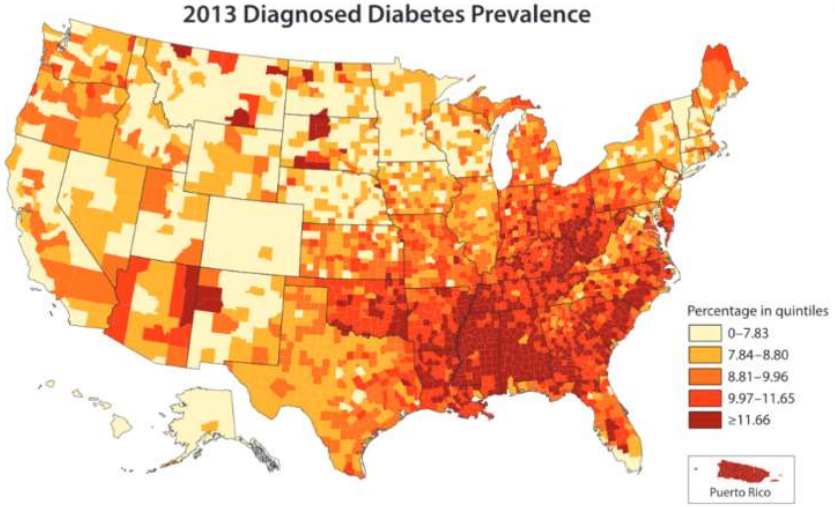
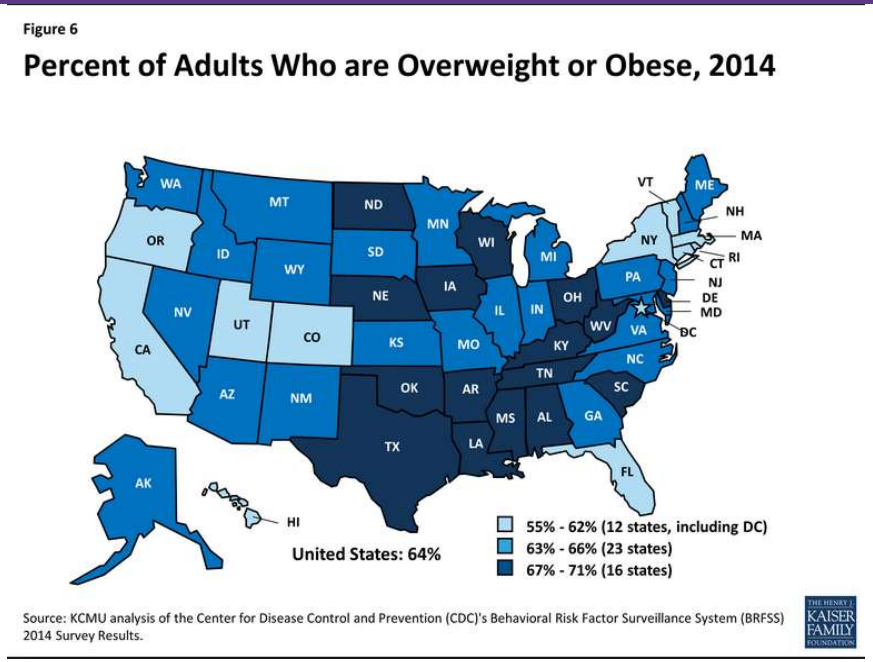


Figure 2. Age-adjusted, county-level prevalence of diagnosed diabetes among adults aged ≥20 years, United States, 2013





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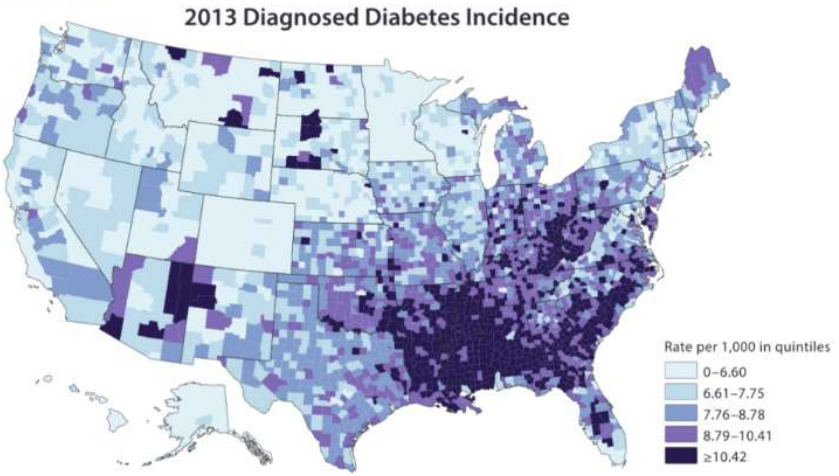
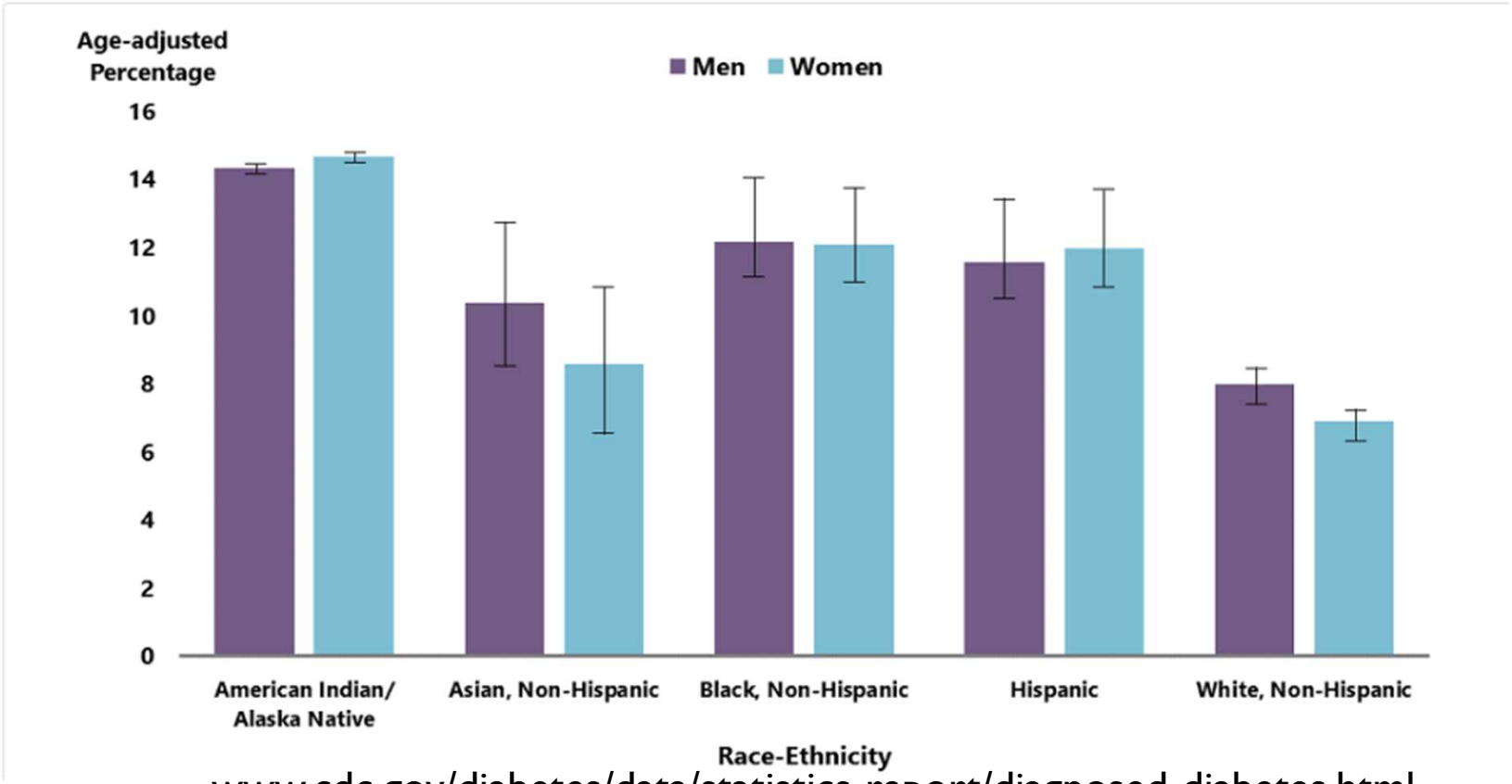


Diabetes Prevalence by Ethnic Group

- 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

Socioeconomics – Diabetes Prevalence

- Prevalence of diabetes varied significantly by education level, an indicator of SES status
  - 7.1% - More than high school education
  - 9.2% - High school education
  - 13.4% - Less than high school education
  - 13.7 – 14.4% of men and women with income below federal poverty level have highest prevalence of diabetes.

CDC 2023

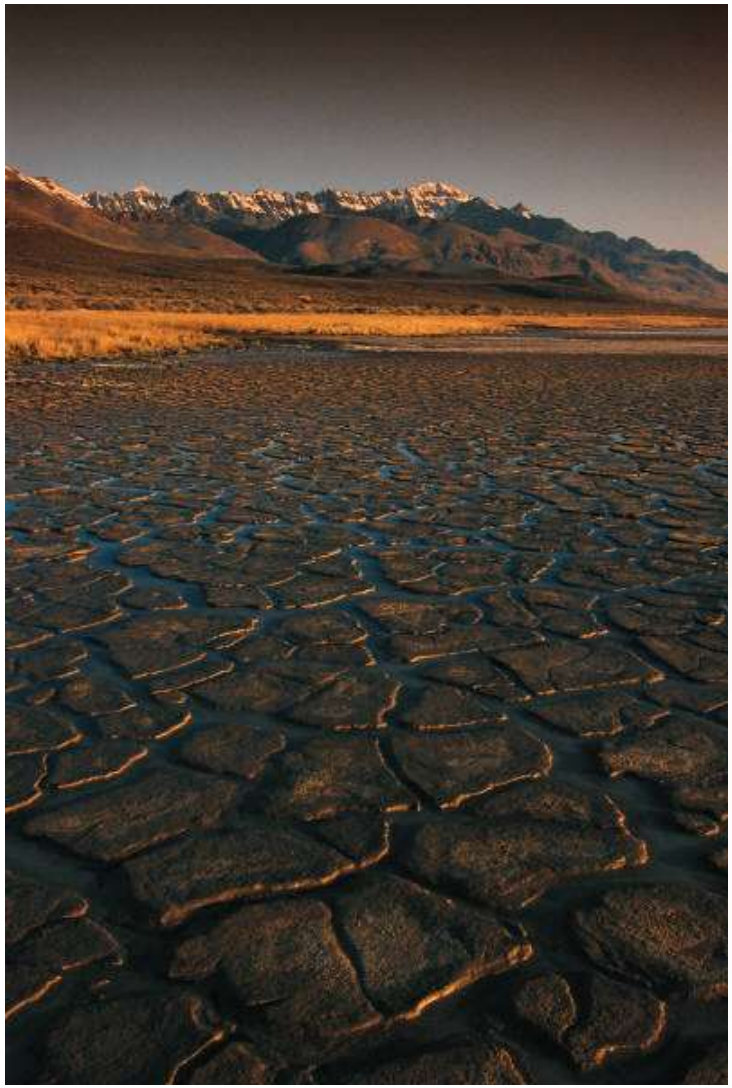
https://www.cdc.gov/diabetes/data/statistics-report/diagnosed-diabetes.html

1. Improving Care and Promoting Health in Populations

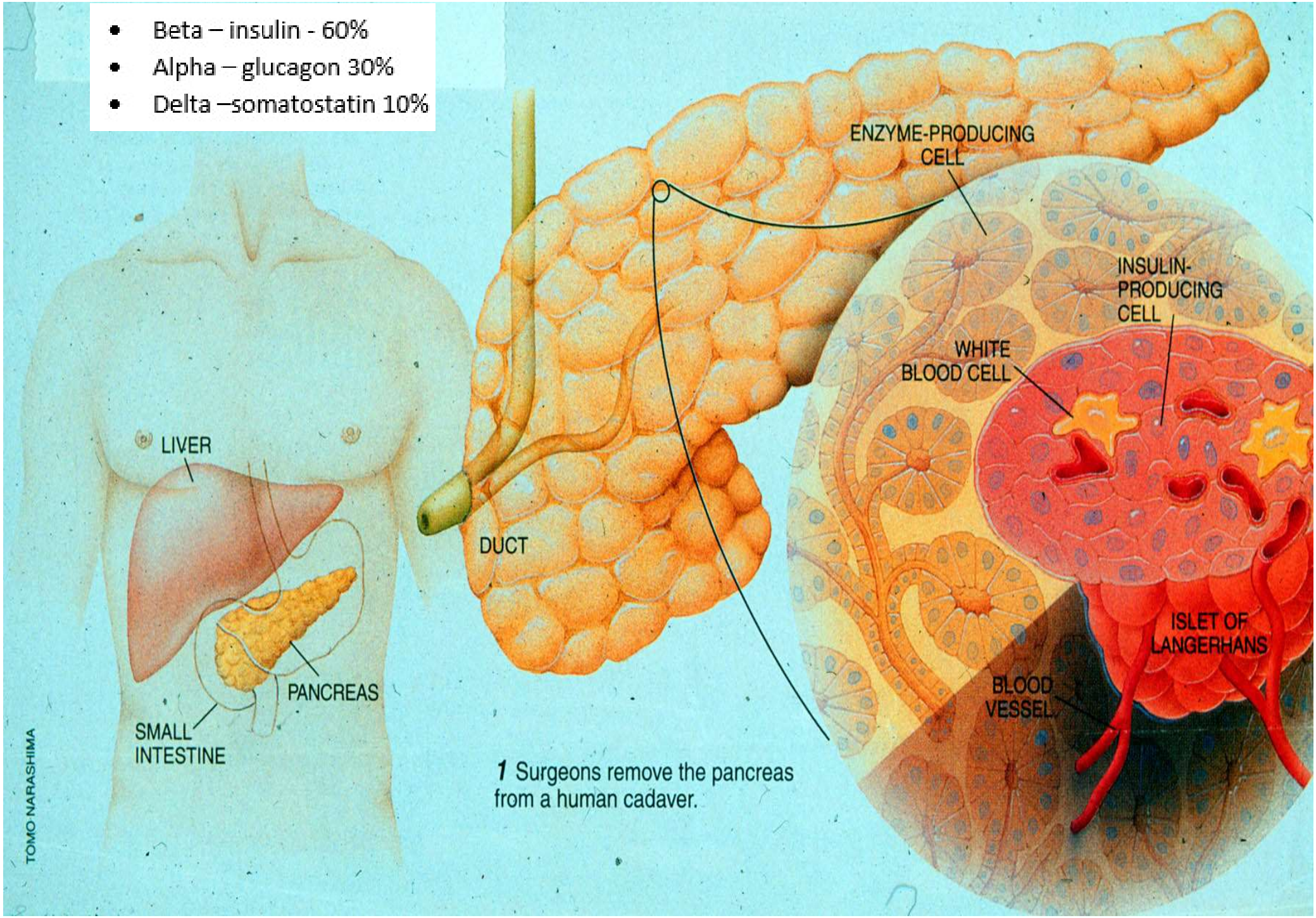
- Population Health measurements include:
  - Outcomes (mortality, morbidity)
  - Disease burden (incidence and prevalence)
  - Behavioral and metabolic factors (A1c, MNT, exercise, etc)
- Diabetes annual cost 2017 - $327 bil

- 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)

Now, let's get to the Nitty Gritty



- Beta – insulin - 60%
- Alpha – glucagon 30%
- Delta –somatostatin 10%



Hormones Effect on Glucose

Hormone	Effect
Glucagon (pancreas)	↑
Stress hormones (kidney)	↑
Epinephrine (kidney)	↑
Insulin (pancreas)	↓
Amylin (pancreas)	↓
Gut hormones - incretins (GLP-1) released by L cells of intestinal mucosa, beta cell has receptors)	↓

Incretins:

GLP-1 & GLP-1/GIP Receptor Agonists

New Drugs Take Hollywood by Storm

"The worst-kept secret in Hollywood"

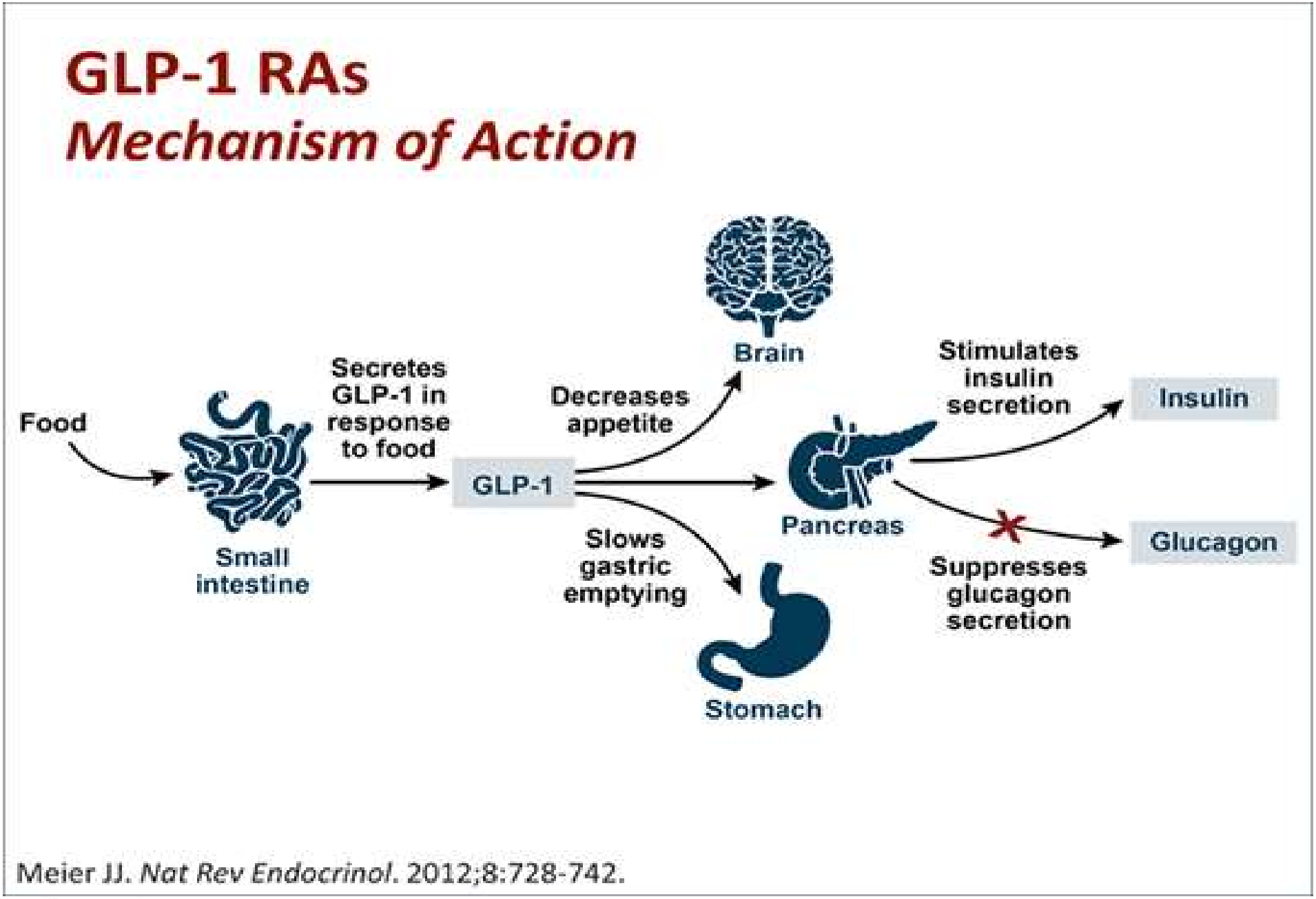
In the last several months, Ozempic has exploded onto the scene, with everyone from Elon Musk to Chelsea Handler talking about taking versions of the drug.

"My doctor ... just hands it out to anybody," comedian Chelsea Handler said on a podcast.

01 of 15 **Celebs Talk Ozempic and Wegovy**

PHOTO: MEDIAPUNCH/SHUTTERSTOCK, ASTRID STAWIARZ/GETTY, AFF-USA/SHUTTERSTOCK

GLP-1 Receptor Agonist Mechanism



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. Increase dose monthly to achieve 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	
	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 with sip of water	
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:** 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.

GLP-1 Receptor Agonist Devices

Byetta

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

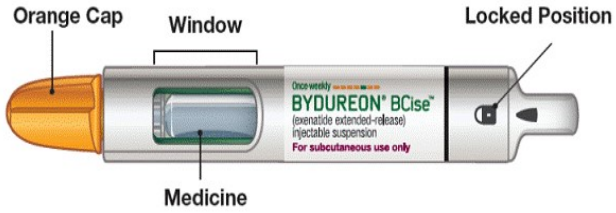
Ozempic

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

Victoza

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

Before Use 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

Oral Semaglutide (Rybelsus)

- Barriers to GLP-1 oral absorption:
  - Degradation by gastrointestinal enzymes
  - pH induced conformational changes
  - Limited protein permeability of the intestinal membrane
- Semaglutide co-formulated with sodium N-(8-[2-hydroxybenzoyl] amino) caprylate (**SNAC**), an absorption enhancer
- Absorbed in stomach where SNAC causes a localized increase in pH, leading to higher solubility and protection against proteolytic degredation
- Take daily at least 30 mins before first food, beverage, or other oral meds
- Take with no more than 4 ounces of plain water
- Swallow tablets whole (don't cut or crush)

GLP-1 & GIP Receptor Agonists

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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. Increase dose monthly to achieve 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	
	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 with sip of water	
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:** 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.

GLP-1 & GIP

Glucagon-like Peptide-1 Receptor Agonism

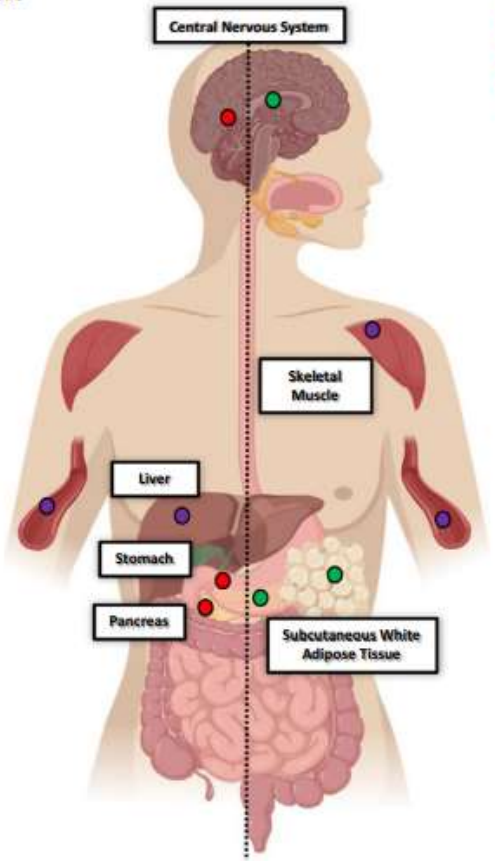
Central Nervous System
- ↑ Satiety
- ↓ Food Intake
- ↑ Nausea
- ↓ Body Weight

Pancreas
- ↑ Insulin
- ↓ Glucagon

Stomach
- ↓ Gastric Emptying

Systemic
- ↓ Hyperglycemia

Liver
- ↑ Insulin Sensitivity
- ↓ Hepatic Glucose Production
- ↓ Ectopic Lipid Accumulation



Glucose-dependent Insulinotropic Polypeptide Receptor Agonism
Glucagon-like Peptide 1 Receptor Agonism
Indirect Action

Glucose-dependent Insulinotropic Polypeptide Receptor Agonism

Central Nervous System
- ↓ Food Intake
- ↓ Nausea
- ↓ Body Weight

Pancreas
- ↑ Insulin
- ↑ Glucagon

Subcutaneous White Adipose Tissue
- ↑ Insulin Sensitivity
- ↑ Lipid Buffering Capacity
- ↑ Blood Flow
- ↑ Storage Capacity
- ↓ Proinflammatory Immune Cell Infiltration

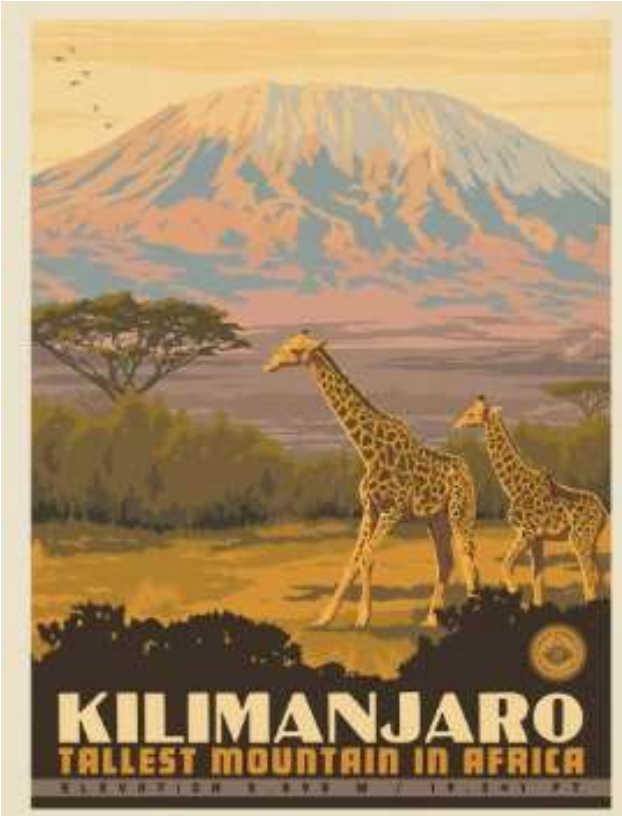
Systemic
- ↓ Hyperglycemia
- ↓ Dietary Triglyceride

Skeletal Muscle
- ↑ Insulin Sensitivity
- ↑ Metabolic Flexibility
- ↓ Ectopic Lipid Accumulation

Samms RJ, Coghlan MP, Sloop KW. How May GIP Enhance the Therapeutic Efficacy of GLP-1? Trends Endocrinol Metab. 2020 Jun;31(6):410-421.

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

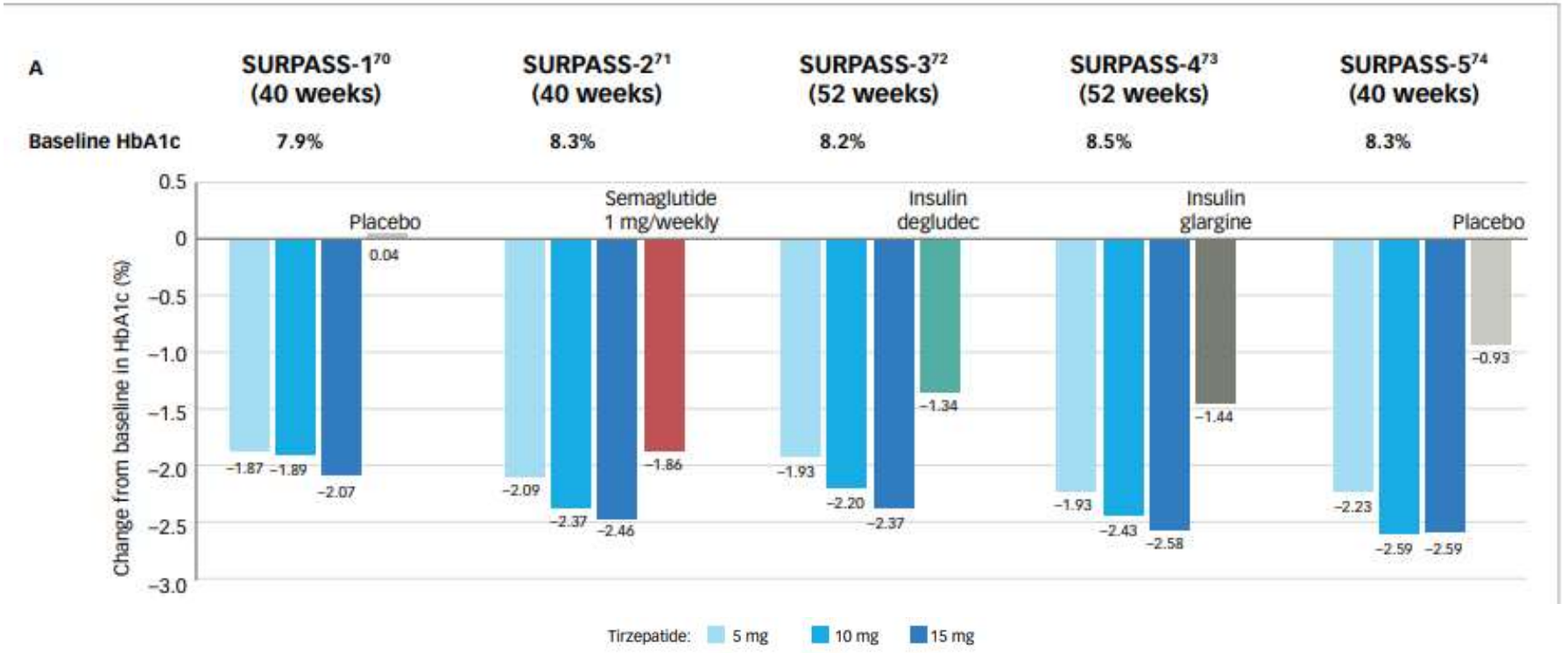


SURPASS Clinical Program

Study acronym	Study type	Number of participants	Eligibility	Comparator	Study duration (weeks)	Primary outcome
SURPASS-1[70]	Randomized double-blind	478	Drug-naïve	Placebo	40	HbA1c
SURPASS-2[71]	Randomized open-label	1,879	Metformin	Semaglutide	40	HbA1c
SURPASS-3[72]	Randomized open-label	1,947	Metformin w/wo sGLT2i	Insulin degludec	52	HbA1c
SURPASS-4[73]	Randomized open-label	2,002	1–3 antidiabetic medicines (metformin, SGLTi or sulfonylurea) with cardiovascular risk	Insulin glargine	52	HbA1c
SURPASS-5[74]	Randomized double-blind	475	Insulin glargine (U100) w/wo metformin	Placebo	40	HbA1c

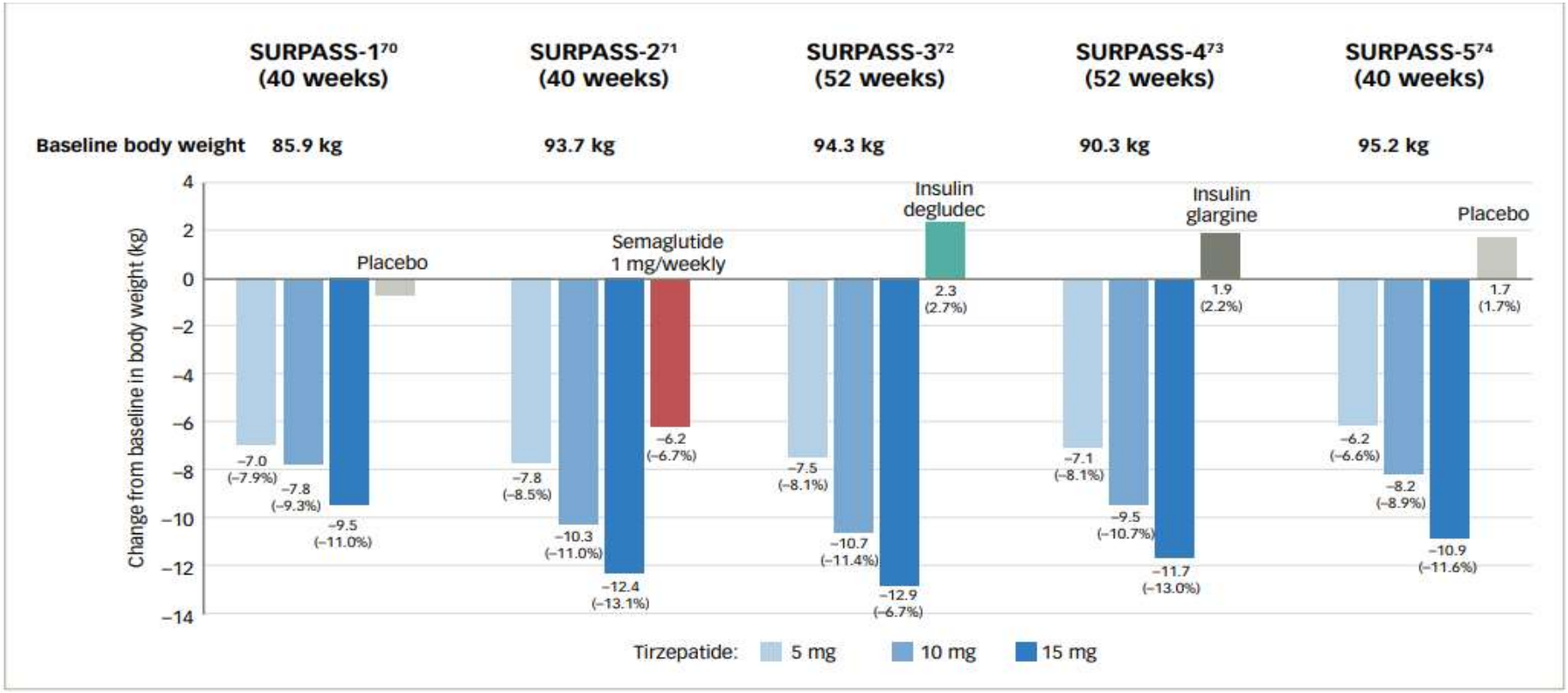
Rosenstock J, et al. Lancet. 2021;398:143–55. Frias JP, et al. N Engl J Med. 2021;358:503–15.82. Ludvik B, et al. Lancet. 2021;398:583–98. 83. Del Prato S et al. Lancet. 2021;398:1811–24. 84. Dahl Det al. Diabetologia. 2021:64(Suppl. 1):S13. Abstr 20. Kaneko S.. touchREV Endocrinol. 2022 Jun;18(1):10-19.

SURPASS: A1C Change



Rosenstock J, et al. Lancet. 2021;398:143–55. Frias JP, et al. N Engl J Med. 2021;358:503–15. 82. Ludvik B, et al. Lancet. 2021;398:583–98. 83. Del Prato S et al. Lancet. 2021;398:1811–24. 84. Dahl Det al. Diabetologia. 2021:64(Suppl. 1):S13. Abstr 20. Kaneko S.. touchREV Endocrinol. 2022 Jun;18(1):10-19.

SURPASS: Change in Body Weight



Rosenstock J, et al. Lancet. 2021;398:143–55. Frias JP, et al. N Engl J Med. 2021;358:503–15. 82. Ludvik B, et al. Lancet. 2021;398:583–98. 83. Del Prato S et al. Lancet. 2021;398:1811–24. 84. Dahl Det al. Diabetologia. 2021:64(Suppl. 1):S13. Abstr 20. Kaneko S.. touchREV Endocrinol. 2022 Jun;18(1):10-19.

Tirzepatide Clinical Use

Starting dose (for 4 weeks)

MONTH 1

For at least 4 weeks

MONTH 2

IF ADDITIONAL GLYCEMIC CONTROL IS NEEDED

For at least 4 weeks

For at least 4 weeks

For at least 4 weeks

Maximum dose

Tirzepatide & GLP-1 RA Safety Profile

- GI side effects
  - Nausea, appetite loss, diarrhea, constipation, dyspepsia, abdominal pain
- Pancreatitis
- Hypoglycemia with concomitant use of insulin or secretagogues
- Hypersensitivity reactions
- Acute kidney injury
- Thyroid C-Cell tumors
- Acute gallbladder disease
- Worsening retinopathy

Package inserts.

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

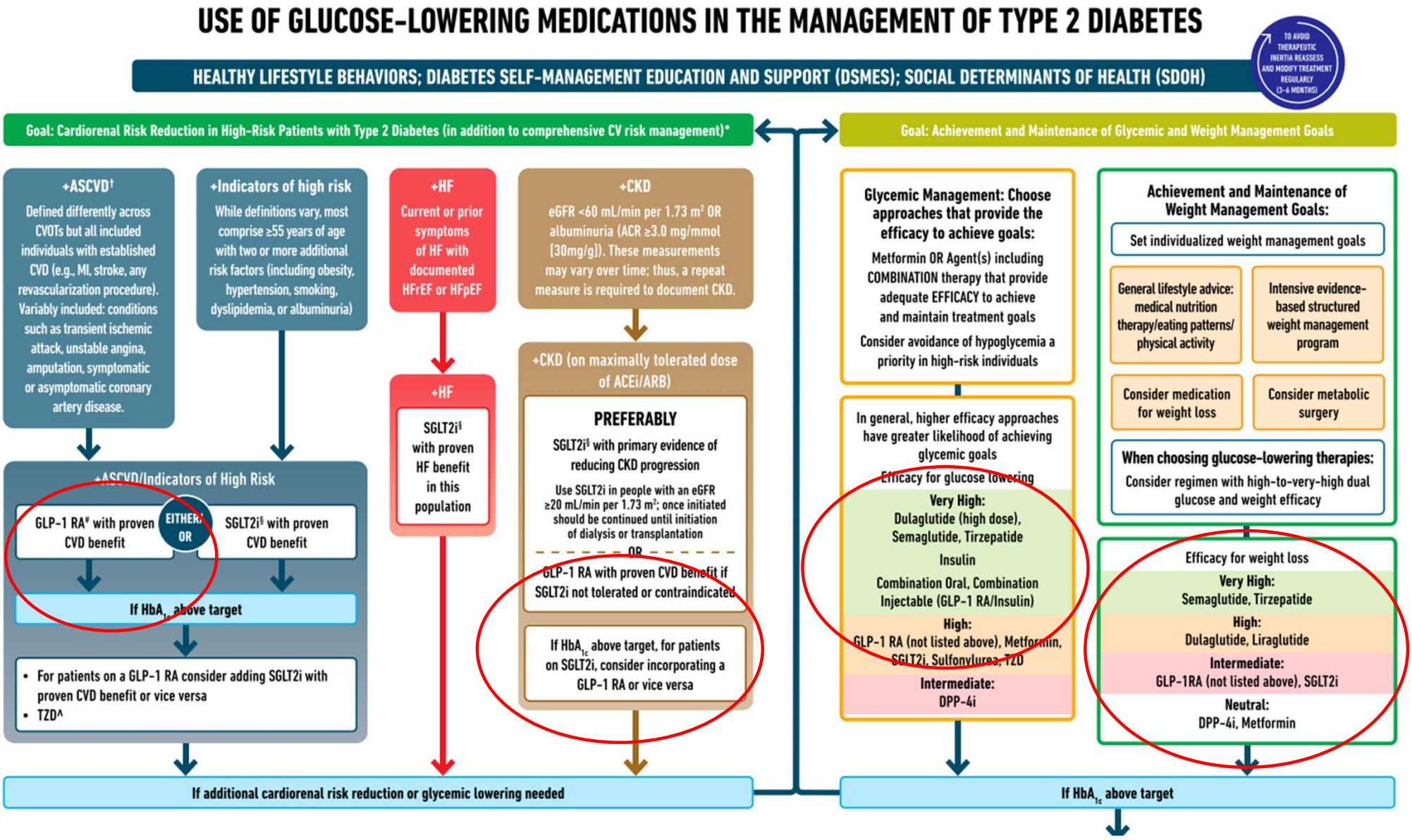
- Avoid if personal or family history of medullary thyroid cancer
- Start at lower dose and titrate
- Eat smaller *nourishing* meals to reduce nausea
- Avoid high fat meals
- Store extra pens in fridge
- Avoid in combo with DPP-4 inhibitors
- Report any sudden abdominal pain or pancreatitis symptoms
- Back-up birth control when starting or increasing dose of tirzepatide
- Ask about recent eye exam

Poll Question 2

Alice injects tirzepatide once a week. Which of the following is true?

a. May experience nausea
b. May cause hypoglycemia
c. Muscle aches are common
d. Doubles risk of pancreatic cancer

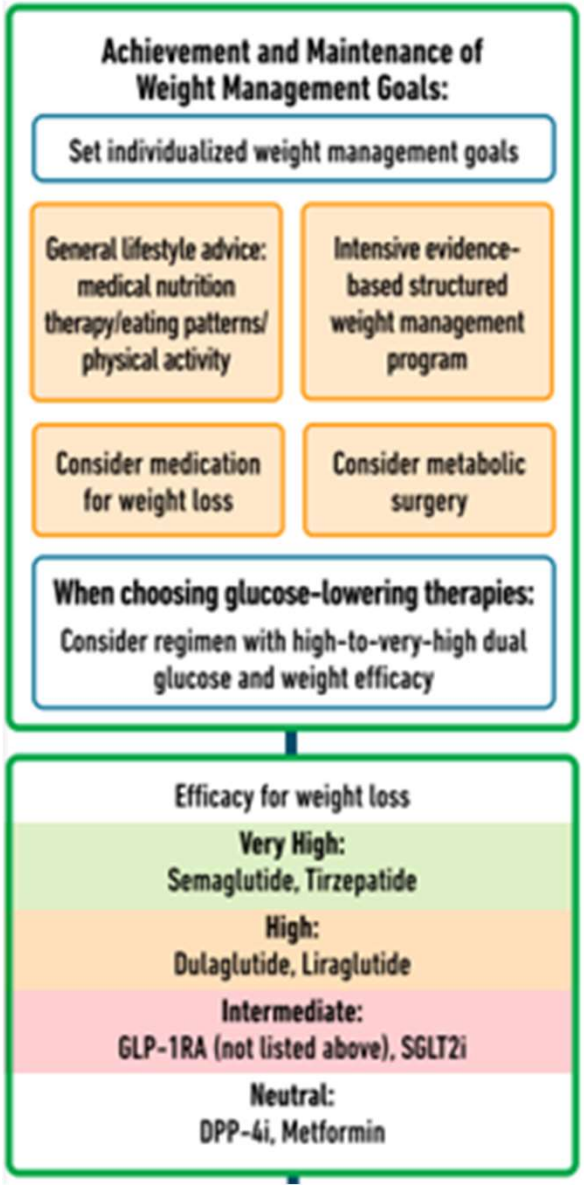
ADA Algorithm: Where do GLP-1 Fit?



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

Weight Management

- These meds associated with wt loss
  - GLP-1 agonists
  - SGLT-2 Inhibitors
- These meds are weight neutral
  - Metformin
  - DPP-4 Inhibitors



Diabetes Care 2023;46(Suppl. 1):S125-S143.

GLP-1 RA Approved for Weight Loss

- Saxenda and Victoza contain the same active ingredient (liraglutide) at different doses
  - Saxenda 3 mg and Victoza 1.8 mg SC injection
- Wegovy and Ozempic contain the same active ingredient (semaglutide) at different doses
  - Wegovy 2.4mg and Ozempic 2mg SC injection
- Both are FDA approved as a treatment option for chronic weight management in addition to a 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 diabetes, or dyslipidemia.

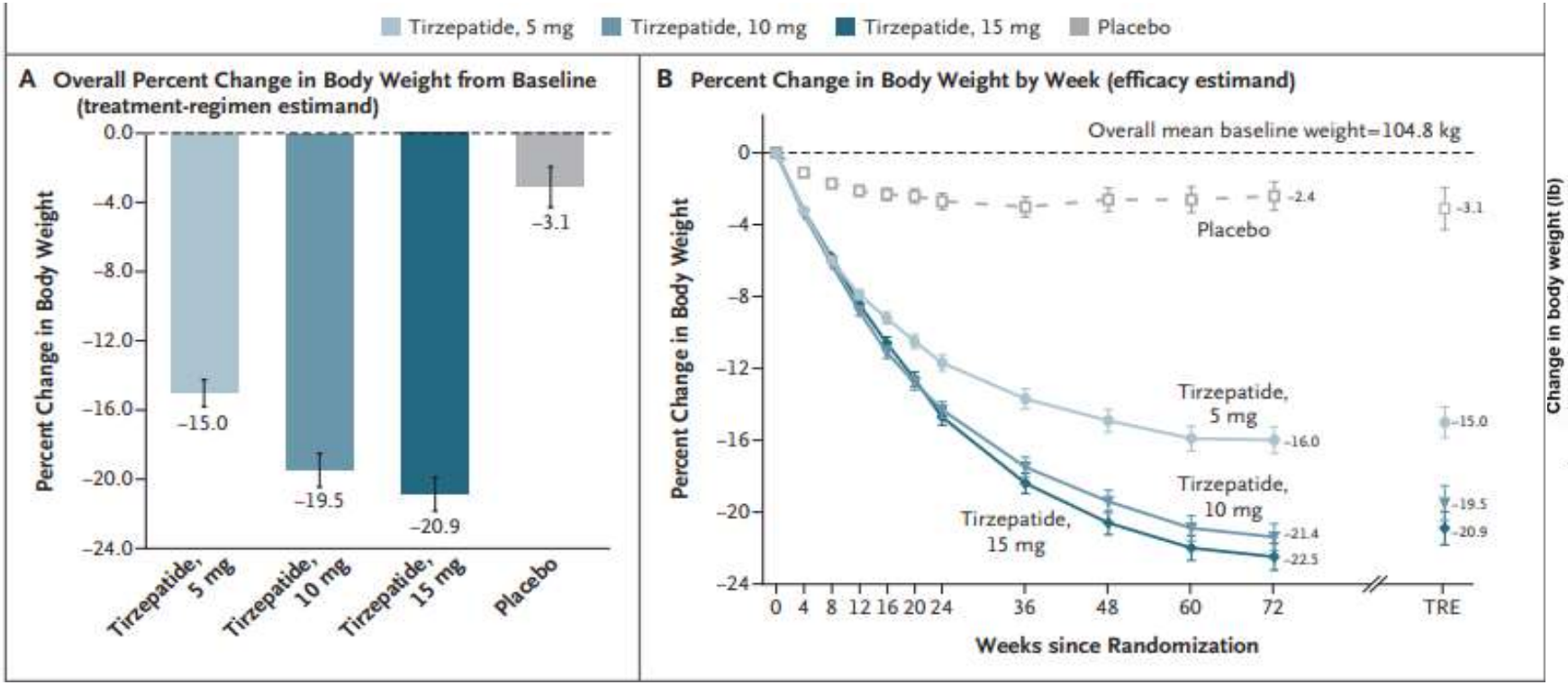
Saxenda & Wegovy Weight Loss

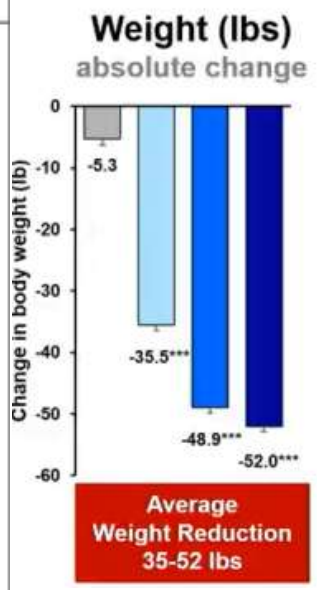
Medication name	Typical adult maintenance dose	Average wholesale price (30-day supply) (130)	National Average Drug Acquisition Cost (30-day supply) (131)	1-Year (52- or 56-week) mean weight loss (% loss from baseline)		Common side effects (132–136)	Possible safety concerns/ considerations (132–136)
				Treatment arms	Weight loss (% loss from baseline)		
Glucagon-like peptide 1 receptor agonist							
Liraglutide (16)**	3 mg q.d.	$1,619	$1,296	3.0 mg q.d. 1.8 mg q.d. PBO	6.0 4.7 2.0	astrointestinal side effects (nausea, vomiting, diarrhea, esophageal reflux), injection site reactions, elevated heart rate, hypoglycemia	• Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected. • Use caution in patients with kidney disease when initiating or increasing dose due to potential risk of acute kidney injury **Black box warning:** • Risk of thyroid C-cell tumors in rodents; human relevance not determined
Semaglutide (139)	2.4 mg once weekly	$1,619	$1,302	2.4 mg weekly PBO	9.6 3.4	astrointestinal side effects (nausea, vomiting, diarrhea, esophageal reflux), injection site reactions, elevated heart rate, hypoglycemia	• Pancreatitis has been reported in clinical trials, but causality has not been established. Discontinue if pancreatitis is suspected. **Black box warning:** • Risk of thyroid C-cell tumors in rodents; human relevance not determined

Diabetes Care 2023;46(Supplement_1):S113–S124

Tirzepatide for Weight Loss: SURMOUNT-1

- 20.9% weight loss with 15mg dose and 35-52lbs lost!





Jastreboff AM, et al., on behalf of the SURMOUNT-1 Investigators. Tirzepatide Once Weekly for the Treatment of Obesity. *N Engl J Med* 2022;387:205-16.

Incretin Mimetics – How Do They Rate?

Question	Answer
Cause hypoglycemia?	No
Cause weight gain?	No
Affordable?	No, $1000/month
Lowers CV risk?	Liraglutide / Semaglutide/Dulaglutide
Can most tolerate /use?	Yes/No (GI)

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

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)

RECOMMENDATIONS FOR DIAGNOSIS AND CLASSIFICATION OF DIABETES – 2023

CRITERIA FOR TESTING FOR DIABETES AND PREDIABETES IN ASYMPTOMATIC ADULTS – TABLE 1

DIABETES TYPE	RISK FACTORS and FREQUENCY OF SCREENING and TESTING FOR DIABETES
Type 1	Screening for presymptomatic type 1 diabetes, by testing autoantibodies to insulin, GAD, islet antigen 2, or ZnT8 is recommended in research study setting or for those with first-degree family members with type 1 diabetes.
Type 2	1. Test all adults starting at age **35** for prediabetes and diabetes using Fasting Plasma Glucose, A1c or OGTT. 2. Perform risk-based screening if BMI ≥ 25 or BMI ≥ 23 in Asian Americans with 1 or more risk factors: • History of cardiovascular disease • First degree relative with diabetes • People with HIV* • HDL ≤ 35 mg/dl or triglyceride ≥ 250 mg/dl • Physical inactivity • History of GDM (repeat test at least every 3 years) • Hypertension ≥ $^{140}/_{90}$ or on therapy for HTN • A1c ≥ 5.7% or Impaired Fasting Glucose (test yearly) • Other clinical conditions associated with insulin resistance (PCOS, Acanthosis Nigricans) • High risk ethnicity (African American, Latino, Native American, Asian American, Pacific Islanders) 3. If results normal, repeat test at a minimum of 3-year intervals or more frequently based on risk status. 4. *Screen those w/ HIV with FPG before starting & during antiretroviral therapy. If FPG normal, check yearly.

TESTS TO DIAGNOSE DIABETES - TABLE 2

STAGE	For all the below tests, in the absence of unequivocal hyperglycemia, Confirm results by repeat testing.			
	A1C *NGSP certified & standardized assay*	**Fasting* Plasma Glucose (FPG)** **No intake 8 hrs.*	**Random Plasma Glucose**	**Oral Glucose Tolerance Test (OGTT) 75-g** (Carb intake of ≥ 150 g/day for 3 days prior to test.)
Diabetes	A1C ≥ 6.5%	FPG ≥ 126 mg/dl	Random plasma glucose ≥ 200 mg/dl plus symptoms[1] [1]Random = any time-of-day w/out regard to time since last meal; symptoms include usual polyuria, polydipsia, and unexplained wt. loss.	Two-hour plasma glucose (2hPG) ≥ 200 mg/dl
Prediabetes	A1C 5.7 – 6.4%	Impaired Fasting BG (IFG) = FPG 100-125 mg/dl		Impaired Glucose Tolerance (IGT) = 2hPG 140 -199 mg/dl
Normal	A1C < 5.7%	FPG < 100 mg/dl		2hPG < 140 mg/dl

Acanthosis Nigricans (AN)

- Signals high insulin levels in bloodstream
- Patches of darkened skin over parts of body that bend or rub against each other
  - Neck, underarm, waistline, groin, knuckles, elbows, toes
  - Skin tags on neck and darkened areas around eyes, nose and cheeks.
- No cure, lesions regress with treatment of insulin resistance

Poll Question 3

- Which of the following level is considered pre-diabetes range?

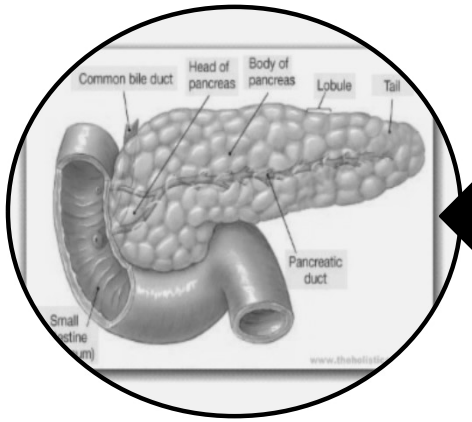
a. Fasting BG of 62

b. A1c of 5.9 %

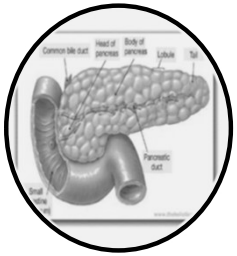
c. After meal BG of 137

d. A1c of 7.1 %

Natural History of Diabetes



Yes!



NO

Healthy

FBG <100

Random <140

A1c <5.7%

Prediabetes

FBG 100-125

Random 140 - 199

A1c ~ 5.7- 6.4%

~ 50% working pancreas

Diabetes

FBG 126 +

Random 200 +

A1c 6.5% or +

~ 20% working pancreas

Development of type 2 diabetes happens over years or decades

PreDiabetes is FREAKING ME OUT

- 96 million people in US
- 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
- Why isn't is called stage 1 diabetes?

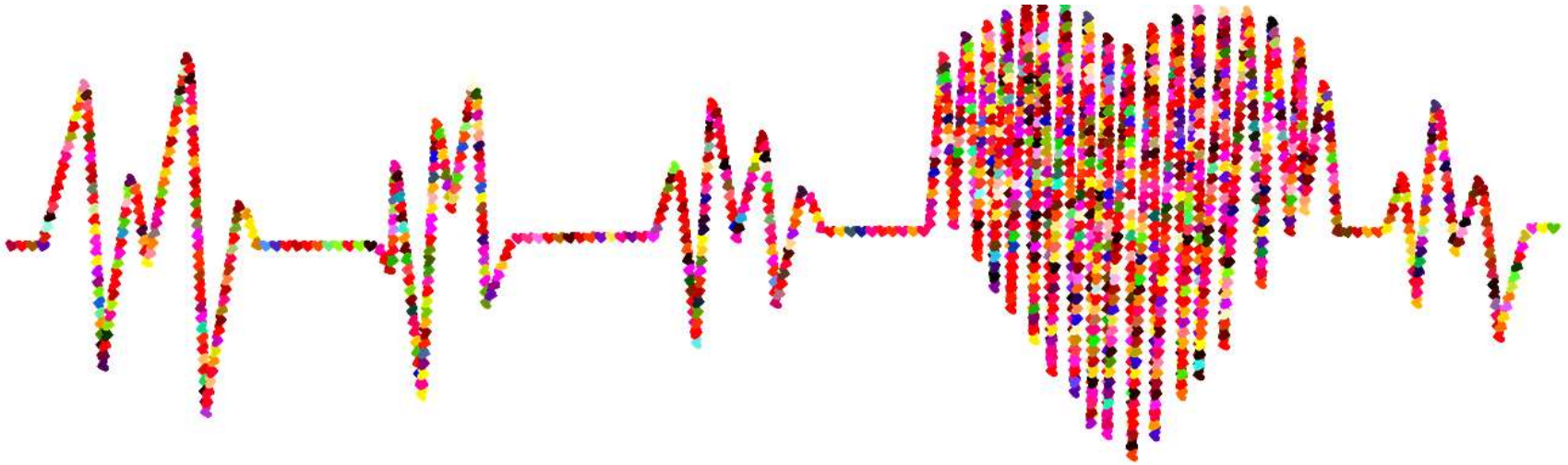
Do I look like I am freaking out?

Poll Question 4

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

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* FREE

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 xtra weight
    - Refer to DPP approved programs
    - Includes intensive behavioral lifestyle interventions with 7% -10% wt reduction goal
  - 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* FREE

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
- Not 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* FREE

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

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

Social Determinants of Health (SDOH)

- Defined as the economic, environmental, political, and social conditions in which people live and
- Responsible for a major part of health inequality worldwide.
- Health inequities strongly linked to diabetes and associated complications
- Greater exposure to adverse SDOH over life course results in worse health, greater risk for diabetes, higher population prevalence, and worse outcomes.

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.

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

Remember by Joy Harjo – Poet Laureate

- Remember the earth whose skin you are:
  red earth, black earth, yellow earth, white earth, brown earth, we are earth.

- Remember the plants, trees, animal life who all have their tribes, their families, their histories, too. Talk to them, listen to them. They are alive poems.

- Remember the wind. Remember her voice. She knows the origin of this universe.

- Remember you are all people and all people are you.
  Remember you are this universe and this universe is you.
  Remember all is in motion, is growing, is you.
  Remember language comes from this.
  Remember the dance language is, that life is.
  Remember.

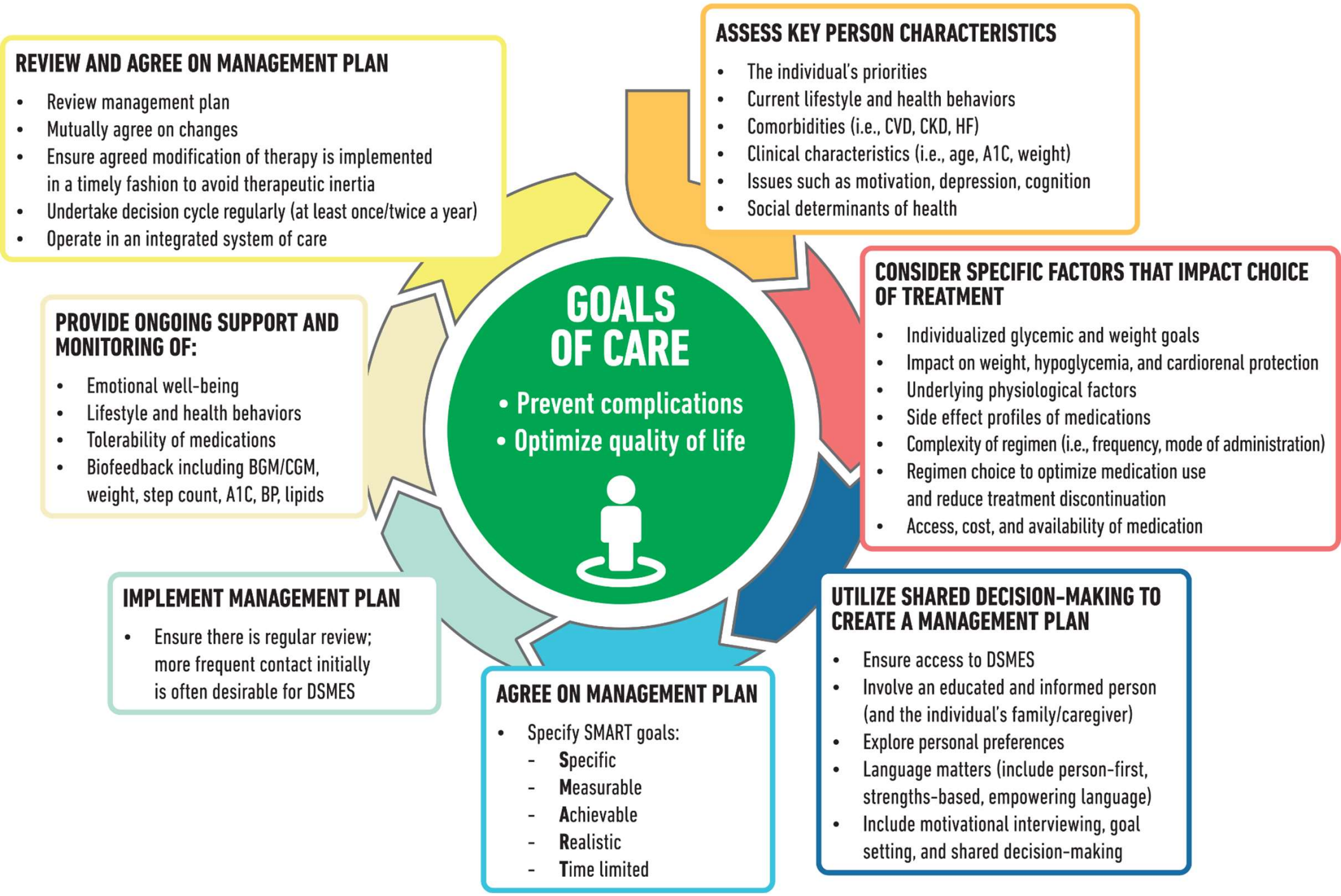
We are all connected

Person Centered Care

- Emphasize that a collaboratively developed plan improves well-being and outcomes.
- Provides care that is respectful and responsive to the individuals preferences, needs and values.
- Ensuring that the person's values guide all clinical decisions

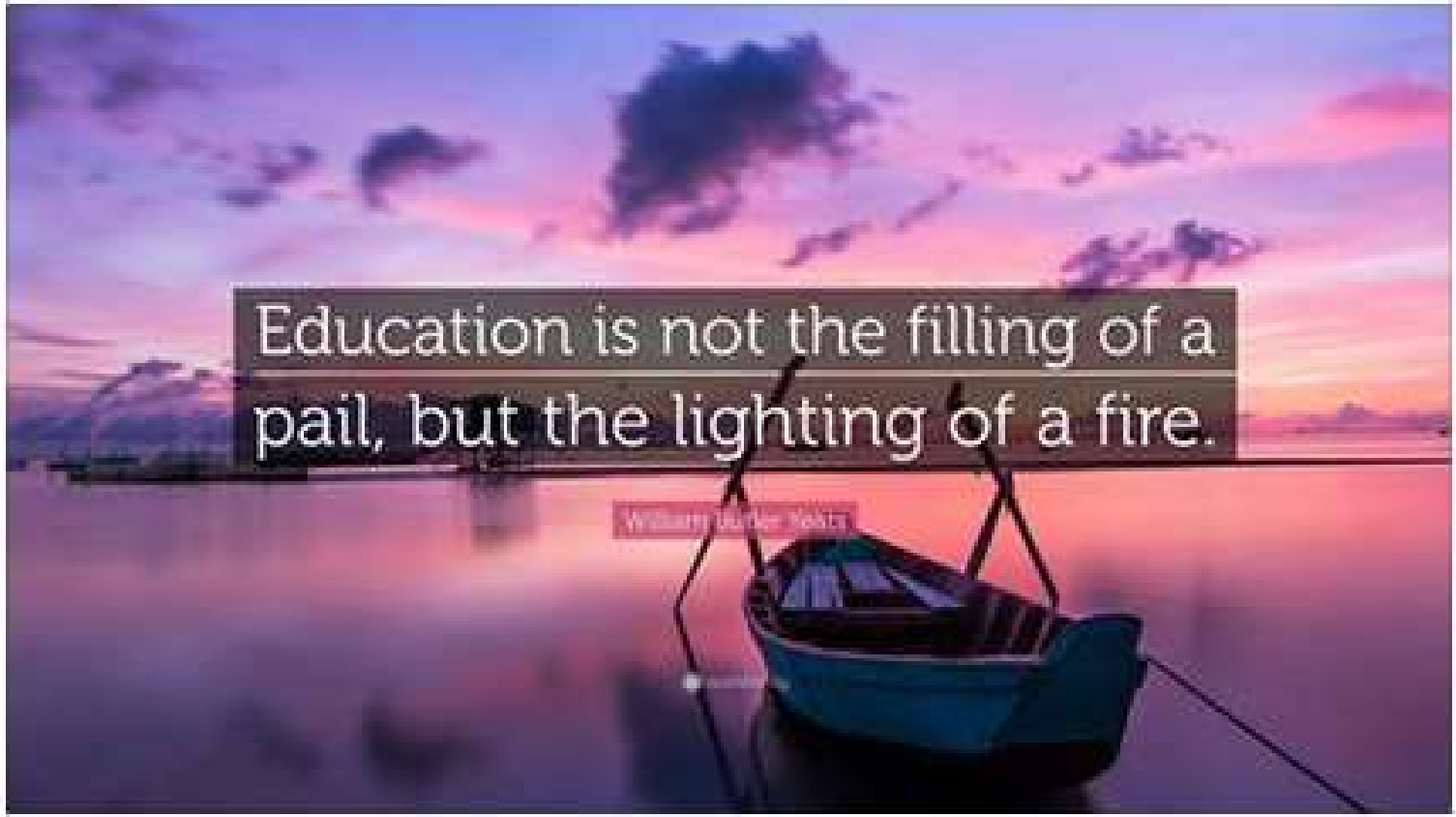
Recognizes the expert within. Goal is to improve outcomes and encourage self-management for the long run.

DECISION CYCLE FOR PERSON-CENTERED GLYCEMIC MANAGEMENT IN TYPE 2 DIABETES



ADA Standard 4 2023

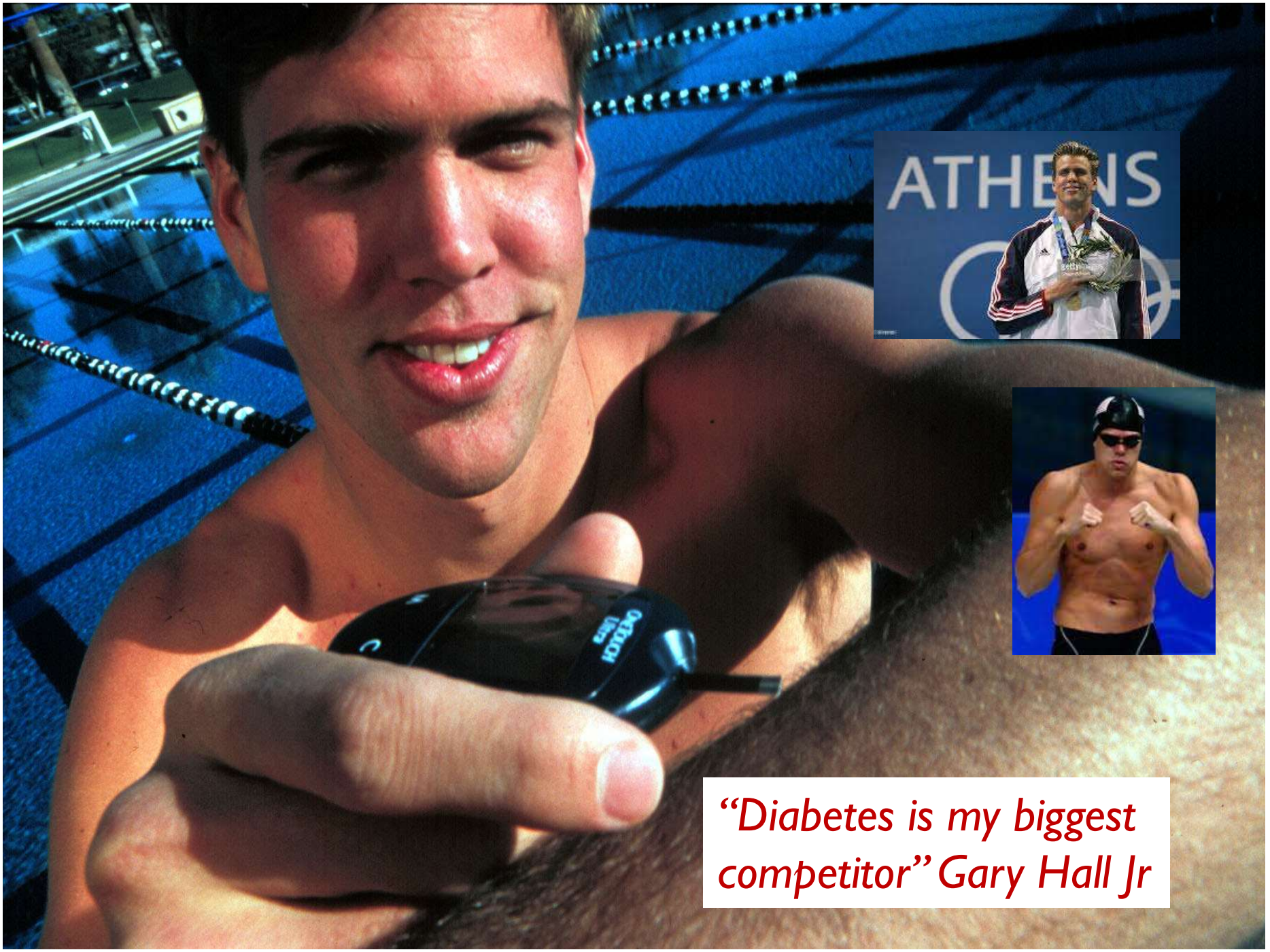
Let’s meet people where they are at.



Let’s Take A 15 minute Break

- Store open all 3 Days
- Place order on online store

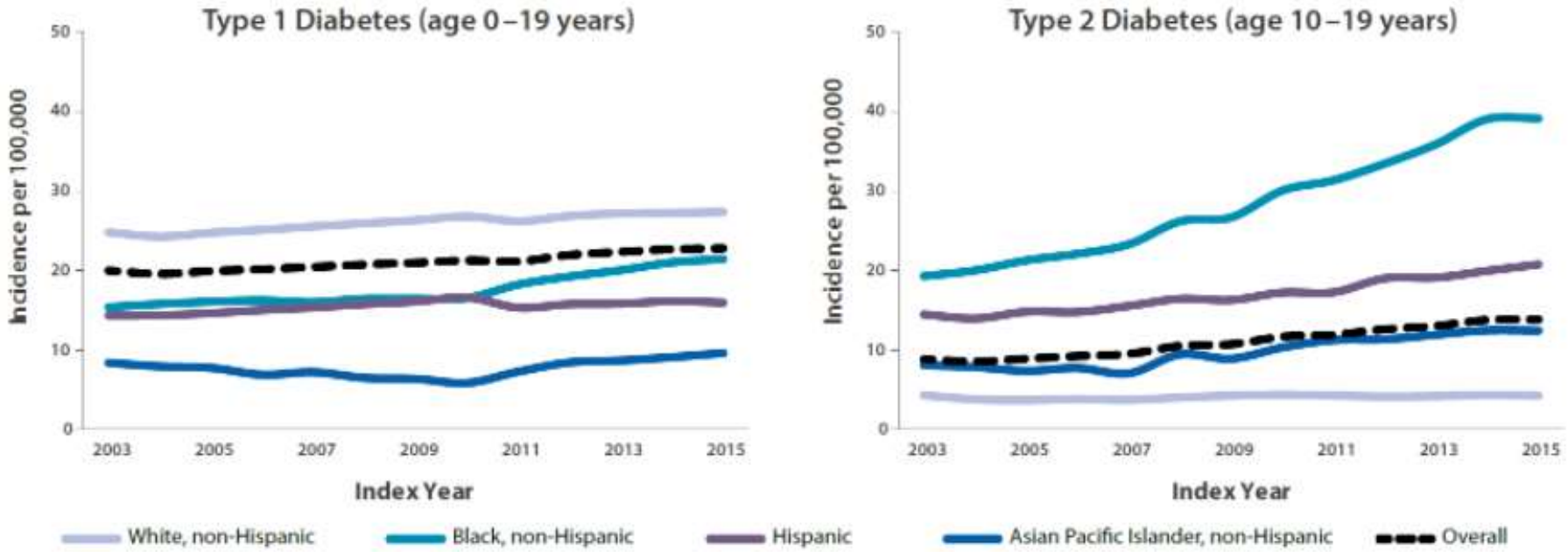
Type 1 ~ Immune Mediated Diabetes



"Diabetes is my biggest competitor" Gary Hall Jr

Type 1 & 2 Incidence in Children

Figure 5. Trends in incidence of type 1 and type 2 diabetes in children and adolescents, overall and by race/ethnicity, 2002–2015



Note: Adapted from Divers et al. (2020).[1] Data are model-adjusted incidence estimates (See Appendix B: Detailed Methods and Data Sources).

Data source: SEARCH for Diabetes in Youth Study.

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

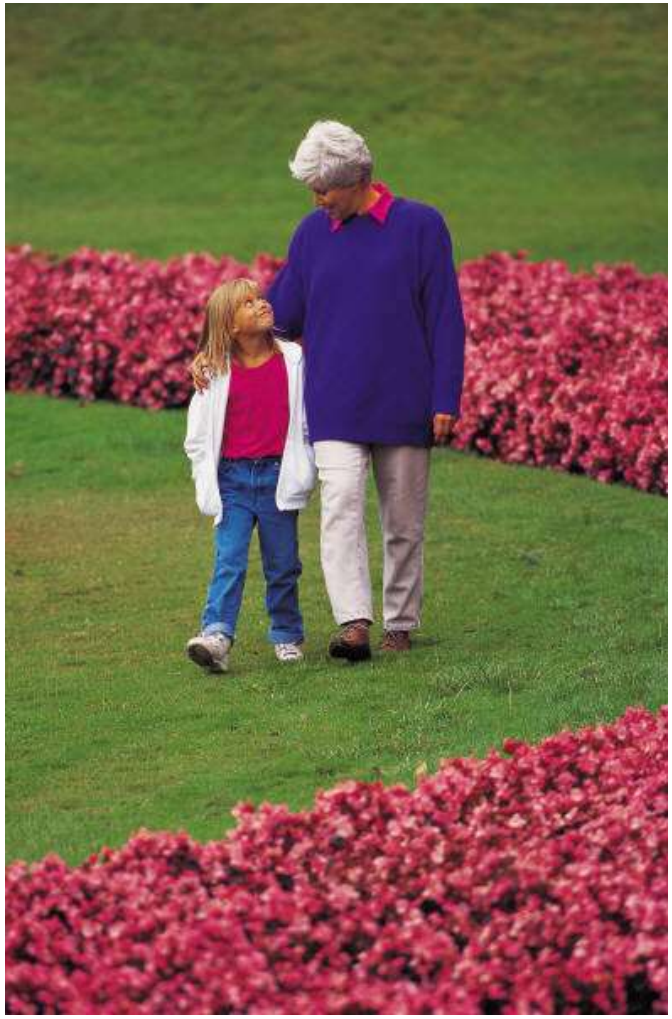
Poll Question 5

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 autoimmune 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* FREE

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* FREE

Diabetes Education SERVICES 25 years

www.DiabetesEd.net

Type 1 – 10% of all Diabetes

- Immune medication pancreatic beta cells destruction
- Most commonly expressed during puberty, 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

Poll Question 6

Which factor would most make you suspect type 1 diabetes?

a. Enuresis

b. Presents with low HDL cholesterol

c. Friend tells you she has been eating "tons of sweets“

d. Reports vivid dreams

Signs of Type 1 Diabetes

- Sudden onset of nighttime bedwetting
- Weight loss, thirst, hunger
- May present in DKA
  - Fruity breath
  - Hypothermic
  - Poor skin turgor
  - “Out of it”
  - Ketone positive (blood or urine)
  - Other

Type 1 Diabetes Features?

- For JR, a 21 admitted to the ICU with a blood glucose of 476 mg/dl, pH of 7.1, anion gap of 15. Recently lost 13 pounds.

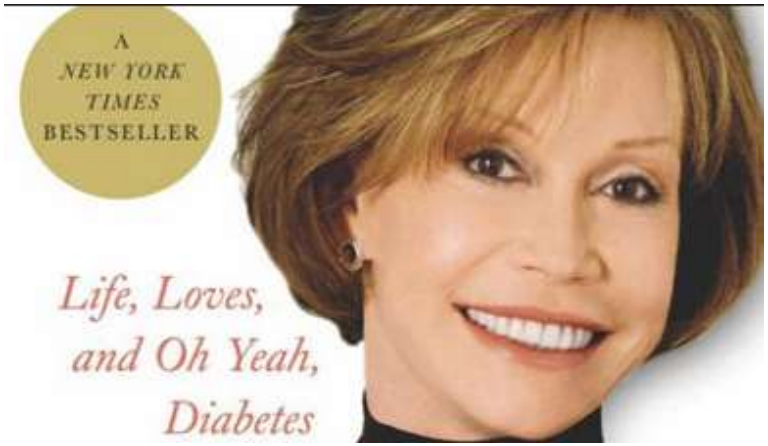
Type 1 Most Discriminative Features

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

CONSENSUS REPORT | OCTOBER 18 2021

The Management of Type 1 Diabetes in Adults. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD) FREE

What Does Type 1 Look Like?



Mary Tyler Moore

Justice Sonia Sotomayor

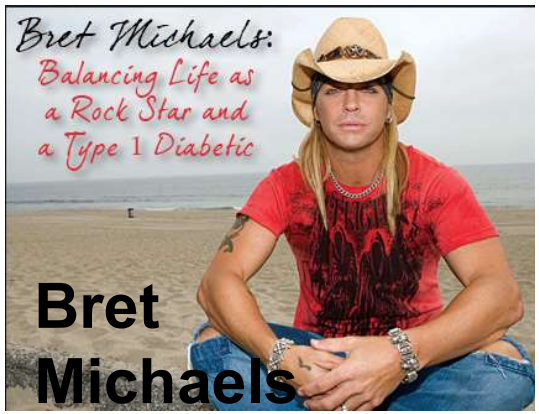
Nick Jonas

Kate Moss' daughter Lila praised for wearing insulin pump on the catwalk: 'An inspiration to so many living with Type 1 diabetes'

The catwalk showcased a joint collection by Versace and Fendi on Sunday

Saman Javed • Tuesday 28 September 2021 17:32 • Comments

Lila Grace Moss

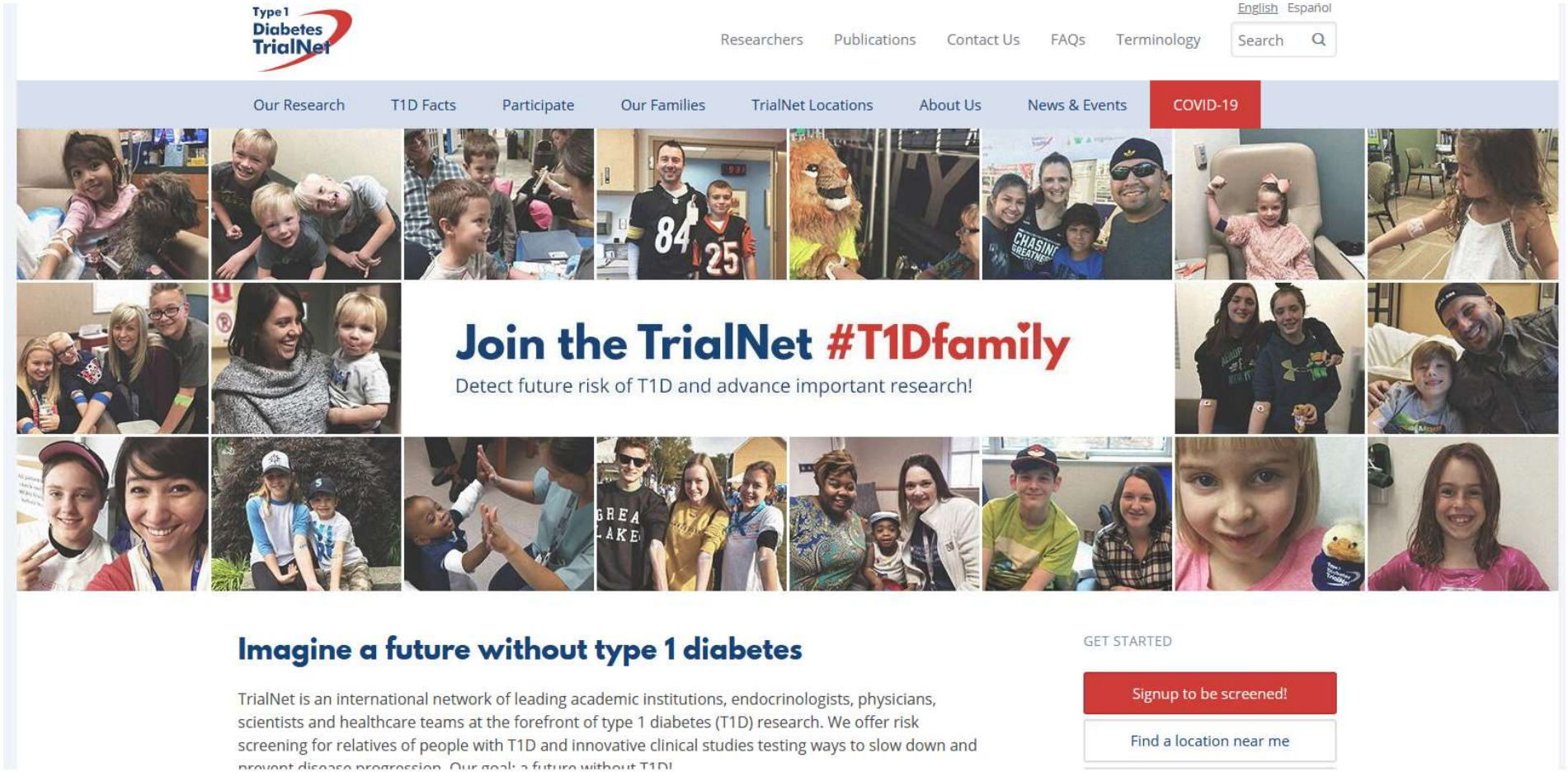


Medalist Study – Harvard Joslin Diabetes Center

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

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

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

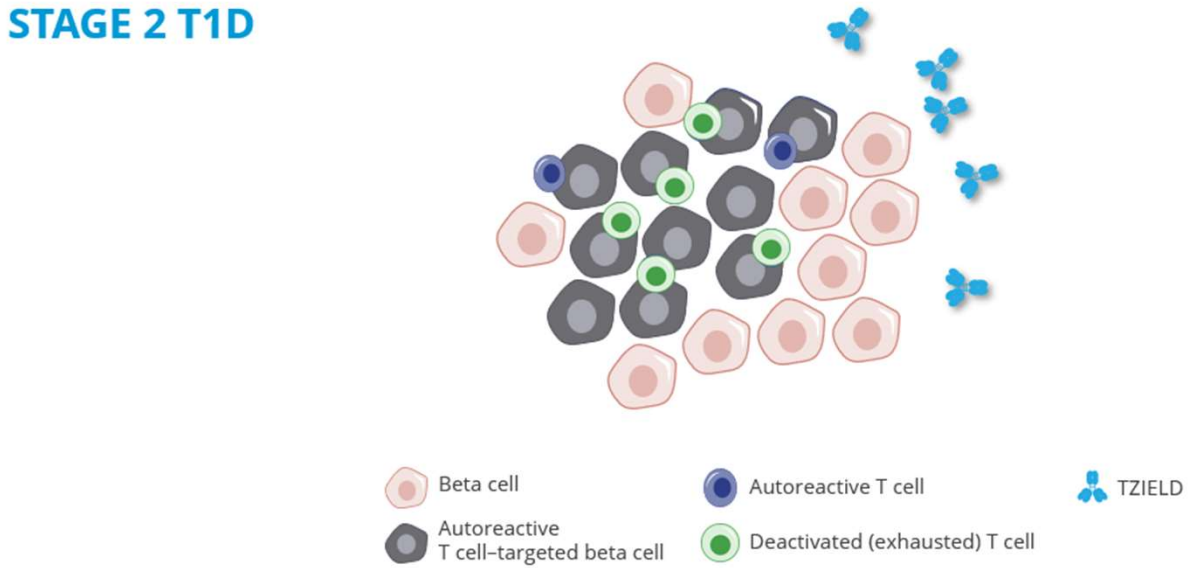


Quick Question

- **Question:** LT has just been diagnosed with stage 2, type 1 diabetes. They have 2 positive antibodies and their blood sugars are slightly elevated. They ask you if they are a candidate for "that therapy" that can protect their beta cells and slow progression of type 1 diabetes. **What is the most accurate response?**
  - Unfortunately, you are not a candidate, since you already have 2 positive antibodies.
  - Let's talk to your provider about the possibility of starting Teplizumab therapy.
  - With your blood sugar elevation, the best early intervention is insulin therapy.
  - Since you are already in stage 2, the monoclonal antibody therapy won't be effective.

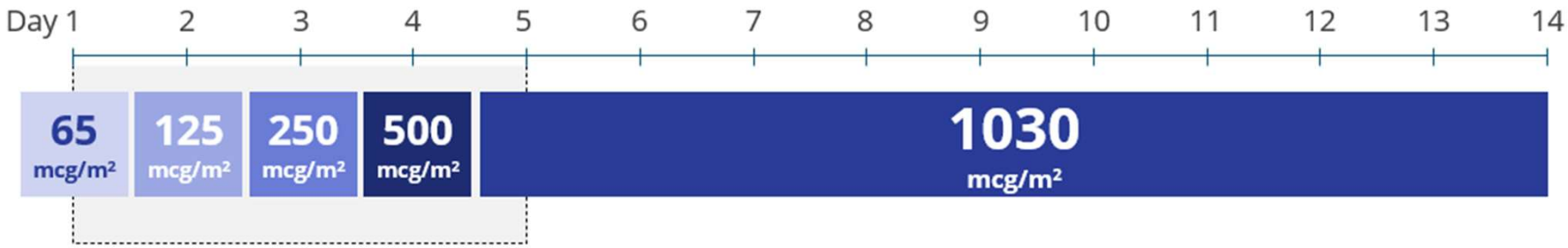
Teplizumab (Tzield®)

- Humanized CD3 Monoclonal Antibody that delays the onset of Stage 3 T1D
- Binds to CD3 antigens on the surface of T cells
- The mechanism may involve partial agonistic signaling and deactivation of pancreatic beta cell autoreactive T Cells
- Teplizumab leads to an increase in the proportion of regularly T cells and of exhausted CD8+ T cells in peripheral blood



Teplizumab Dosing & Side Effects

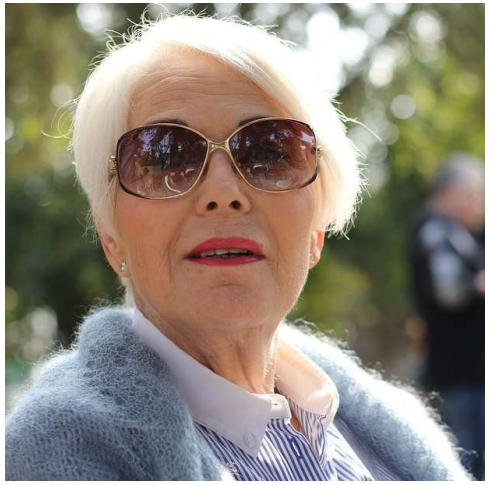
TZIELD is administered by intravenous infusion over a minimum of 30 minutes, using a body surface area-based dosing, once daily for 14 consecutive days as follows:



- Adverse reactions: cytokine release syndrome (2%), injections (9%), hypersensitivity (2%), neutropenia (7%)

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

What type of Diabetes?

- 72 Years old
- A1c 3 months prior 6.2%
- A1c now 13.9%
- BMI 24.5
- Lost about 10 pounds over last month

Latent AutoImmunity Diabetes in Adults (LADA)

- Antibody positive to 1-2 of below
  - GAD-65 autoantibodies
  - Insulin Autoantibodies
  - Islet Cell antigen-2
- Adult Age at onset
- Usually need insulin w/in first 6 months of diagnosis
- Early insulin therapy may preserve beta cell function

Diabetes Care 26:536-538, 2003
Jerry P. Palmer, MD and Irl B. Hirsch, MD

LADA Clinical Features Compared to Type 2

Feature	LADA	Type 2
Age <50	63%	19%
Acute hyperglycemia	66	24
BMI < 25	33	13
Hx of autoimmune dx	27	12
Family hx autoimmune	46	35

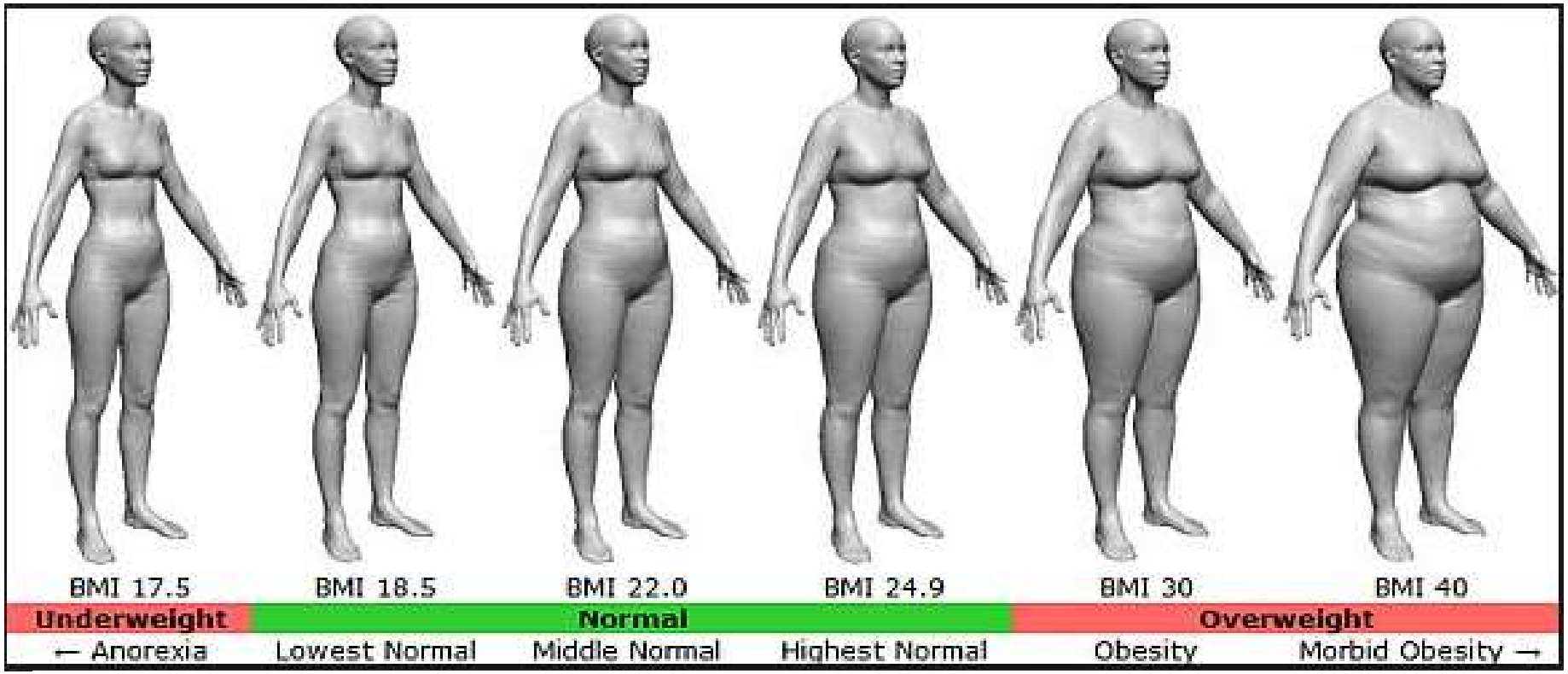
Practical Diabetology March 08, Unger MD

Patti Labelle

"divabetic"

“I have diabetes, it doesn’t have me”

BMI – Visual Image

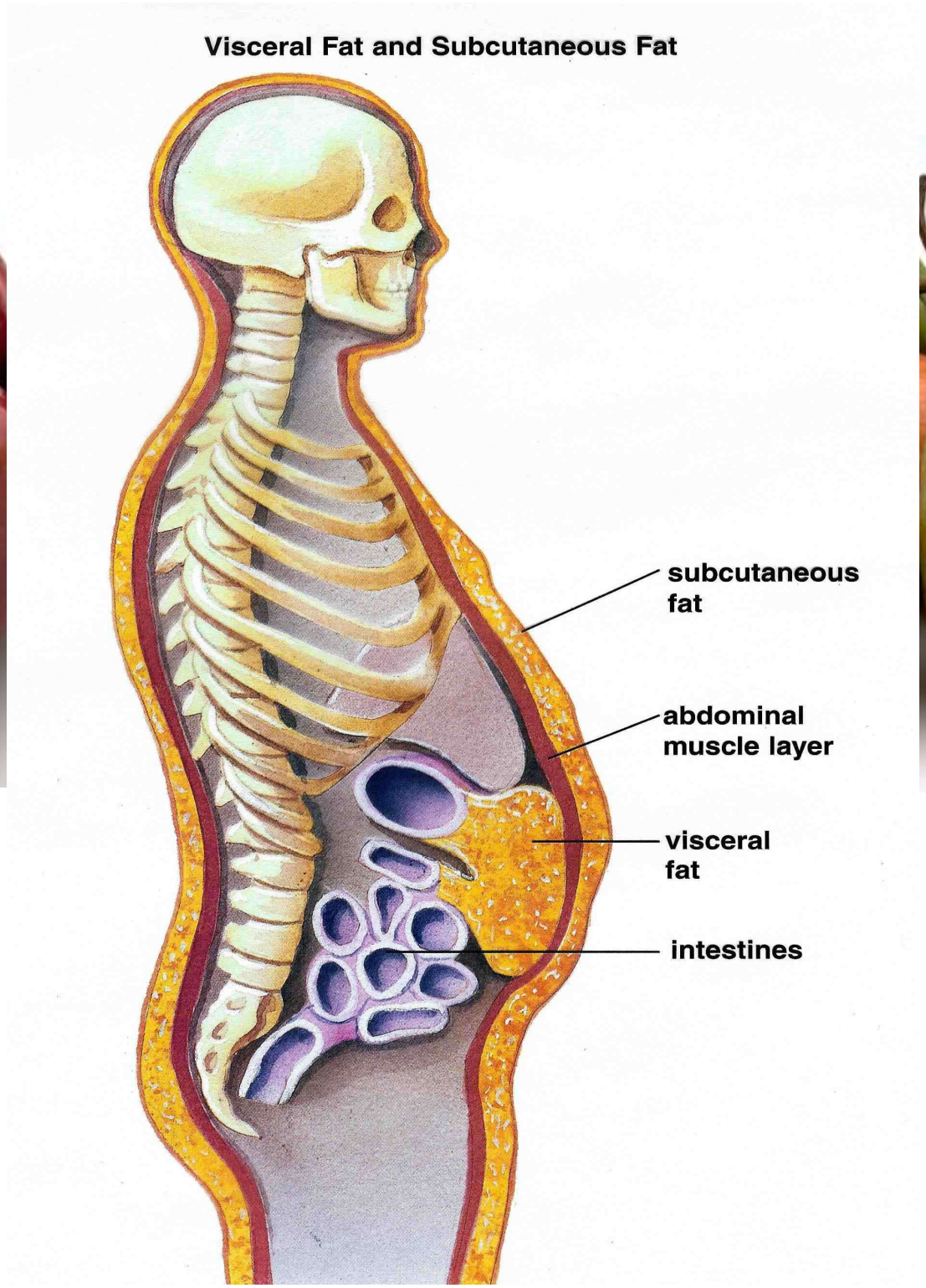


Underweight **Healthy weight** **Experiencing overweight** **Experiencing obesity**

Signs of Diabetes

- Polyuria
- Polydipsia
- Polyphasia
- Weight loss
- Fatigue
- Skin and other infections
- Blurry vision

- Glycosuria, H_2O losses
- Dehydration
- Fuel Depletion
- Loss of body tissue, H_2O
- Poor energy utilization
- Hyperglycemia increases incidence of infection
- Osmotic changes


Visceral Fat and Subcutaneous Fat
subcutaneous fat
abdominal muscle layer
visceral fat
intestines

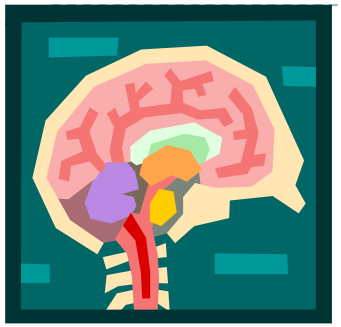
What is Type 2 Diabetes?

- Complex metabolic disorder ….
  (Insulin resistance and deficiency)

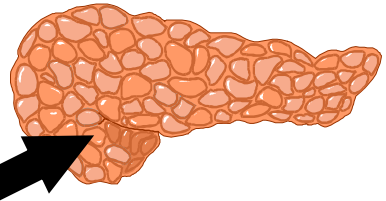
with social, behavioral and environmental risk factors unmasking the effects of genetic susceptibility.

New Diagnosis?
Call 800 – DIABETES to request "Getting Started Kit"
www.Diabetes.org

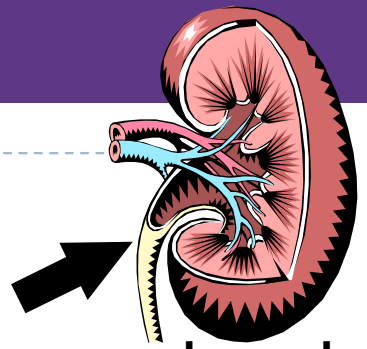
Ominous Octet



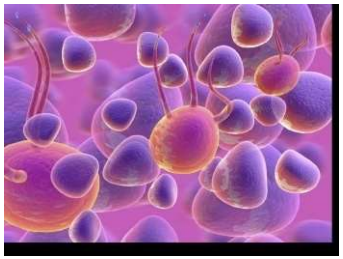
Decreased satiation neuro-transmission



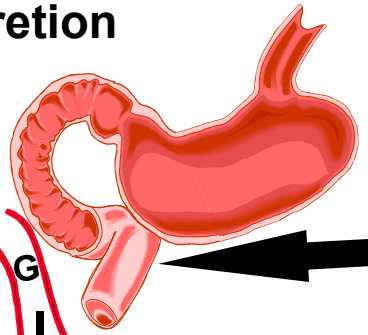
Decreased amylin, β-cell secretion
80% loss at dx



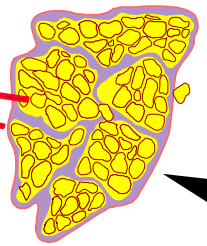
Increased renal glucose reabsorption



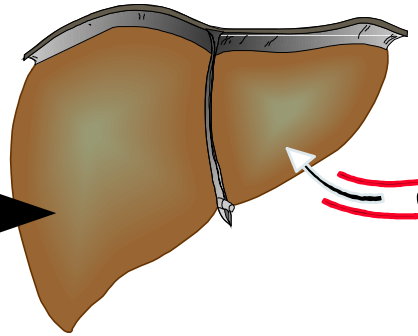
Increased glucagon secretion



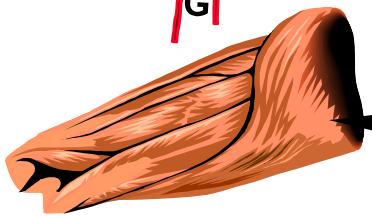
Decreased Gut hormones



Increased lipolysis



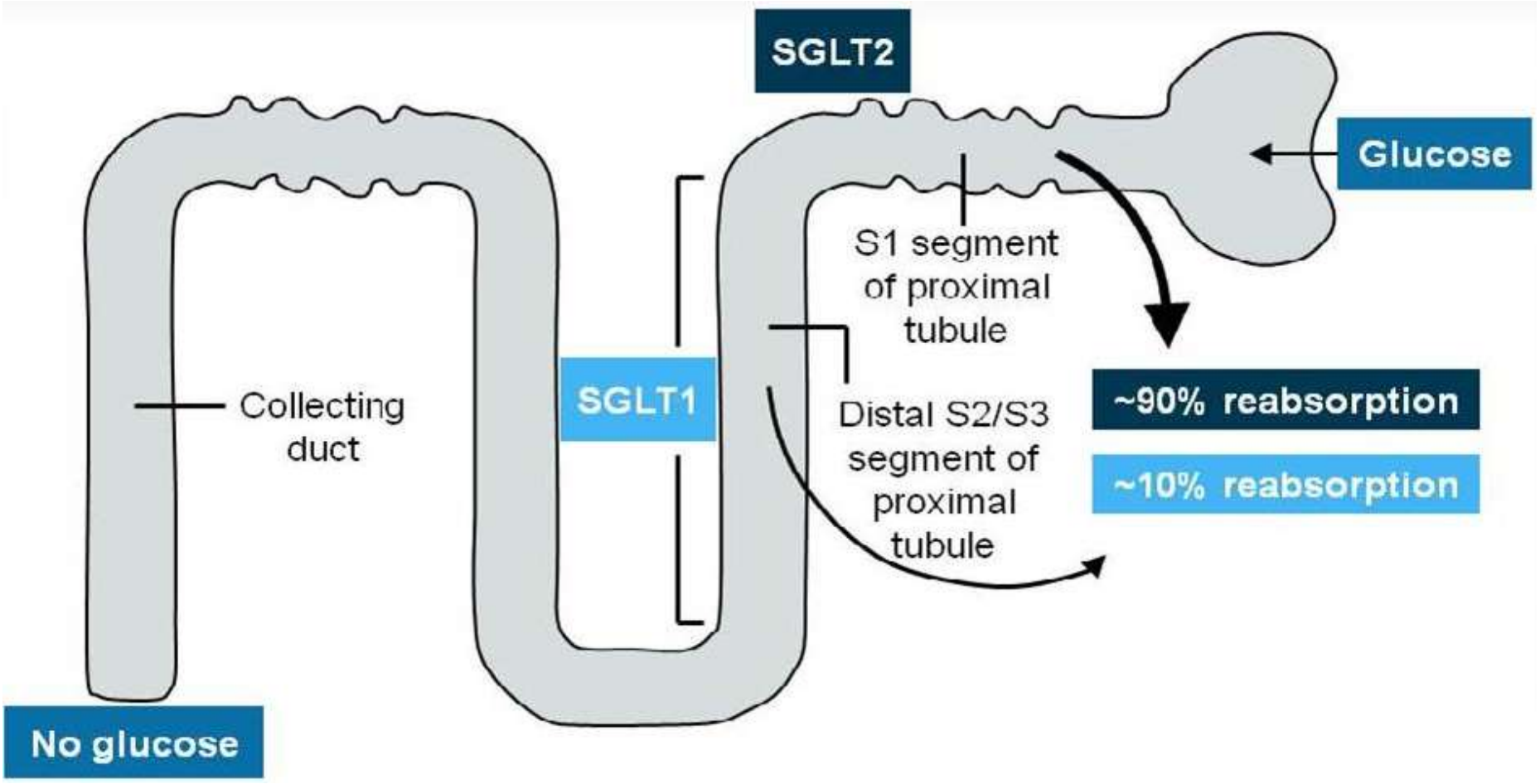
Increase glucose production



Decreased glucose uptake


SGLT-2 Inhibitors

SGLT and the Kidney



Poll Question 7

- A potential side effect of SGLT-2 Inhibitors is:

a. Urinary tract infections
b. Hypertension
c. Kidney tenderness
d. Increased uric acid

SGLT2 Inhibitors- “Flozins”

- **Action**: decreases renal reabsorption of glucose proximal tubule of kidneys (reset renal threshold)
- **Preferred** diabetes treatment for people with heartd failure and kidney disease. 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	No	Yes w/ Diabetes	Yes
Bexagliflozin (Brenzavvy)	Yes	NA	NA	NA

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)

Amputation risk? Fournier's gangrene?

SGLT2i: Managing Adverse Effects

- Maintain good hygiene to reduce risk of genital mycotic infections
  - Higher risk with higher glucose
- DKA risk
  - Use caution with reducing insulin dose
- Monitor BP
  - May need to reduce antihypertensive meds
- UTI risk greater with hyperglycemia
- Amputations observed with canagliflozin
  - Good foot care, check feet daily
- Monitor renal function/potassium

Case Study: Rick

- Rick is a 51yoM diagnosed with type 2 diabetes 5 years ago.
- He takes metformin 1000mg twice daily and semaglutide 2mg weekly. His A1C=7.3%.
- In the last 3 months, he was diagnosed with kidney disease. He has albuminuria and eGFR=50.
- Weight: 205lbs, 5”7, BMI=32kg/m^2
- He lost 20lbs in the last year

Case Study: Rick (continued) Poll 8

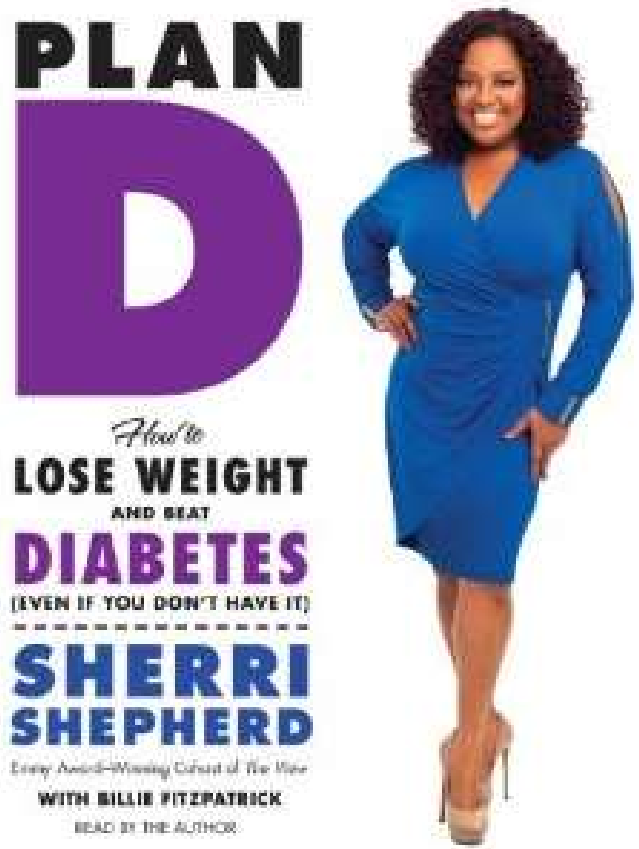
- What is the best drug to add to Rick's regimen?

A. Glipizide
B. Dapagliflozin (Farxiga)
C. Pioglitazone (Actos)
D. Linagliptin (Tradjenta)
E. More than 1 correct answer

SGLT2 Inhibitors- How do they rate?

Question	Answer
Cause hypoglycemia?	No
Cause weight gain?	No
Affordable?	No
Lowers Cardiorenal risk?	Yes
Can most tolerate /use?	Yes

"Getting diabetes saved my life."
~ Sherri Sheperd



Sherri Shepard decided to embrace diabetes and use it as a motivator to improve her health.

Comparison of Type 1,Type 2, LADA

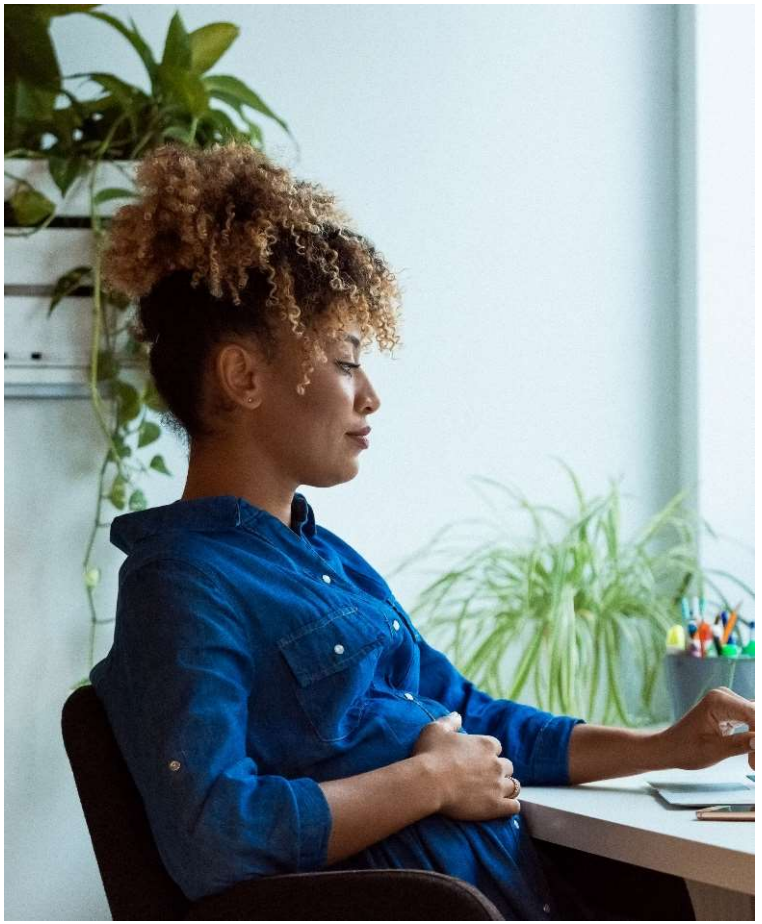
	Type I	Type 2	LADA
Excess weight	x	xxx	x
Insulin dependence	xxx	30%	6mos
Respond to oral agents	0	xxx	x
Ketosis	xxx	x	x
Antibodies present	xxx	0	xx
Typical Age of onset	teens	adult	adult
Insulin Resistance	0	xxx	x

Other Types of Diabetes

- Gestational
- Other specific types of diabetes

Screening in early Pregnancy

- Check glucose before 15 weeks of gestation:
  - Can find undetected diabetes or hyperglycemia
  - Prevent fetal exposure to hyperglycemia
  - Allows providers and pregnant people to take action to prevent complications
- Use standard diabetes diagnostic criteria.
  - If positive, diagnosis "Diabetes in Pregnancy"
- If fasting BG 110+ or A1C 5.9%+
  - At higher risk of adverse outcomes and more likely to experience GDM and need insulin.



If BG in normal range, recheck at 24-28 weeks for Gestational Diabetes

Poll question 9

- What best describes gestational diabetes?

a. Diabetes discovered within the first 12 weeks of pregnancy.
b. Diabetes discovered in the 24-28 weeks of pregnancy.
c. Risk of getting diabetes before pregnancy.
d. Diabetes discovered at any point during pregnancy.

Gestational DM ~ 9% of all Pregnancies

- Detected at 24-28 weeks of pregnancy (most insulin resistant phase)
- 50% chance of getting diabetes post delivery
- Offspring at greater risk of insulin resistance and diabetes

Rates of Gestational Diabetes (GDM) and Diabetes in Pregnancy increasing

- 1% to 2% have type 1 or type 2 during pregnancy
- 6% to 9% develop GDM.
- From 2000 to 2010
  - GDM rates increased 56%
  - Type 1 or type 2 before pregnancy increased 37%.
- Asian and Hispanic women have higher rates of GDM
- Black and Hispanic women have higher rates of type 1 or type 2 diabetes during pregnancy.

CDC
https://www.cdc.gov/reproductivehealth/maternalinfanthealth/diabetes-during-pregnancy.htm

See Diabetes and Pregnancy Level 2

Screening and Diagnosis of Diabetes Cheat Sheet

GESTATIONAL DIABETES (GDM)*

PREGNANCY SCREENING	TEST	DIAGNOSTIC CRITERIA
Consider early screening at <15 weeks of gestation to identify abnormal glucose metabolism. Or test those w/ risk factors (table 1) to identify undiagnosed prediabetes or diabetes.	Standard Diagnostic Testing and Criteria as listed in Diagnosing Diabetes –Table 2	Standard Diagnostic Testing and Criteria as listed in Diagnosing Diabetes –Table 2 Those with fasting of 110-125 or A1C of 5.9% to 6.4% are at higher risk of adverse outcomes (GDM, need insulin, preeclampisa and other)
Screen for GDM at 24–28 wks gestation for those without known diabetes. Screen those with GDM for diabetes 4 - 12 wks postpartum with 75-g OGTT. Lifelong screening at least every 3 yrs. **Please see reference below for complete guidelines.*	Can use either IADPSG consensus: **"One Step" 75-g OGTT** fasting and at 1 and 2 h (perform after overnight fast of at least 8 h) **"Two step" NIH Consensus – Step 1:** 50gm glucose load (non fasting) w/ plasma BG test at 1 hr. If BG ≥ 130-140*, go to **Step 2 >**	**One Step:** GDM diagnosis when ANY of following BG values are exceeded: • Fasting ≥92 mg/dl, • 1 h ≥180 mg/dl • 2 h ≥153 mg/dl **Two Step -Step 2** - 100g OGTT (fasting) GDM diagnosis if at least 2 of 4 plasma BG measured fasting, 1h, 2h, 3h after OGTT are met or exceeded.*

*** Please see reference** for complete Gestational Diabetes Criteria. American Diabetes Association Standards of Medical Care in Diabetes.

Diabetes Care 2023 Jan; 46 (Supplement 1): S19-S40. Compliments of Diabetes Education Services www.DiabetesEd.net

STANDARDS OF CARE | DECEMBER 12 2022

2. Classification and Diagnosis of Diabetes: *Standards of Care in Diabetes—2023* FREE

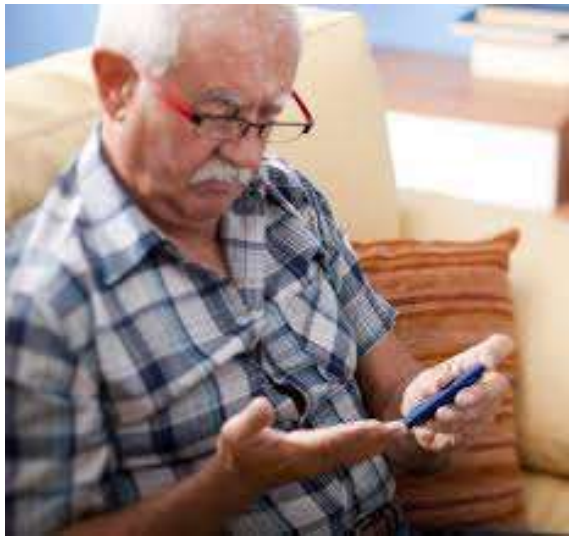
Gestational Diabetes and Pregnancy

- Test for GDM at 24-28 weeks
- Test GDM women for post partum diabetes at 4-12 weeks, using OGTT
- Women with GDM need lifelong screening for prediabetes/diabetes at least every 3 yrs
- Women with hx of GDM, found to have prediabetes need intensive lifestyle interventions or metformin to prevent diabetes.

15. Management of Diabetes in Pregnancy: *Standards of Care in Diabetes—2023* FREE

Other Specific Types of DM

- Medications such as: steroids, protease inhibitors and Prograf®
- Secondary to Agent Orange
- Liver failure
- TPN or tube feedings
- Pancreatic cancers or removal
- Cystic fibrosis, pancreatitis
- Other



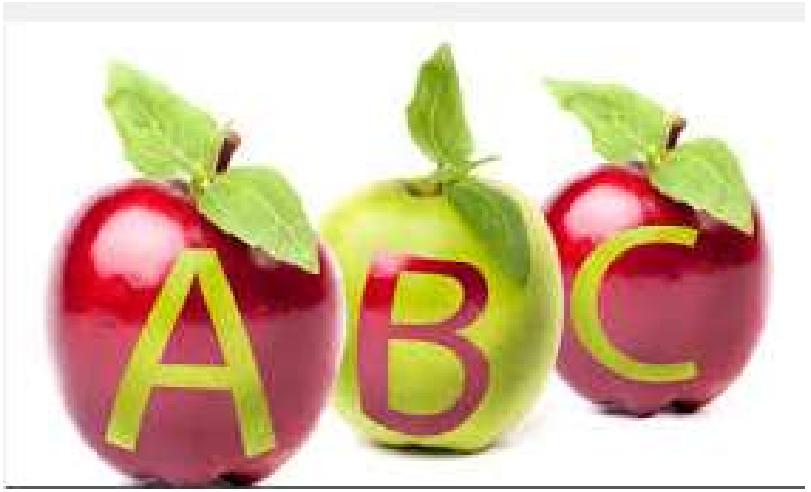
Regardless of the cause, hyperglycemia needs to be treated.

6. Glycemic Targets

A1C

Blood Pressure

Cardiovascular risk reduction



6. Glycemic Targets for Non-Pregnant Adults

- **A1c < 7%** - a reasonable goal for adults.
- **A1c < 6.5%** - for those without significant risk of hypoglycemia
- **A1c < 8%** - for those with history of hypoglycemia, limited life expectancy, or those with longstanding diabetes and vascular complications.
- **A1c Check Frequency:**
  - If meeting goal - At least 2 times a year
  - If *not* meeting goal – Quarterly

- **Also review Ambulatory Glucose Profile**

6. Glycemic Targets
Individualize Targets – ADA

- Pre-Prandial BG 80- 130
- 1-2 hr post prandial < than 180

  *for nonpregnant adults
- Time in Range: 70%
  - BG of 70-180 mg/dL

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)

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

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

BGM vs CGM

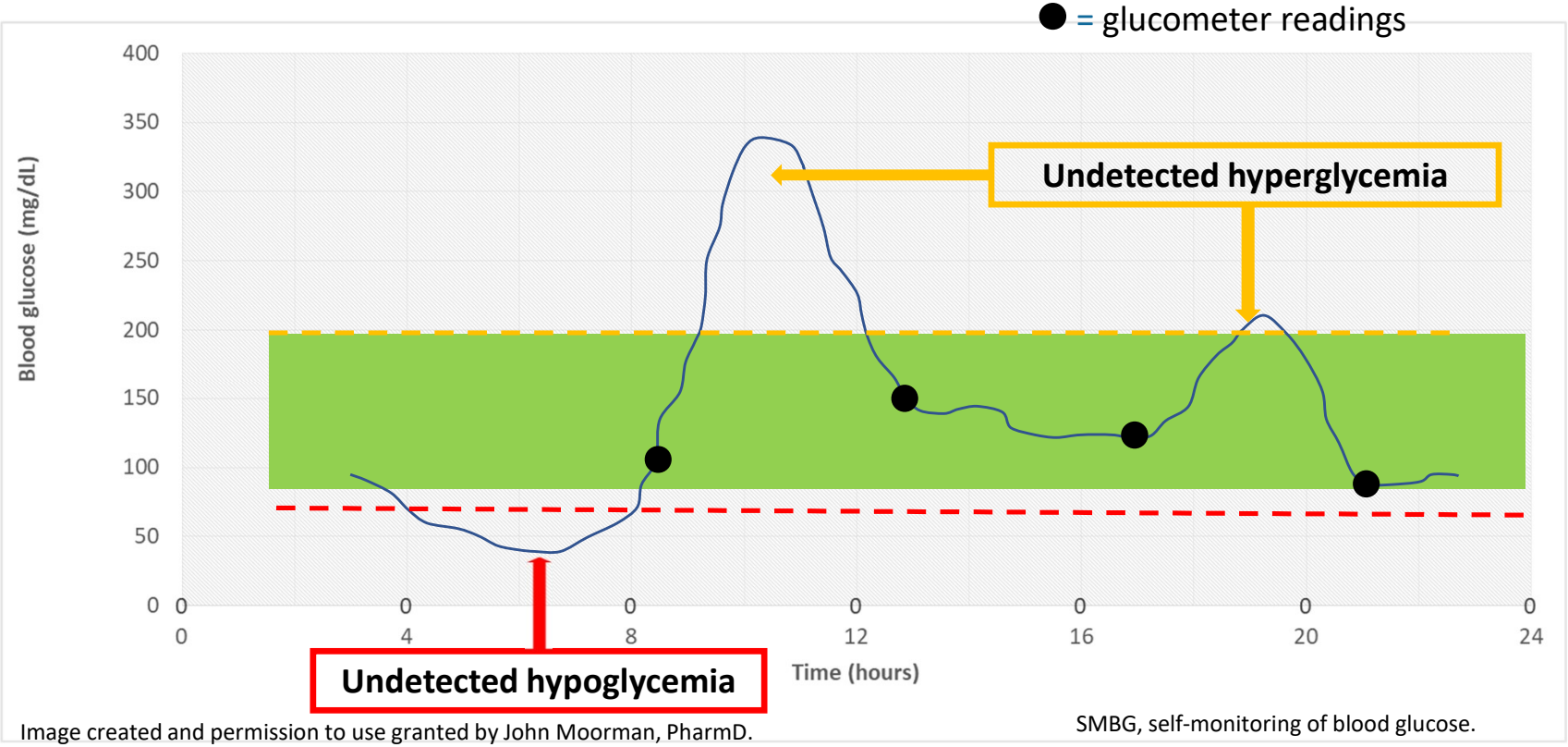
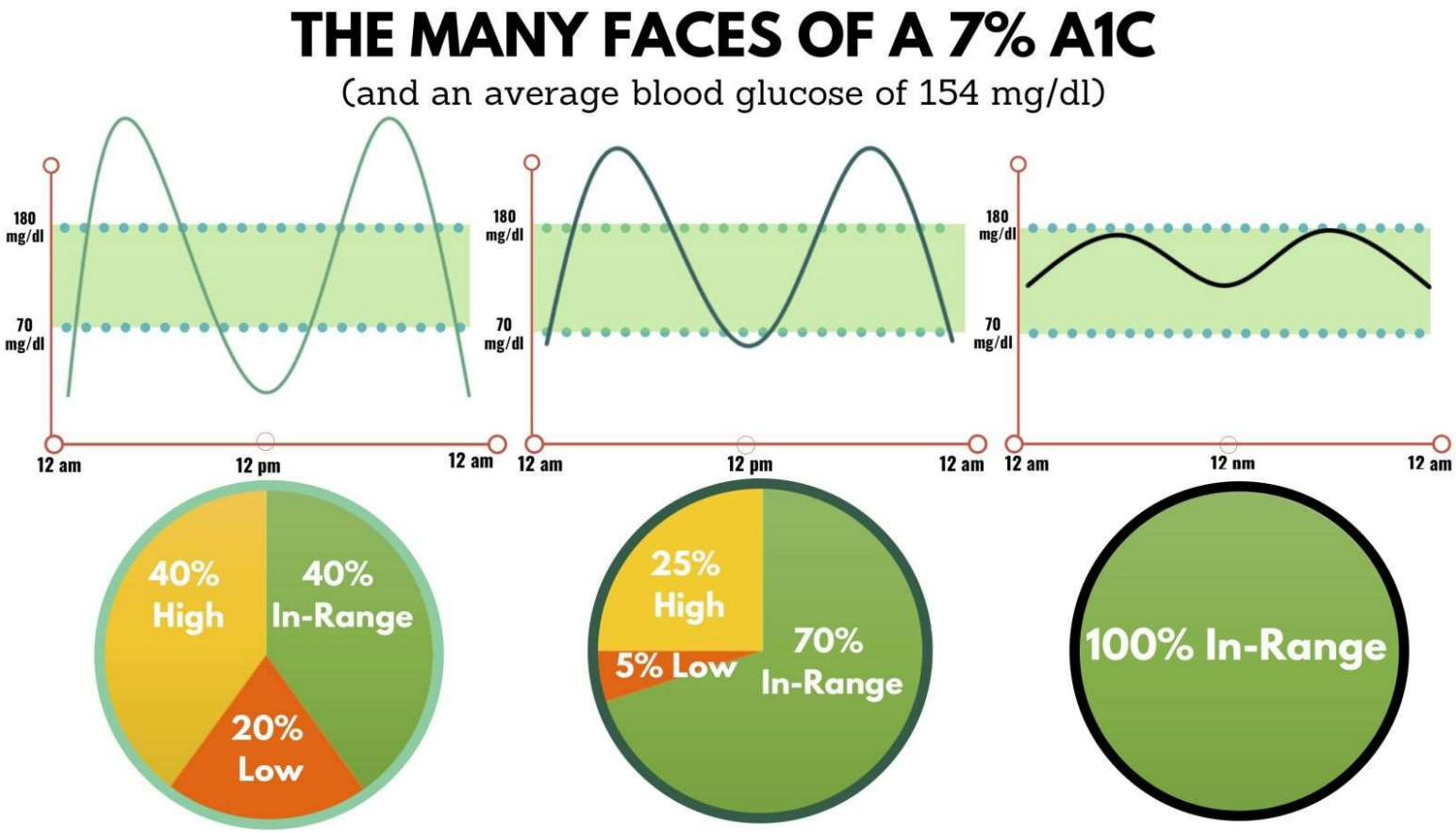


Image created and permission to use granted by John Moorman, PharmD.

SMBG, self-monitoring of blood glucose.

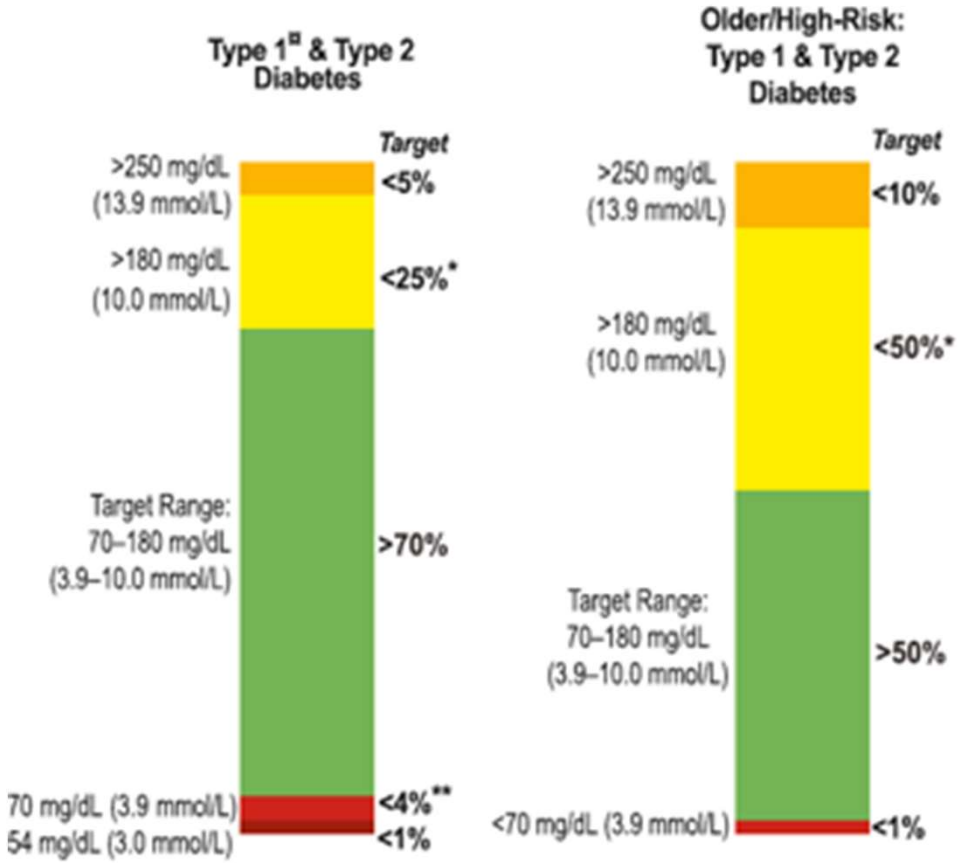
A1C Alone is Just Not Enough



https://diatribe.org/time-range.

Time in Range

- Evaluate Time in Range (TIR)
  - Target 70-180 mg/dl
  - Target time *below* goal
    - Less than 70
    - Less than 54
  - Target time *above* goal
    - Above 180
    - Above 250



Battelino T, et al. *Diabetes Care*. 2019;42(8):1593-1603.

Estimation of A1c for a Given TIR

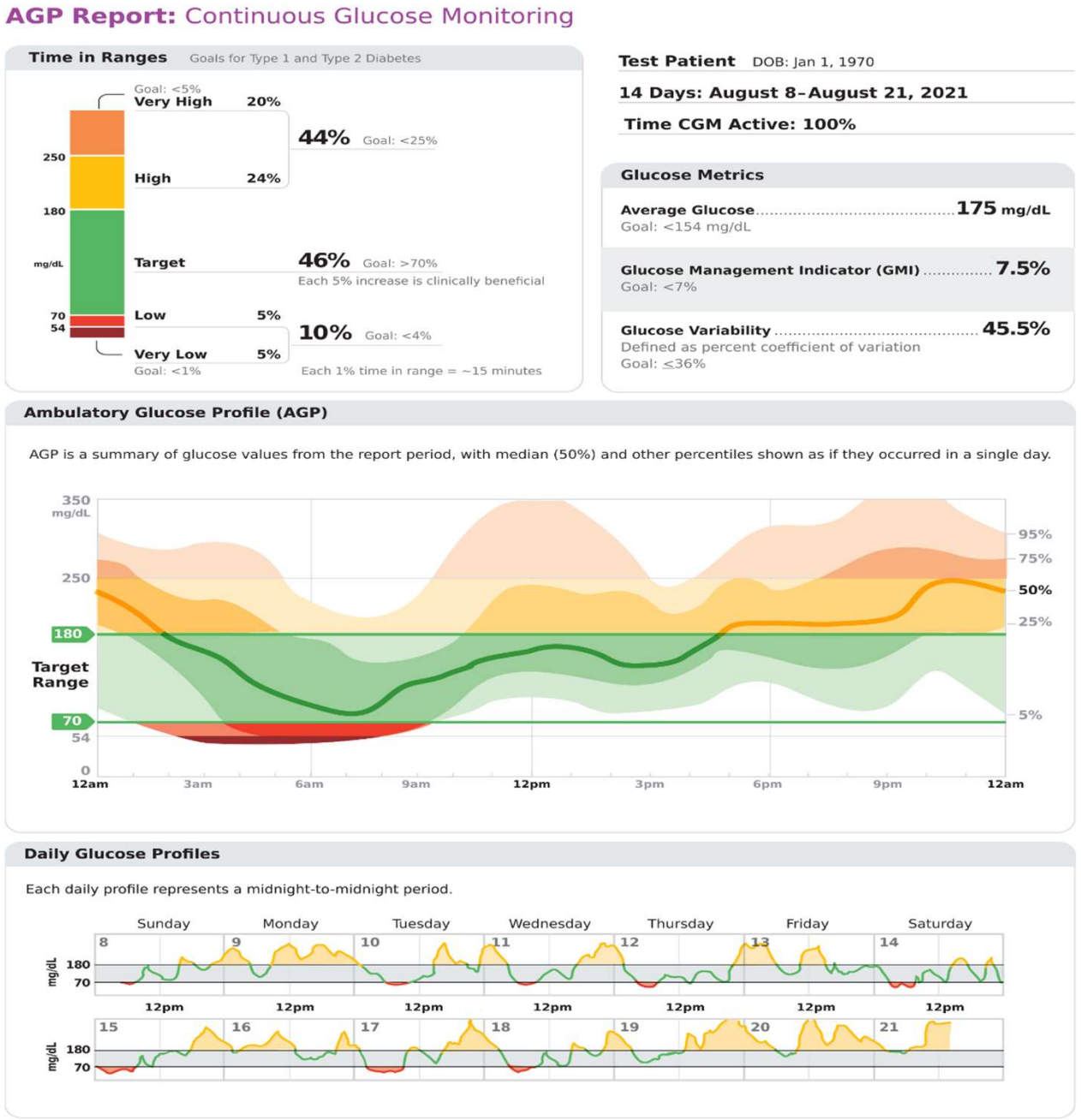
TIR$^{70\text{-}180}$ (%)	Estimated HbA1c (%)	95% CI for the predicted value
20	9.4	(8.0, 10.7)
30	8.9	(7.7, 10.2)
40	8.4	(7.1, 9.7)
50	**7.9**	**(6.6, 9.2)**
60	7.4	(6.1, 8.8)
70	**7.0**	**(5.6, 8.3)**
80	6.5	(5.2, 7.8)
90	6.0	(4.7, 7.3)

10% ΔTIR ≈ 0.5% ΔHbA1c

Beck RW, et al. J Diabetes Sci Technol. 2019;13:614-626.

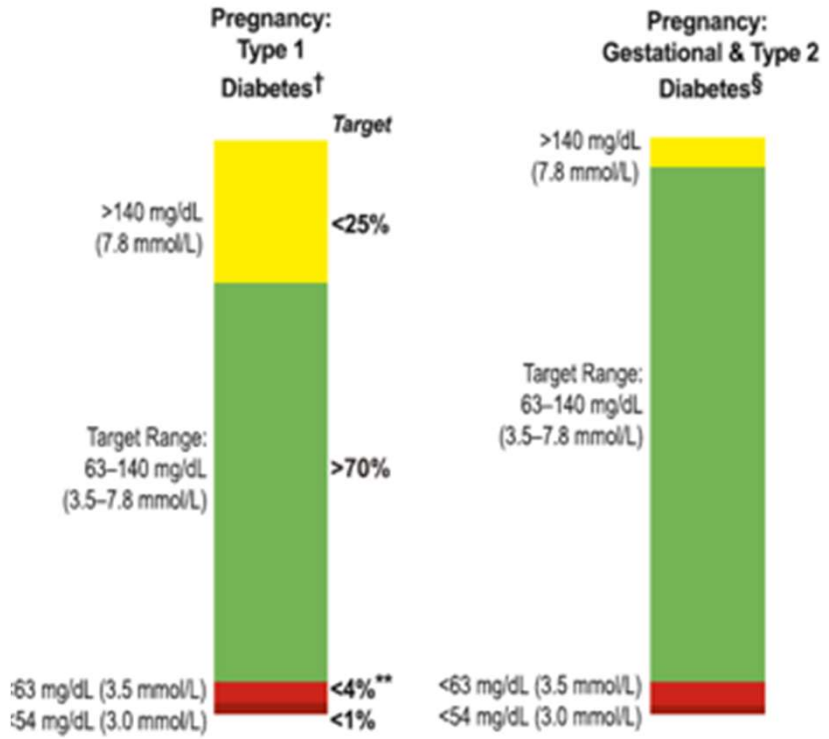
Ambulatory Glucose Profile Report

- CGM key metrics
- AGP
- Daily tracings



15. ADA Pregnancy Targets – For those with type 1, type 2 and GDM

- A1c < 6-6.5% (closer to 6 in 2nd/3rd tri)
- Fasting and Post Meal BG Goals
  - Fasting glucose 70–95 mg/dL and either
  - One-hour postprandial glucose 110–140 mg/dL or
  - Two-hour postprandial glucose 100–120 mg/dL
- Time in range: 63-140 mg/dL



Battelino T, et al. *Diabetes Care*. 2019;42(8):1593-1603. 6. Glycemic Targets: *Standards of Care in Diabetes—2023* FREE

Lunch Break 12:00 to 12:55 PDT

Question and Answer Session from 12:55 to 1pm

Team Name
Join us tonight at 5:45 to celebrate 25 years.

Please come even if you didn't sign-up!

Pharmacologic Treatment during Pregnancy

- Insulin is preferred therapy for GDM, type 1 and 2
  - Does not cross placenta
  - Can overcome insulin resistance assoc w/ type 2
- Sulfonylureas pass through placenta / associated with neonatal hypo (glyburide)
- Metformin – lower risk of hypo and maternal wt gain but may increase prematurity rate
  - Passes through placenta
  - If using for PCOS, stop by end of first trimester
- Refer to specialized center

Pregnancy and Hypertension

- If pregnant with diabetes and chronic hypertension
  - Blood pressure target of 110–135/85 mmHg
    - Reduces risk for accelerated maternal hypertension
    - Minimizes impaired fetal growth
  - Stop potentially harmful medications in prep for pregnancy
    - Avoid ACE inhibitors, angiotensin receptor blockers (ARBs), statins in sexually active women of childbearing age if not using reliable contraception
    - Stop these meds at conception
    - Preferred meds: labetolol, nifedipine

Case Study - Ricki

Ricki is a 36yoF with a history of GDM and newly diagnosed with type 2 diabetes. A1C=7.4%. Normal kidney function. Past medical history includes hypertension for which she takes HCTZ 25mg daily.

Weight: 220lbs, BMI=34kg/m^2

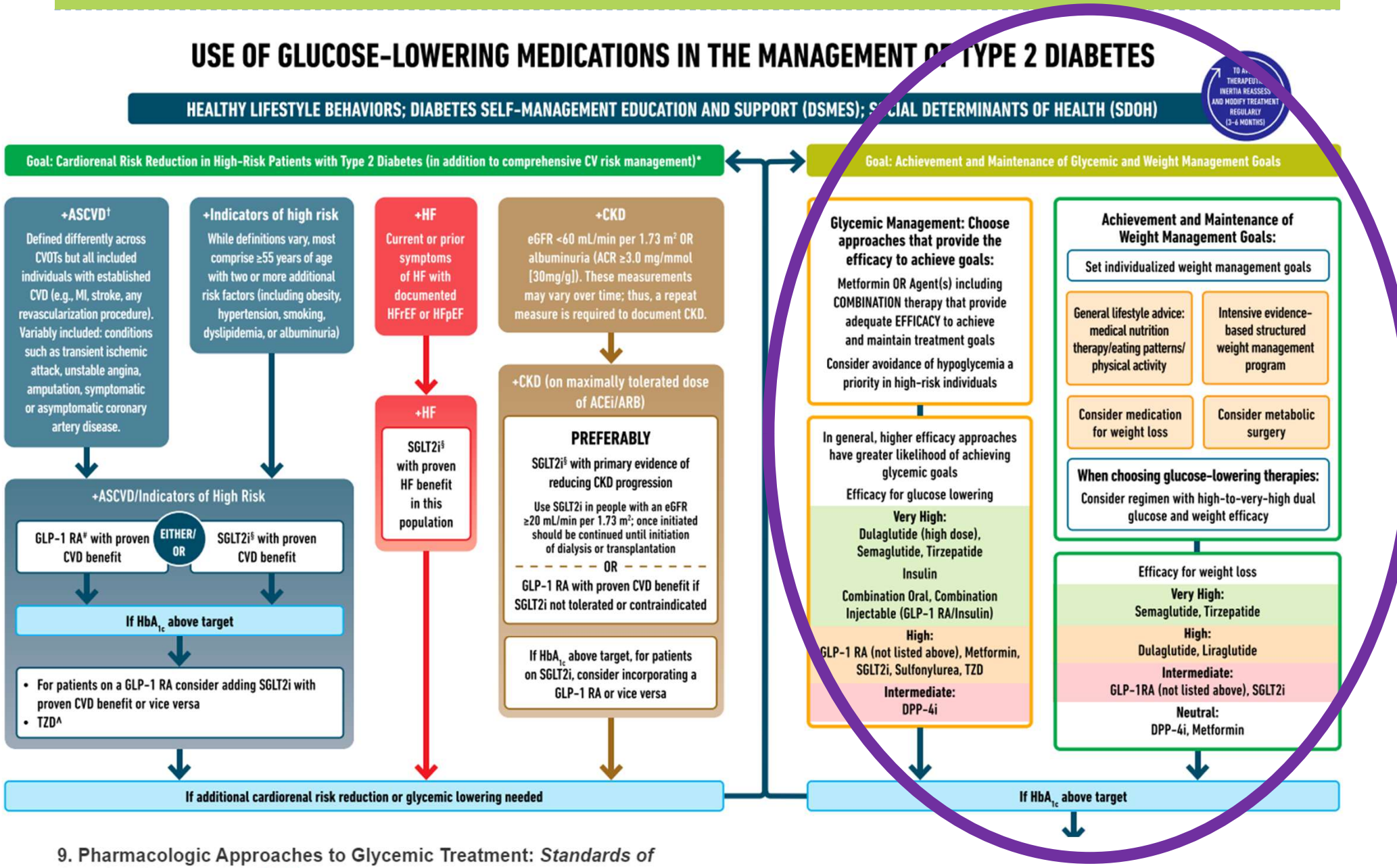
Social history

- Works full time as an accountant
- Skips breakfast, eats a small lunch, eats a large dinner, snacks in evening
- No Exercise
- Loves Starbucks Frappuccino's

Poll. What Treatment Should Ricki Be Started On?

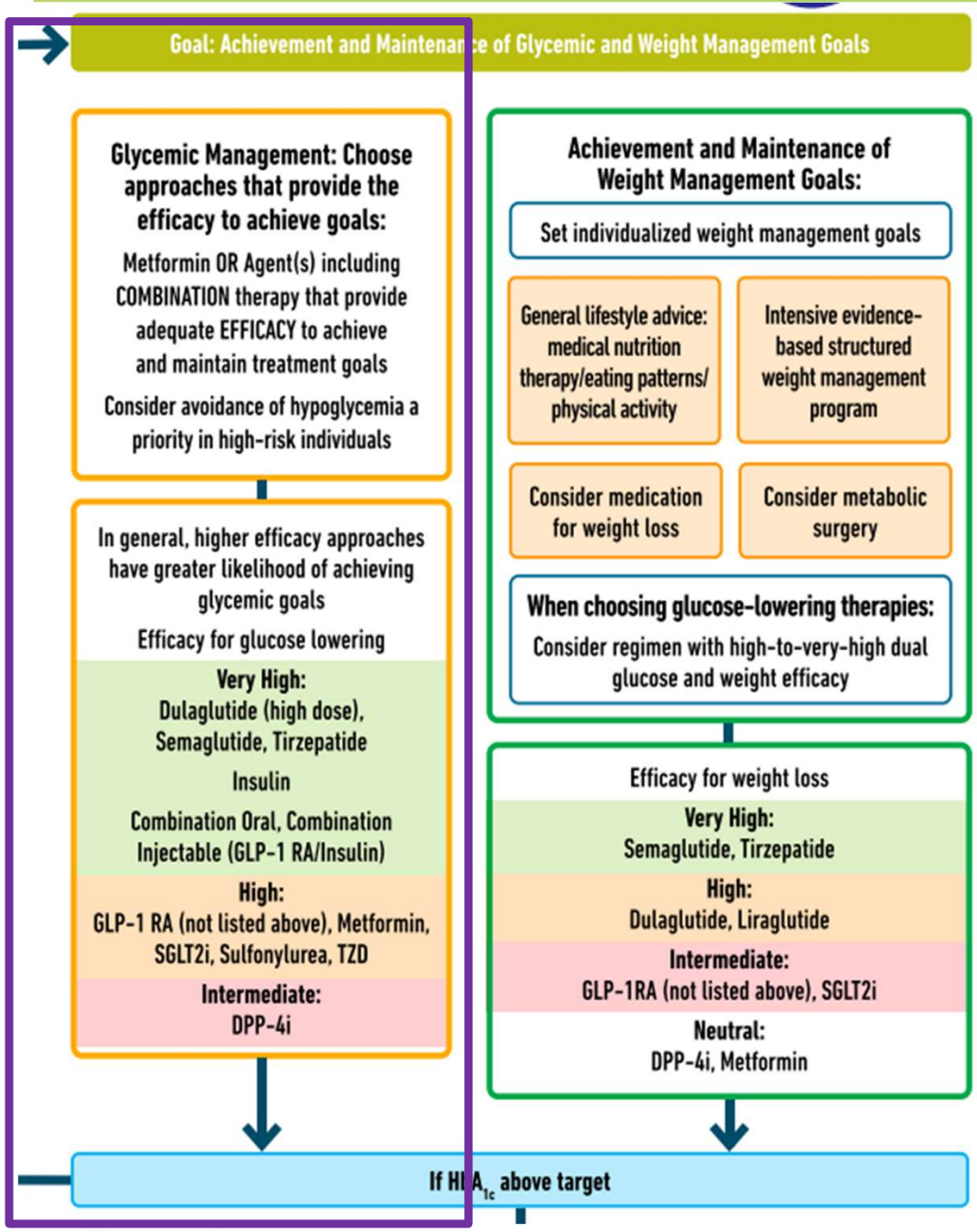
A. Glipizide (sulfonylurea)
B. Linagliptin (DPP-4 inhibitor)
C. Empagliflozin (SGLT-2 inhibitor)
D. Metformin (Biguanide)
E. Lifestyle modifications only

Management of Hyperglycemia Type 2



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

Metformin is "Often" 1st Line

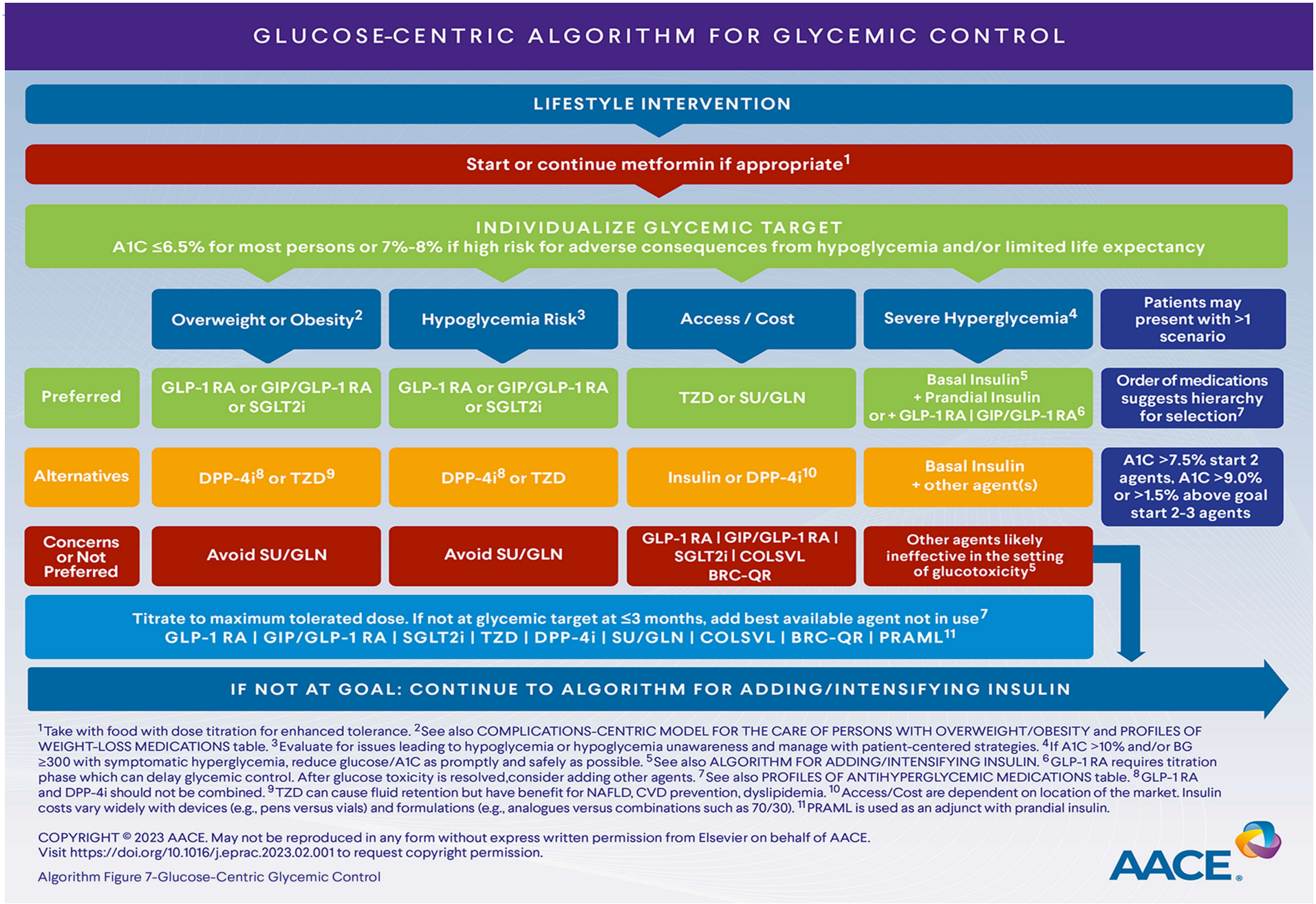


- Why metformin?
  - Longstanding evidence
  - High efficacy and safety
  - Inexpensive - 3 months for $12
  - Weight neutral

- 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* FREE

AACE 2023 Diabetes Guideline

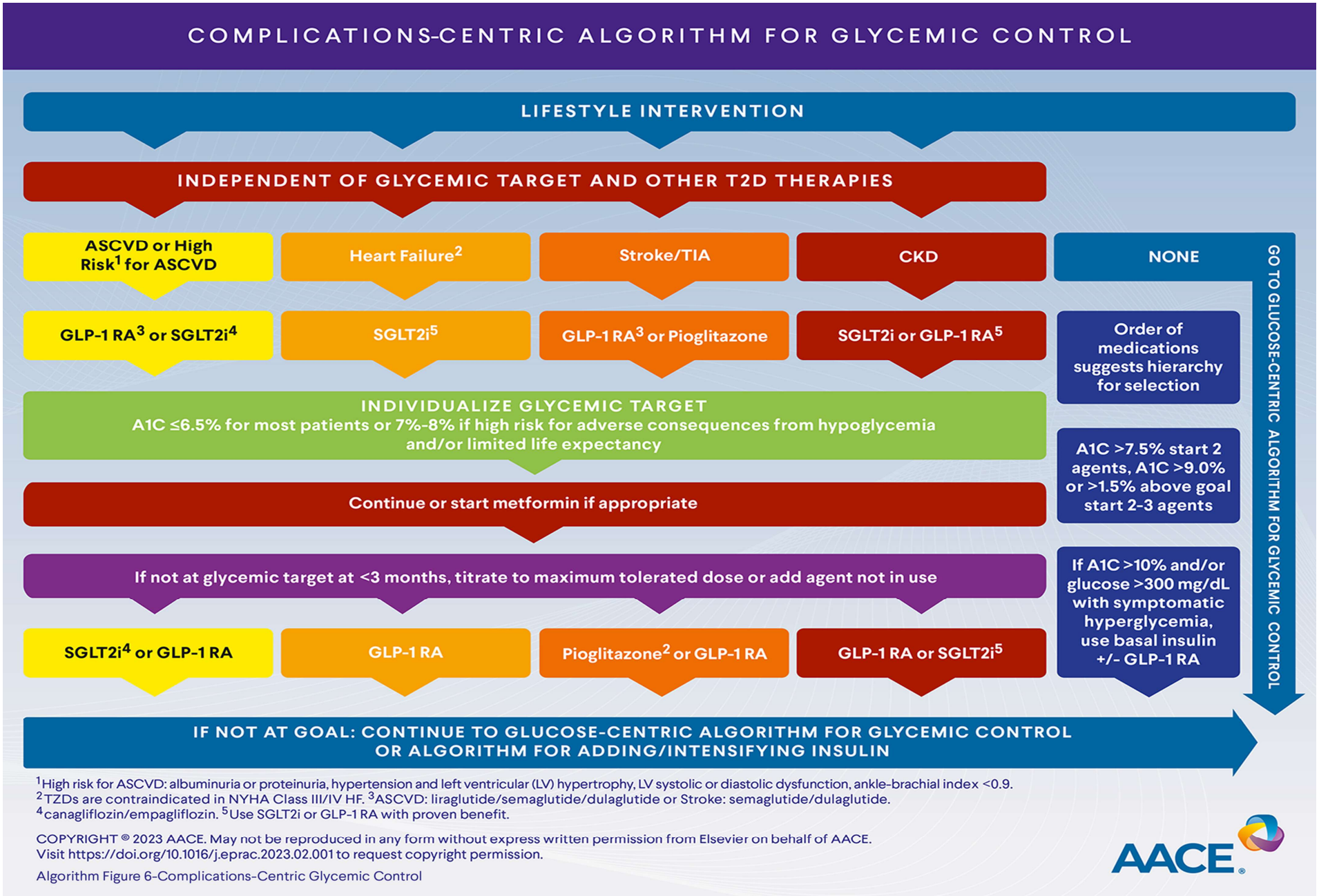


[1]Take with food with dose titration for enhanced tolerance. [2]See also COMPLICATIONS-CENTRIC MODEL FOR THE CARE OF PERSONS WITH OVERWEIGHT/OBESITY and PROFILES OF WEIGHT-LOSS MEDICATIONS table. [3]Evaluate for issues leading to hypoglycemia or hypoglycemia unawareness and manage with patient-centered strategies. [4]If A1C >10% and/or BG ≥300 with symptomatic hyperglycemia, reduce glucose/A1C as promptly and safely as possible. [5]See also ALGORITHM FOR ADDING/INTENSIFYING INSULIN. [6]GLP-1 RA requires titration phase which can delay glycemic control. After glucose toxicity is resolved,consider adding other agents. [7]See also PROFILES OF ANTIHYPERGLYCEMIC MEDICATIONS table. [8]GLP-1 RA and DPP-4i should not be combined. [9]TZD can cause fluid retention but have benefit for NAFLD, CVD prevention, dyslipidemia. [10]Access/Cost are dependent on location of the market. Insulin costs vary widely with devices (e.g., pens versus vials) and formulations (e.g., analogues versus combinations such as 70/30). [11]PRAML is used as an adjunct with prandial insulin.

Algorithm Figure 7-Glucose-Centric Glycemic Control

AACE

AACE 2023 Diabetes Guideline



[1]High risk for ASCVD: albuminuria or proteinuria, hypertension and left ventricular (LV) hypertrophy, LV systolic or diastolic dysfunction, ankle-brachial index <0.9.
[2]TZDs are contraindicated in NYHA Class III/IV HF. [3]ASCVD: liraglutide/semaglutide/dulaglutide or Stroke: semaglutide/dulaglutide.
[4]canagliflozin/empagliflozin. [5]Use SGLT2i or GLP-1 RA with proven benefit.

Algorithm Figure 6-Complications-Centric Glycemic Control

Quick Question 10

- Ricki is started on Metformin 500mg BID. Which of the following is true?

a. Hold metformin if your blood glucose is below 80 mg/dl
b. If you forget to take metformin before the meal, hold the dose
c. Metformin may cause loose stools
d. Avoid Metformin if GFR is less than 60

Metformin Dosing and Mechanism

- Mechanism: decreases hepatic glucose production
  - Data suggest metformin may be safely continued with eGFR of 30-45 mL/min/1.73m^2 with dose reductions
  - Do not initiate when eGFR < 45
  - Max effective dose: 2000mg/day
- Monitor vitamin B12 levels and renal function
- GI issues: nausea, vomiting, diarrhea
  - Consider long-acting formulation, dose reduction

Common Oral Diabetes Meds

Diabetes Education SERVICES

Class/Main Action	Name(s)	Daily Dose Range	Considerations
Biguanides • Decreases hepatic glucose output • First line med at diagnosis of type 2	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	

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

Metformin – How Does it Rate?

Question	Answer
Cause hypoglycemia?	No
Cause weight gain?	No
Affordable?	Yes
Lowers CV risk?	Yes
Can most tolerate /use?	Yes/No (GI, creat)

Risk based Screening for PreDiabetes or Type 2 in Children and Youth

- Test youth with excess weight (BMI >85% percentile)
- Plus any ONE of following risk factors:
  - Maternal diabetes or GDM during child's gestation
  - Family history type 2 in 1st or 2nd degree relative
  - Native American, African American, Latin, Asian, Pacific Islander
  - Signs of insulin resistance (acanthosis nigricans, HTN, dyslipidemia, Polycystic Ovary Syndrome – PCOS or small for gestational age birth weight
- Test at 10 yrs or puberty and every 3 yrs or more frequently if indicated

14. Type 2 and Kids Goals

- A1c goal of 7% if on oral meds alone
- A1c goal of 7.5% if at risk for hypoglycemia
- Some children may benefit from A1c of 6.5% or less

- Initiate pharmacologic therapy, in addition to lifestyle therapy, at diagnosis
- Confirm diagnosis with antibody testing
- Treat glucose, B/P and lipids
- Engage in lifestyle coaching
- **Please see Kids and Diabetes Level 2 Course**

14. Pediatric Glycemic Targets

- **A1c goal 6.5 – 8.0% for Type 1**
  - Generally, goal is <7.0%
  - Individualization is encouraged.
  - A goal <6.5% may be considered for those at low risk of excessive hypoglycemia
  - A goal of <8.0 may be needed
  - CGM / Insulin pump important tools.

When Does Old Age Start?

Quick Question 11

- What percent of the population over the age of 65 has type 2 diabetes?

A. 9.3%
B. 18%
C. 26%
D. 34%

13. Older Adults Goals – Whole Picture

- Consider the assessment of medical, psychological and self-care domains to provide context to determine targets and therapeutic approaches for management.
- Screen for geriatric issues
  - polypharmacy,
  - cognitive impairment, depression
  - urinary incontinence, falls, and persistent pain

  that can affect diabetes self-management and diminish quality of life

See Level 2 Course, Older Adults and Diabetes

Treatment Goals Based On:

- Length of time living with diabetes (new onset, undiagnosed for many years or longer history)
- Presence or absence of complications
- Comorbidities
- Degree of frailty
- Cognitive function
- Life expectancy (often longer than expected)
- Functional status

Poll Question 12

- RT, is a healthy 74-year-old who is on metformin 1000mg BID. He has had diabetes for 11 years. His latest A1c was 7.3% What is best response?
  - A. Good job, let's get the A1c less than 7%
  - B. Have you been snacking more than usual?
  - C. What do you think about your A1c level?
  - D. Let's add on another medication to get your A1c to target.

Healthy & Good Functional Status

- Set more intensive goals if:
  - Good cognitive and physical function
  - Expected to live long enough to reap benefits of intensive management,
- Ongoing follow-up to eval safety and hypoglycemia frequency

- **Goals:**
  - Reasonable A1c goal <7.0 - 7.5%
  - Fasting BG 80 – 130
  - Bedtime Glucose 80-180
  - Blood Pressure < 130/80
  - Statin unless contraindicated or not tolerated

Poll 13 – Review Question

- HR is a 78-year-old with a stroke and limited cognition. She has had diabetes for 8 years and is on intensive insulin therapy: Bolus coverage at meals and basal at night. Her A1c is 6.2%. She has a part time care taker. What do you suggest?
- A. Evaluate food intake
- B. Discuss de-intensifying insulin regimen
- C. Move Lantus to morning
- D. Stop insulin and start on oral medications

Older Adults with Complications and Reduced Functionality - Less Intense Goals

- Intermediate remaining life expectancy, high treatment burden, hypo and fall risk.
- Consider DE-Intensification
- Goals:
  - Reasonable A1c goal <8.0%
  - Fasting BG 90 – 150
  - Bedtime BG 100-180
  - Blood Pressure < 130/80
  - Statin unless contraindicated or not tolerated

Older Adults (≥65 years) with diabetes

- Annual screening for early detection of mild cognitive impairment or dementia
- High priority population for depression screening and treatment
- Avoid hypoglycemia in this high risk group
  - Prevent hypo by adjusting glycemic targets and adjusting pharmacologic interventions

Older Adults and Medications

- In older **adults** at increased risk of hypoglycemia, meds with low risk of hypoglycemia are preferred.
- Overtreatment of diabetes is common in older adults and should be avoided.
- Deintensification (or simplification) of complex regimens is recommended to reduce the risk of hypoglycemia, if it can be achieved within the individualized A1C target.

4. ADA – Complete Medical Evaluation

- At initial visit :
  - Whole person care and psychosocial evaluation
  - Explore diabetes self-management and health status
  - Evaluate if changes in diabetes treatment would improve well being.
- Engagement in formulation of a care management plan
- Develop a plan for continuing care

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

		INITIAL VISIT	EVERY FOLLOW-UP VISIT	ANNUAL VISIT
PAST MEDICAL AND FAMILY HISTORY	**Diabetes history**			
	▪ Characteristics at onset (e.g., age, symptoms)	✓		
	▪ Review of previous treatment plans and response	✓		
	▪ Assess frequency/cause/severity of past hospitalizations	✓		
	Family history			
	▪ Family history of diabetes in a first-degree relative	✓		
	▪ Family history of autoimmune disorder	✓		
	Personal history of complications and common comorbidities			
	▪ Common comorbidities (e.g., obesity, OSA, NAFLD)	✓		
	▪ High blood pressure or abnormal lipids	✓		✓
	▪ Macrovascular and microvascular complications	✓		✓
	▪ Hypoglycemia: awareness/frequency/causes/timing of episodes	✓	✓	✓
	▪ Presence of hemoglobinopathies or anemias	✓		✓
	▪ Last dental visit	✓		✓
	▪ Last dilated eye exam			✓
	▪ Visits to specialists			✓
	Interval history			
	▪ Changes in medical/family history since last visit		✓	✓
BEHAVIORAL FACTORS	▪ Eating patterns and weight history	✓	✓	✓
	▪ Assess familiarity with carbohydrate counting (e.g., type 1 diabetes, type 2 diabetes treated with MDI)	✓		✓
	▪ Physical activity and sleep behaviors	✓	✓	✓
	▪ Tobacco, alcohol, and substance use	✓		✓
MEDICATIONS AND VACCINATIONS	▪ Current medication plan	✓	✓	✓
	▪ Medication-taking behavior	✓	✓	✓
	▪ Medication intolerance or side effects	✓	✓	✓
	▪ Complementary and alternative medicine use	✓	✓	✓
	▪ Vaccination history and needs	✓		✓
TECHNOLOGY USE	▪ Assess use of health apps, online education, patient portals, etc.	✓		✓
	▪ Glucose monitoring (meter/CGM): results and data use	✓	✓	✓
	▪ Review insulin pump settings and use, connected pen and glucose data	✓	✓	✓
SOCIAL LIFE ASSESSMENT	**Social network**			
	▪ Identify existing social supports	✓		✓
	▪ Identify surrogate decision maker, advanced care plan	✓		✓
	▪ Identify social determinants of health (e.g., food security, housing stability & homelessness, transportation access, financial security, community safety)	✓		✓

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

Nuha A. ElSayed; Grazia Aleppo; Vanita R. Aroda; Raveendhara R. Bannuru; Florence M. Brown; Dennis Bruemmer; Billy S. Collins; Kenneth Cusi; Marisa E. Hilliard; Diana Isaacs; Eric L. Johnson; Scott Kahan; Kamlesh Khunti; Jose Leon; Sarah K. Lyons; Mary Lou Perry; Priya Prahalad; Richard E. Pratley; Jane Jeffrie Seley; Robert C. Stanton; Robert A. Gabbay on behalf of the American Diabetes Association

American Diabetes Association.

Table 4.1 (cont.) - Components of the comprehensive diabetes medical evaluation at initial, follow-up, and annual visits

		INITIAL VISIT	EVERY FOLLOW-UP VISIT	ANNUAL VISIT
PHYSICAL EXAMINATION	• Height, weight, and BMI; growth/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, lipodystrophy)	✓	✓	✓
	• Comprehensive foot examination			
	• Visual inspection (e.g., skin integrity, callous formation, foot deformity or ulcer, toenails)**	✓		✓
	• Screen for PAD (pedal pulses—refer for ABI if diminished)	✓		✓
	• Determination of temperature, vibration or pinprick sensation, and 10-g monofilament exam	✓		✓
	• Screen for depression, anxiety, and disordered eating	✓		✓
	• Consider assessment for cognitive performance*	✓		✓
	• Consider assessment for functional performance*	✓		✓
LABORATORY EVALUATION	• A1C, if the results are not available within the past 3 months	✓	✓	✓
	• If not performed/available within the past year	✓		✓
	• Lipid profile, including total, LDL, and HDL cholesterol and triglycerides#	✓		✓^
	• Liver function tests#	✓		✓
	• Spot urinary albumin-to-creatinine ratio	✓		✓
	• Serum creatinine and estimated glomerular filtration rate+	✓		✓
	• Thyroid-stimulating hormone in people with type 1 diabetes#	✓		✓
	• Vitamin B12 if on metformin	✓		✓
	• Serum potassium levels in people with diabetes on ACE inhibitors, ARBs, or diuretics+	✓		✓

ABI, ankle-brachial pressure index; ARBs, angiotensin receptor blockers; CGM, continuous glucose monitors; MDI, multiple daily injections; NAFLD, nonalcoholic fatty liver disease; OSA, obstructive sleep apnea; PAD, peripheral arterial disease.

*At 65 years of age or older.

+May be needed more frequently in people with diabetes with known chronic kidney disease or with changes in medications that affect kidney function and serum potassium (see **Table 11.1**).

#May also need to be checked after initiation or dose changes of medications that affect these laboratory values (i.e., diabetes medications, blood pressure medications, cholesterol medications, or thyroid medications).

^In people without dyslipidemia and not on cholesterol-lowering therapy, testing may be less frequent.

**Should be performed at every visit in people with diabetes with sensory loss, previous foot ulcers, or amputations.

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

Nuha A. ElSayed; Grazia Aleppo; Vanita R. Aroda; Raveendhara R. Bannuru; Florence M. Brown; Dennis Bruemmer; Billy S. Collins; Kenneth Cusi; Marisa E. Hilliard; Diana Isaacs; Eric L. Johnson; Scott Kahan; Kamlesh Khunti; Jose Leon; Sarah K. Lyons; Mary Lou Perry; Priya Prahalad; Richard E. Pratley; Jane Jeffrie Seley; Robert C. Stanton; Robert A. Gabbay on behalf of the American Diabetes Association

ADA Assess and Treatment Plan

- **Assess risk of diabetes complications**
  - ASCVD risk factors and heart failure history
  - Stage chronic kidney disease
  - Hypoglycemia risk
  - Assess for neuropathy, retinopathy
- **Goal setting**
  - Set A1C/blood glucose targets & Time in Range
  - Address hypertension and lipids
  - Diabetes self-management goals
- **Therapeutic treatment plans**
  - Lifestyle management – referral to RD, DSME and specialists
  - Pharmacologic therapy: glucose lowering
  - Pharmacologic therapy: cardiorenal risk factors
  - Use of glucose monitoring and insulin delivery devices
  - Referral for DSME and RDN

Physical Exam

- Height, weight, BMI, pubertal development
- Blood pressure
- Fundoscopic exam
- Skin exam – insulin insertion sites, acanthosis, fungus, sores
- Comprehensive foot exam
  - Visual eval
  - Screen for Peripheral Arterial Disease
  - Monofilament and vibration assessment

Quick Question

- **Why is the evaluation of glomerular filtration rate (GFR) and Urinary Albumin Creatinine Ratio (UACR) of critical importance for people with diabetes?**
- **Answer Choices:**

1. Evaluate if peritoneal or hemodialysis is necessary for the individual.
2. Determine best anti-hypertensive and glucose pharmacotherapy.
3. Protect against immune mediated renal complications.
4. Slow the progression of chronic kidney disease development.

Lab Eval

- A1c (each 3-6 mo's)
- Each year
  - Lipids
  - Liver function
  - Spot urinary albumin-to-creat ratio (UACR))
  - Serum creat and GFR
  - TSH (type 1)
  - B12 check (on metformin if needed)
- Serum K
  - If on ACE, ARBs or diuretics

Referrals for Initial Care Mgmt

- Family planning
- RDN for Med Nutrition therapy
- DSMES - Diabetes Self-Management Education and support
- Dentist for comprehensive dental and periodontal examination
- Eye Care and Evaluation
- Mental health professional
- Audiology if indicated
- Social Services & Community Resources

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, fatty liver)
  - GU health – continence, creat, GFR, creat /alb ratio
  - Menstruation and contraception
  - Thyroid – Symptoms + TSH
  - Heart – blood pressure, chest pain, heart rate, cholesterol

Immunization Schedule for Diabetes 2023

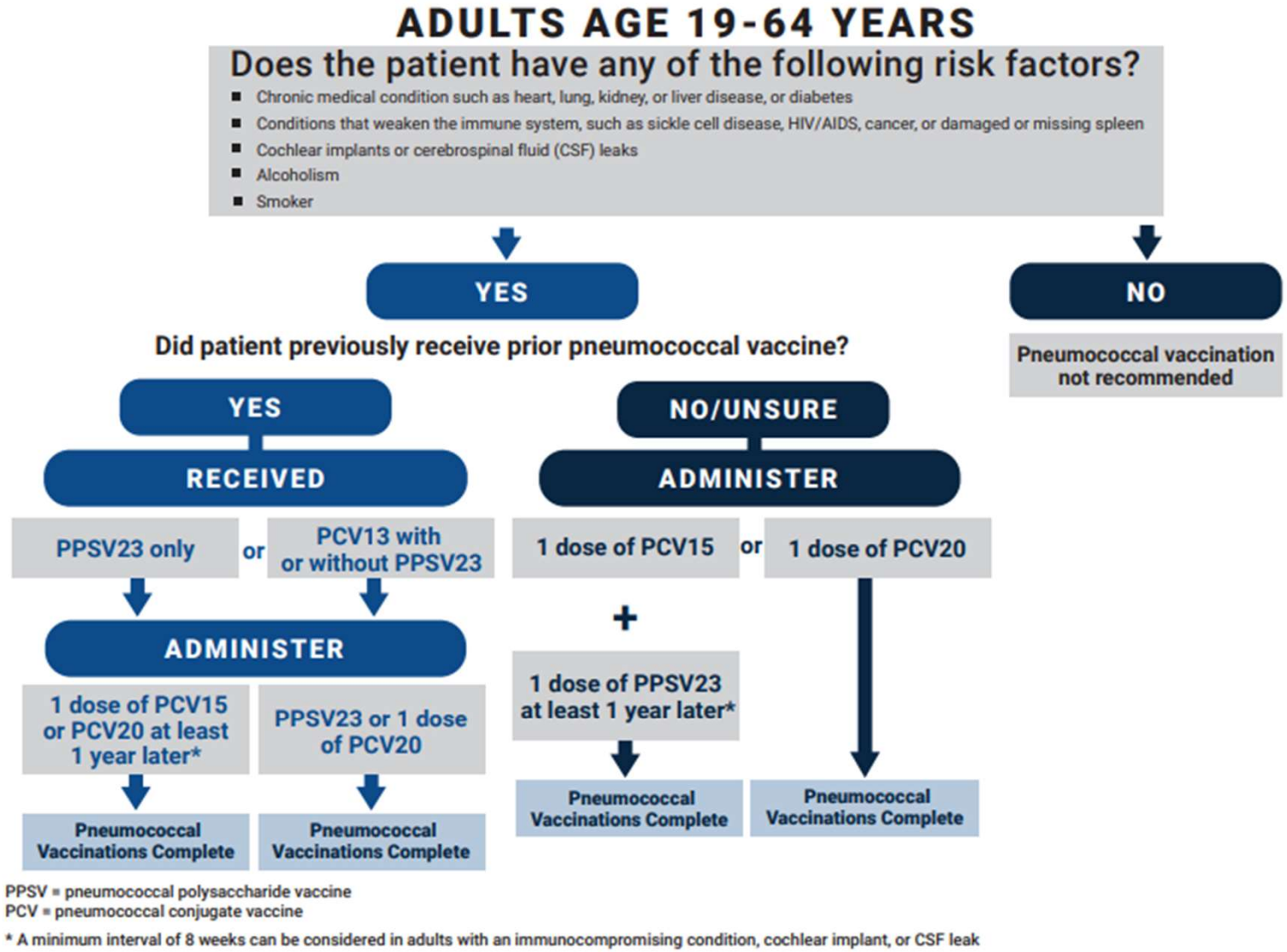
Vaccine	Who by Age	Series and Frequency
Hepatitis B Vaccine	Less than 60 years*	2-3 dose series
Human papilloma virus (HPV)	Up to 26 years (may be considered for 27-45)*	3 doses over 6 months
Influenza (avoid live attenuated vaccine)	All	Annually 
*Pneumococcal Conjugate Vaccine (PCV15, PCV20)	19-64 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+
Tetanus, diphtheria, pertussis (TDAP)	All adults; extra dose during pregnancy	Booster every 10 years.
Herpes 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.

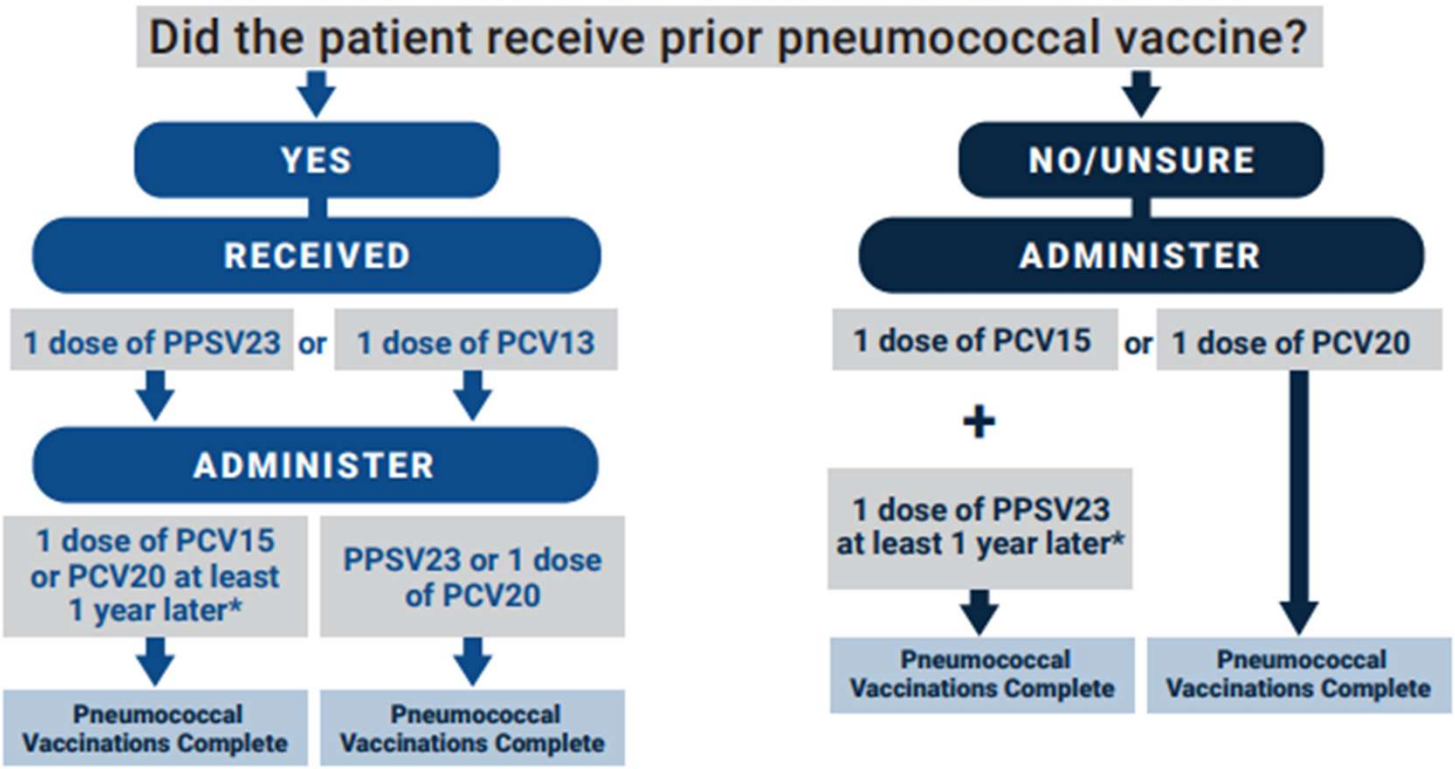
For educational purposes only. www.DiabetesEd.net

Pneumococcal Vaccine for US Adults



PNEUMOCOCCAL VACCINE FOR US ADULTS

ADULTS AGE 65 YEARS AND OLDER



PPSV = pneumococcal polysaccharide vaccine
PCV = pneumococcal conjugate vaccine

* A minimum interval of 8 weeks can be considered in adults with an immunocompromising condition, cochlear implant, or CSF leak

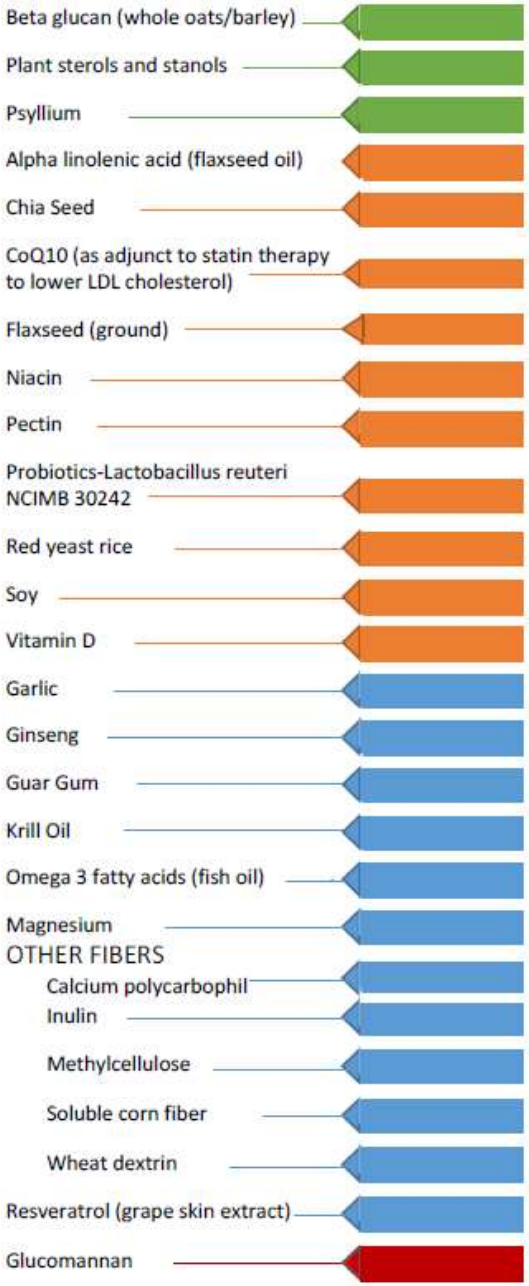
National Foundation for Infectious Diseases

www.nfid.org/pneumococcal

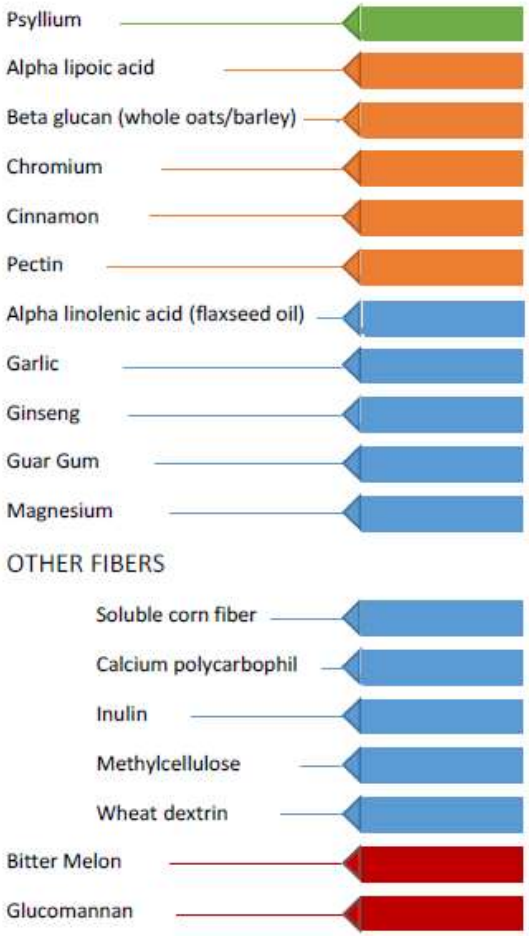
Social History and Med Taking

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

Supplements to Help Manage Total Cholesterol, LDL, and HDL



Supplements to Help Lower Blood Sugar



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Diabetes Education SERVICES

www.DiabetesEd.net

Supplement Safety Ratings from Cleveland Clinic

Safety Rating Color Key

Recommended: Several well-designed studies in humans have shown positive benefit. Our team is confident about its therapeutic potential.

Recommended with Caution: Preliminary studies suggest some benefit. Future trials are needed before we can make a stronger recommendation.

Not Recommended-Evidence: Our team does not recommend this product because clinical trials to date suggest little to no benefit.

Not Recommended-High Risk: Our team recommends against using this product because clinical trials suggest substantial risk is greater than the benefit

This content was adapted from The Cleveland Clinic Wellness flyer. For more detailed information, access full supplement review at www.clevelandclinicwellness.com/supp review

2021

Diabetes Bingo
“DiaBingo” Shout out Right Answer

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

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

Factors that Increase Hypo Risk

- Longer duration of diabetes
- Use of insulin or insulin secretagogues (i.e., sulfonylureas, meglitinides)
- Impaired kidney or hepatic function
- Alcohol use
- Polypharmacy (especially ACE inhibitors, angiotensin receptor blockers, nonselective β-blockers)

- Frailty and older age
- Cognitive impairment
- Impaired counterregulatory response, hypoglycemia unawareness
- Physical or intellectual disability that may impair behavioral response to hypoglycemia

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

Nuha A. ElSayed; Grazia Aleppo; Vanita R. Aroda; Raveendhara R. Bannuru; Florence M. Brown; Dennis Bruemmer; Billy S. Collins; Kenneth Cusi; Marisa E. Hilliard; Diana Isaacs; Eric L. Johnson; Scott Kahan; Kamlesh Khunti; Jose Leon; Sarah K. Lyons; Mary Lou Perry; Priya Prahalad; Richard E. Pratley; Jane Jeffrie Seley; Robert C. Stanton; Robert A. Gabbay on behalf of the American Diabetes Association

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

Hypoglycemia: Identify, Treat, & Prevent

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

SCAN ME

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:

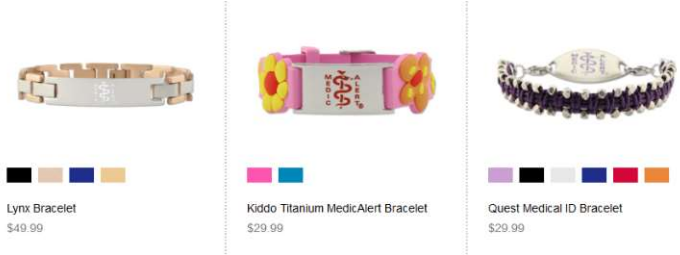
Level 1 – Glucose less than 70
Level 2 – Glucose less than 54
Level 3 - Severe, needs assistance

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

Medic Alert for those on Insulin

LaurensHope.Com



MedicAlert.org

Elegant Medical Alert

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

Sulfonylureas

- Second generation: glipizide, glimepiride, glyburide
- Dosed 1-2x daily before meals
- Mechanism: Stimulate beta cells in the pancreas to release insulin
- Adverse effects
  - Hypoglycemia, Weight gain
- Beta cell burnout? - Decreased longevity
- Low cost, effective A1C lowering

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	

Case Study Ken – Poll

Ken is a 67yoM with type 2 diabetes x 5 years. He complains of dizziness/shakiness 3x/week. Last A1C=6.7%. Which of his medications is most likely causing hypoglycemia?

A. Metformin

B. Sitagliptin (Januvia)

C. Glimepiride (Amaryl)

D. Pioglitazone (Actos)

Reducing Hypoglycemia

- Which are the only diabetes meds that directly cause hypoglycemia?

- ❑ Insulin
- ❑ Secretagogues (sulfonylureas, glitinides)

Diabetes Care 2023;46(Suppl. 1):S125-S143.

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	< 4 yrs: not recommended 4 yrs or older | 3mg dose	Approved Age 4+ 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).

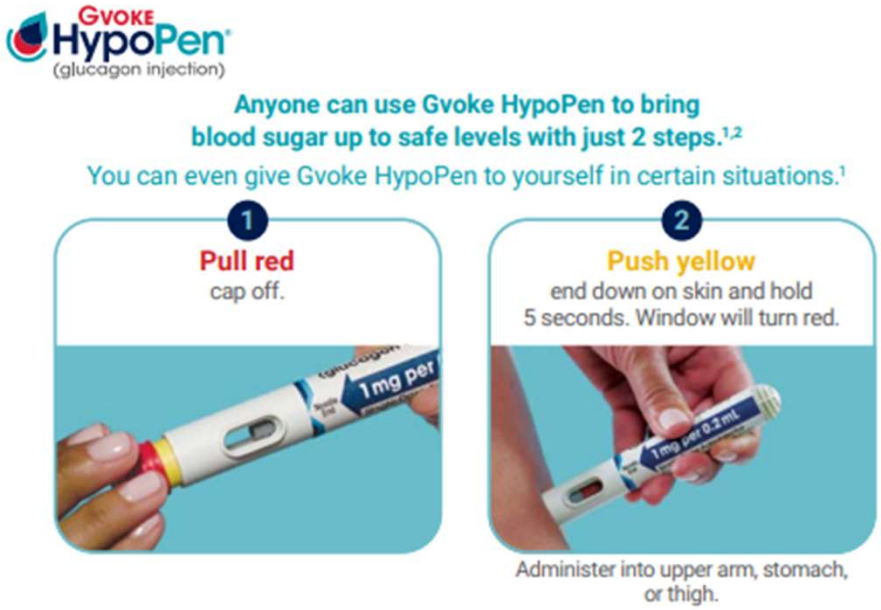
All raise BG 20+ points. Can cause nausea, vomiting. After admin, roll person on side. Seek medical help. If no response after 1st dose, give 2nd dose in 15 mins. When awake, give oral carbs ASAP when safe to swallow. Please consult package insert for detailed info.

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

Glucagon Rescue Meds

Glucagon Emergency Kit

Zegalogue Injector



Gvoke HypoPen

Baqsimi Nasal Powder

Quick Question

- JZ is excited about his A1c of 5.4%. He takes rapid acting insulin 4-6 times a day using a pen to keep his BG to target. Plus, adjusts glargine as needed if his pm BG is elevated. What is your biggest concern?

A. Does he change his needle each time?

B. Why is he adjusting glargine?

C. Is he adjusting insulin for exercise?

D. How many hypoglycemic events per week?

Preventing Hypoglycemia

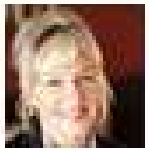
Nocturnal Lows

- If bedtime glucose <110, reduce meds
- If increased daytime activity, may need extra snack
- Eval pre-dinner insulin/meds

Other

- Monitor kidney function / wt loss
- Monitor BG trends
- Too much meds?
- Skipped /delayed meals?
- Plan ahead
- Alcohol precautions
- Exercise planning
- CGM

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



Diabetes Education Services

Published by Beverly Thomassian [?] · July 7 ·

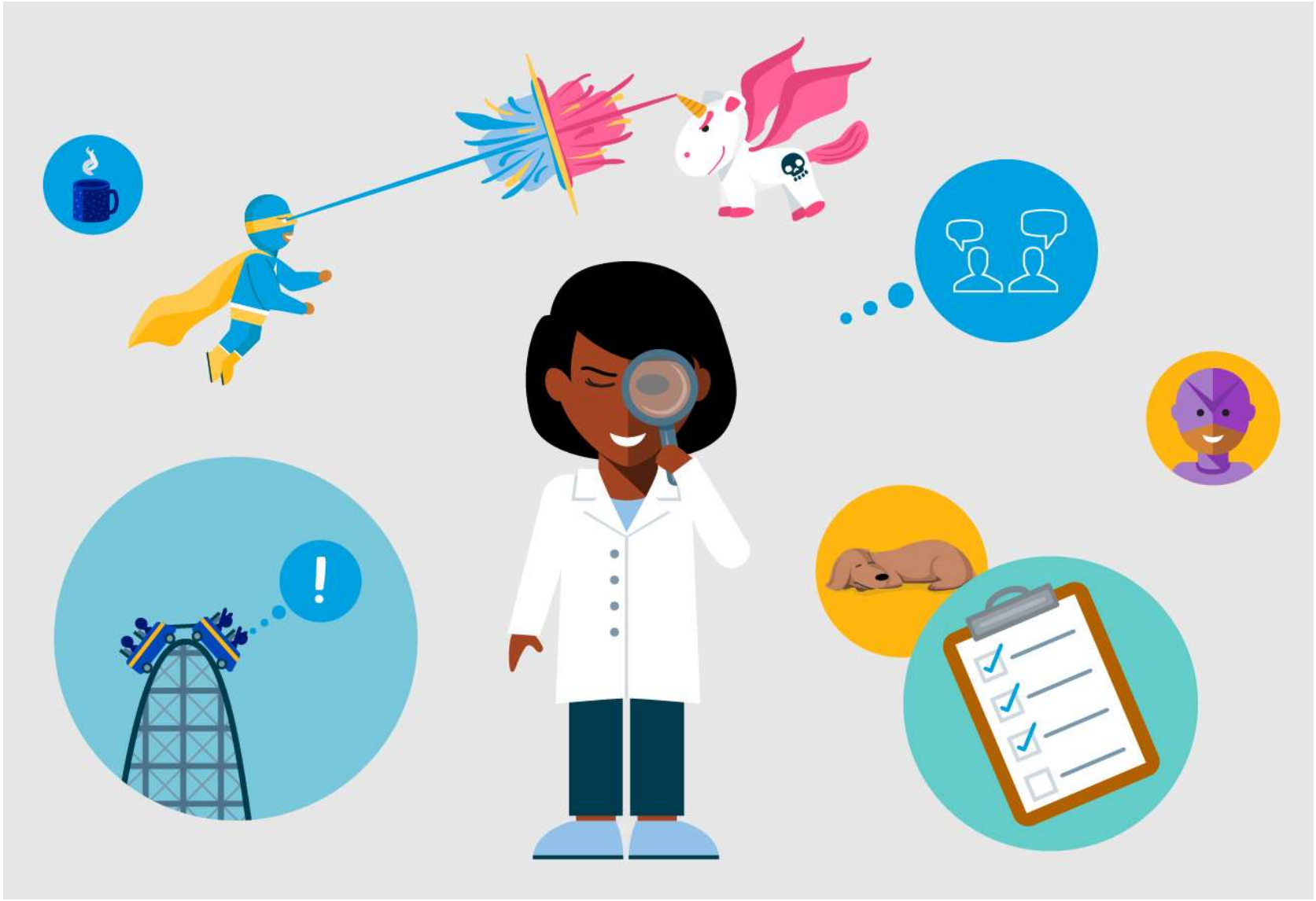
Kindness matters!
Learning to be less harsh or judgmental and more compassionate to oneself may help people with diabetes manage their disease and stave off depression, a recent study suggests.

Self-compassion may help people with diabetes achieve better glucose control and less depression

By Reyna Gobel(Reuters Health) – Learning to be less harsh or judgmental and more...

REUTERS.COM | BY REYNA GOBEL

Landmark Trials



Quick Question

Which study demonstrated that keeping A1c less than 7% reduces complications for Type 1?

a. Diabetes Prevention Trial
b. Diabetes Control and Complications Trial
c. United Kingdom Prospective Diabetes Study
d. YOUTH Trial

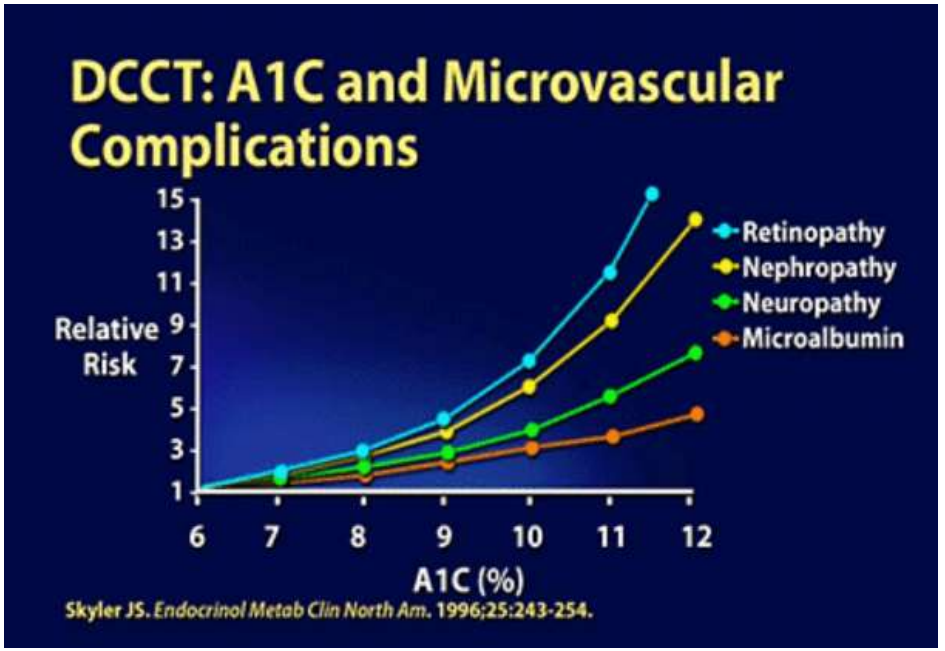
Diabetes Control and Complications Trial (DCCT) Type 1 – Does getting A1c <7% matter?

The largest, most comprehensive diabetes study ever conducted.

10 year study involved more than 1400 subjects with Type 1 DM.

Compared the effects of two treatment regimens:

- standard therapy and
- intensive control-on the complications of diabetes.



DCCT Conclusions

By maintaining A1C < 7%:

- Eye disease - 76% reduced risk
- Kidney disease - 50% reduced risk
- Nerve disease - 60% reduced risk

Management elements included:

- SMBG 4 or more times a day
- 4 daily insulin injections or insulin pump
- Greater risk of hypoglycemia
- More associated weight gain

UKPDS Results

United kingdom Prospective Diabetes Study

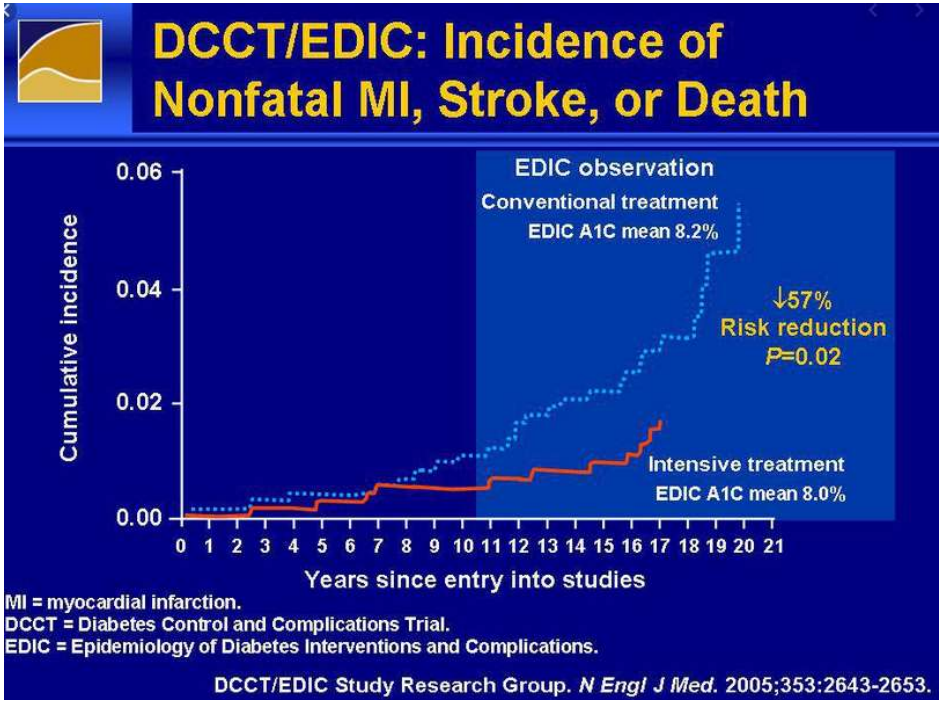
- Conducted over 20 years involving over 5,100 patients with Type 2 diabetes

- 1% decrease in A_1c reduces microvascular complications by 35%
- 1% decrease in A_1c reduces diabetes related deaths by 25%
- B/P control (144/82) reduced risk of:
  - Heart failure (56%)
  - Stroke (44%)
  - Death from diabetes (32%)

Lancet 352: 837-865, 1998

“Legacy Effect”

- For participants of DCCT and UKPDS
  - long lasting benefit of early intensive BG control prevents
    - Microvascular complications
    - Macrovascular complications (15-55% decrease)
  - Even though their BG levels increased over time
  - Message – Catch early and Treat aggressively

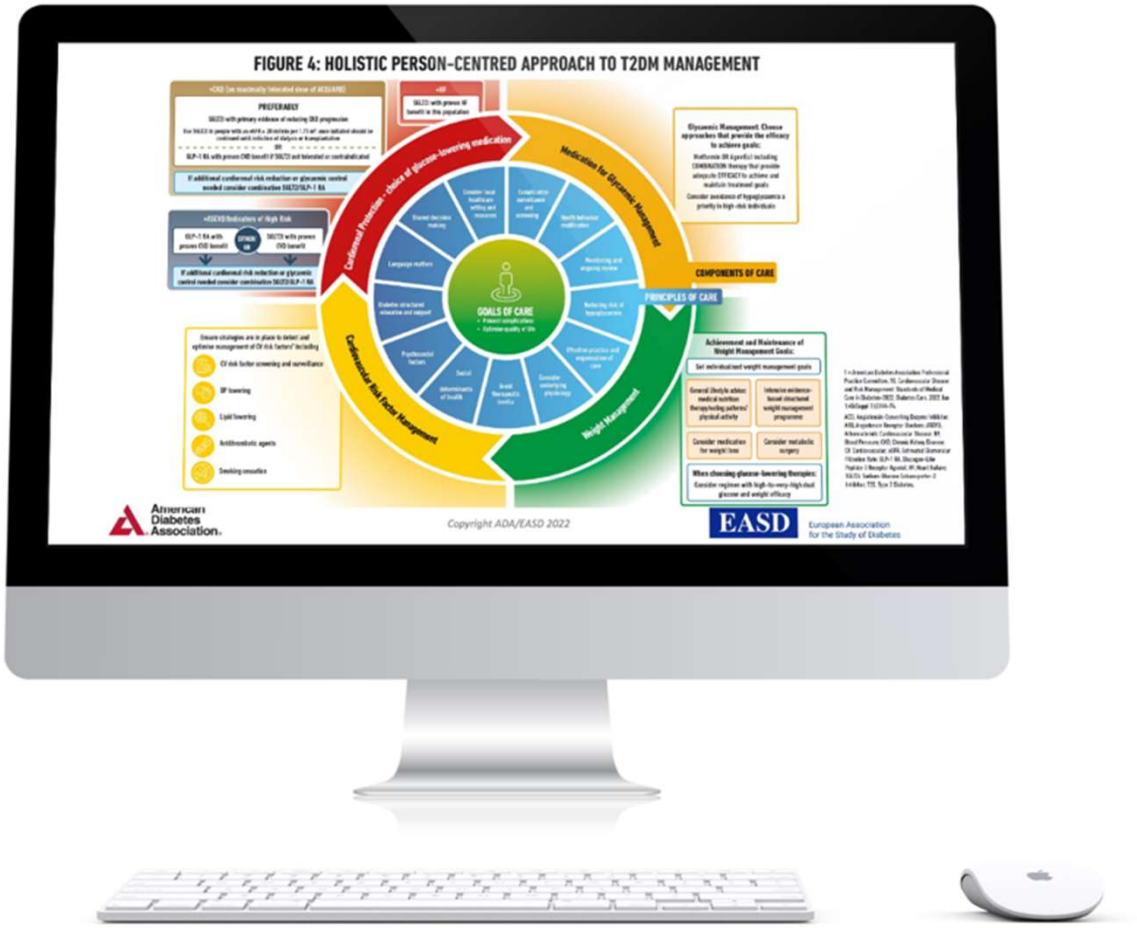


Question and Break Time – 3:05

- Energizing Ideas
  - Dance
  - Walk outside
  - Enjoy a snack
  - Hydrate with spa water
  - Stretch and Breathe

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* FREE

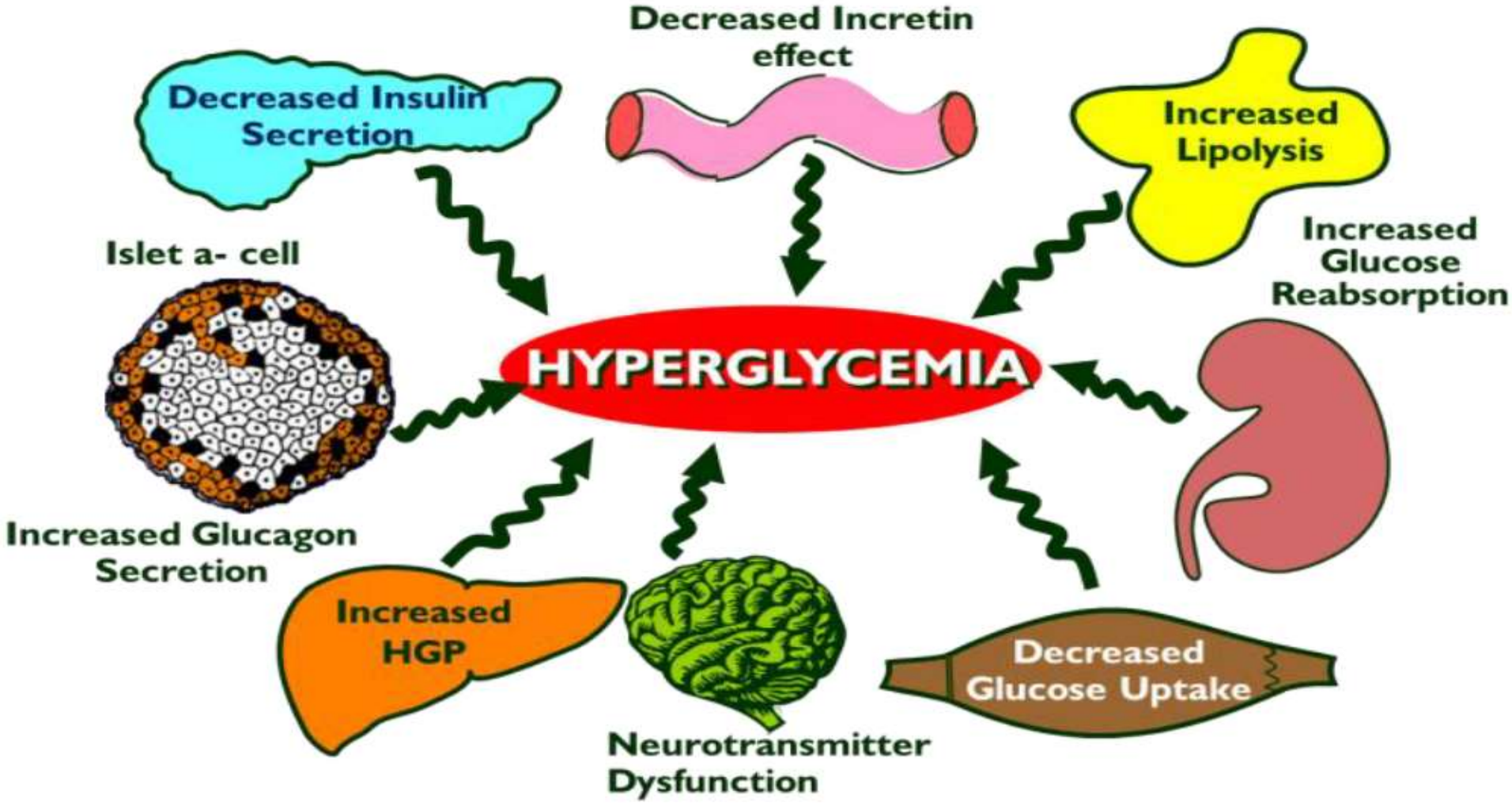
What the Rx?

Now on to other diabetes medications we haven't yet covered

How Many Drug Options for Diabetes?

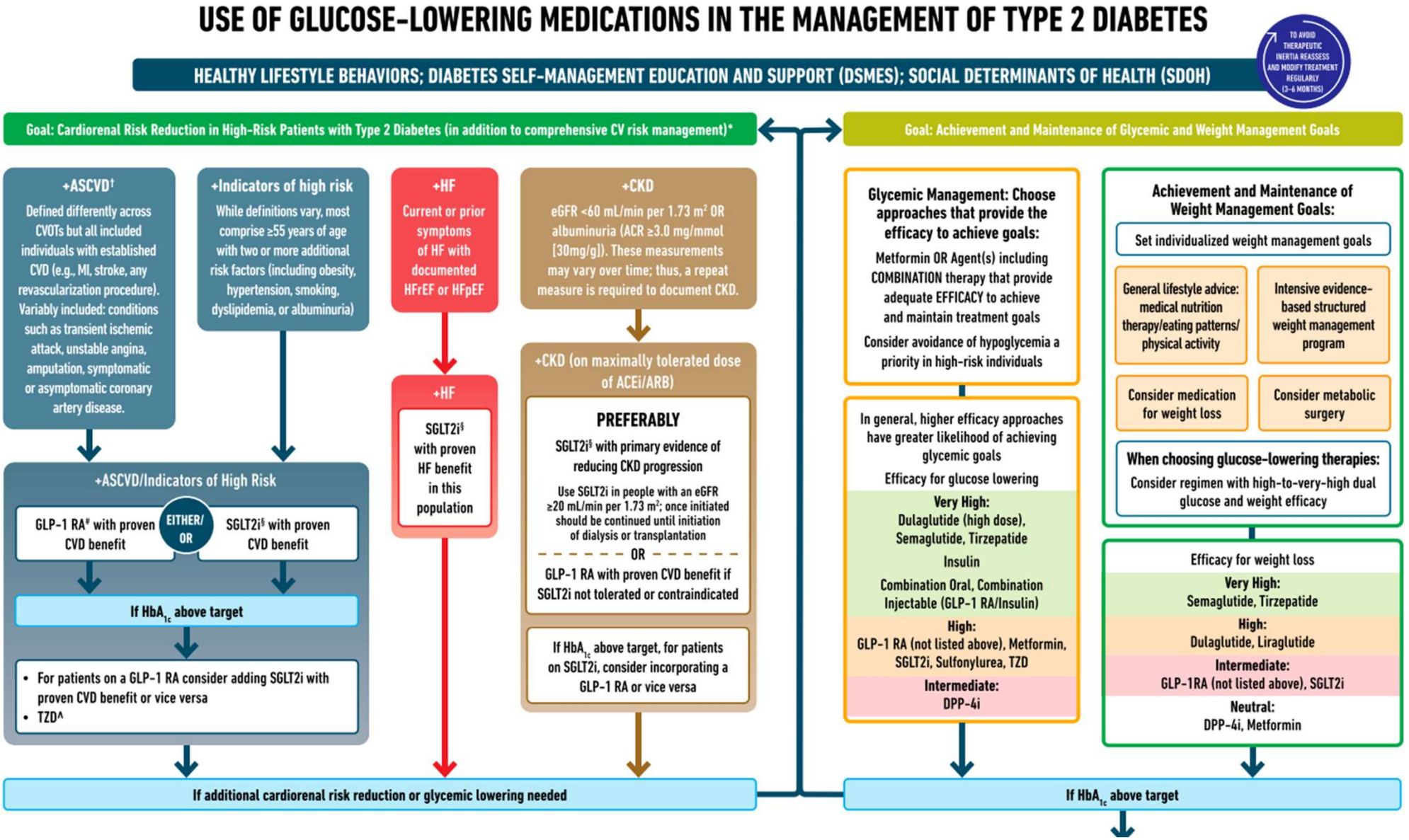
- Biguanide
- Sulfonylureas
- Meglitinides
- Thiazolidinediones (TZD's)
- Dipeptidylpeptidase-4 (DPP-4) inhibitors
- Glucagon-like-peptide-1 (GLP-1) receptor agonists
- GLP/GIP receptor agonist
- Sodium glucose cotransporter-2 (SGLT-2) inhibitors
- Bile acid sequestrant
- Dopamine-2-agonist
- Amylin mimetic
- Alpha-glucosidase inhibitors
- Insulin

Drug Targets in Diabetes



DeFronzo et al. Diabetes Spectrum Volume 27, Number 2, 2014

ADA Management of Hyperglycemia Type 2



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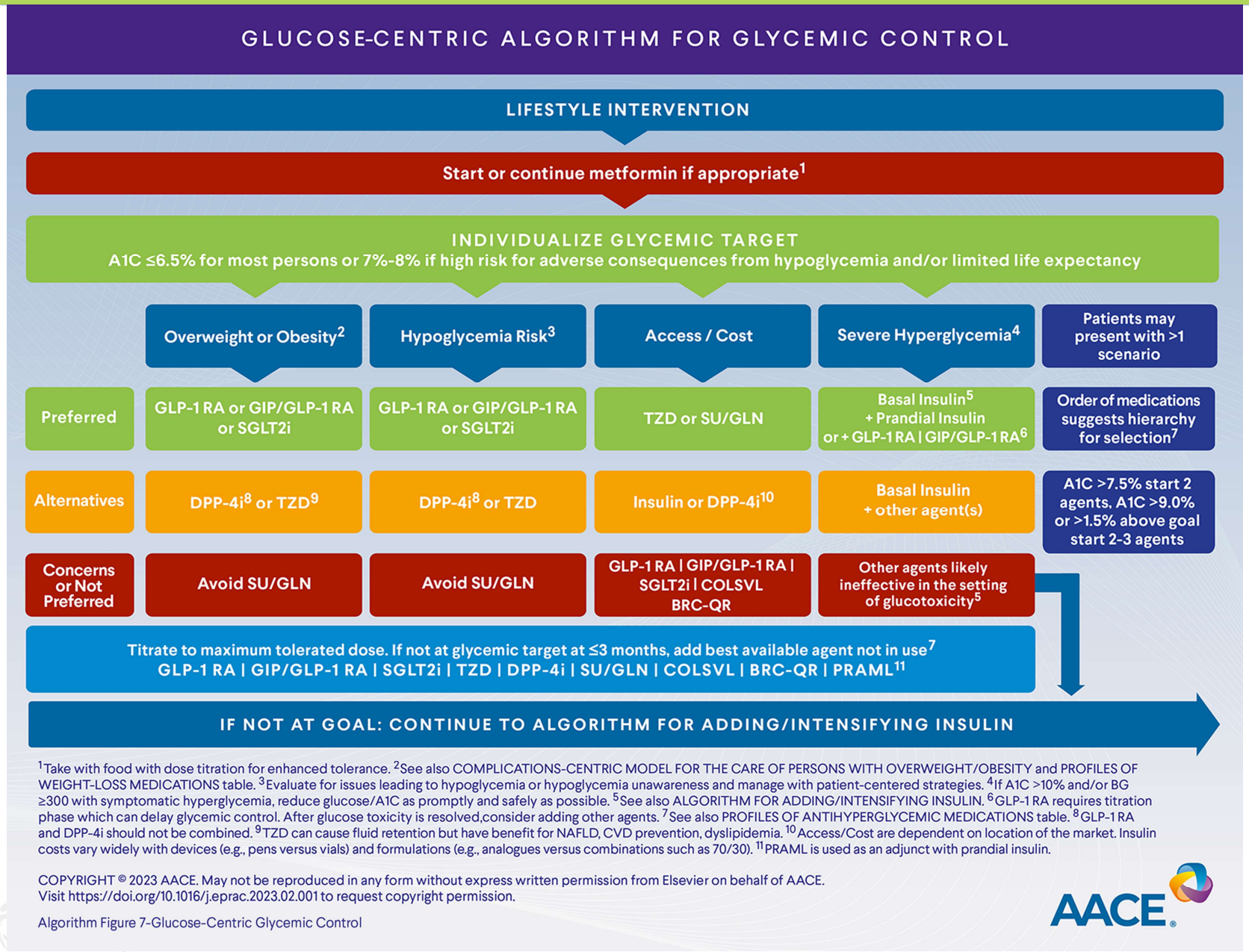
AACE 2023 Diabetes Guideline

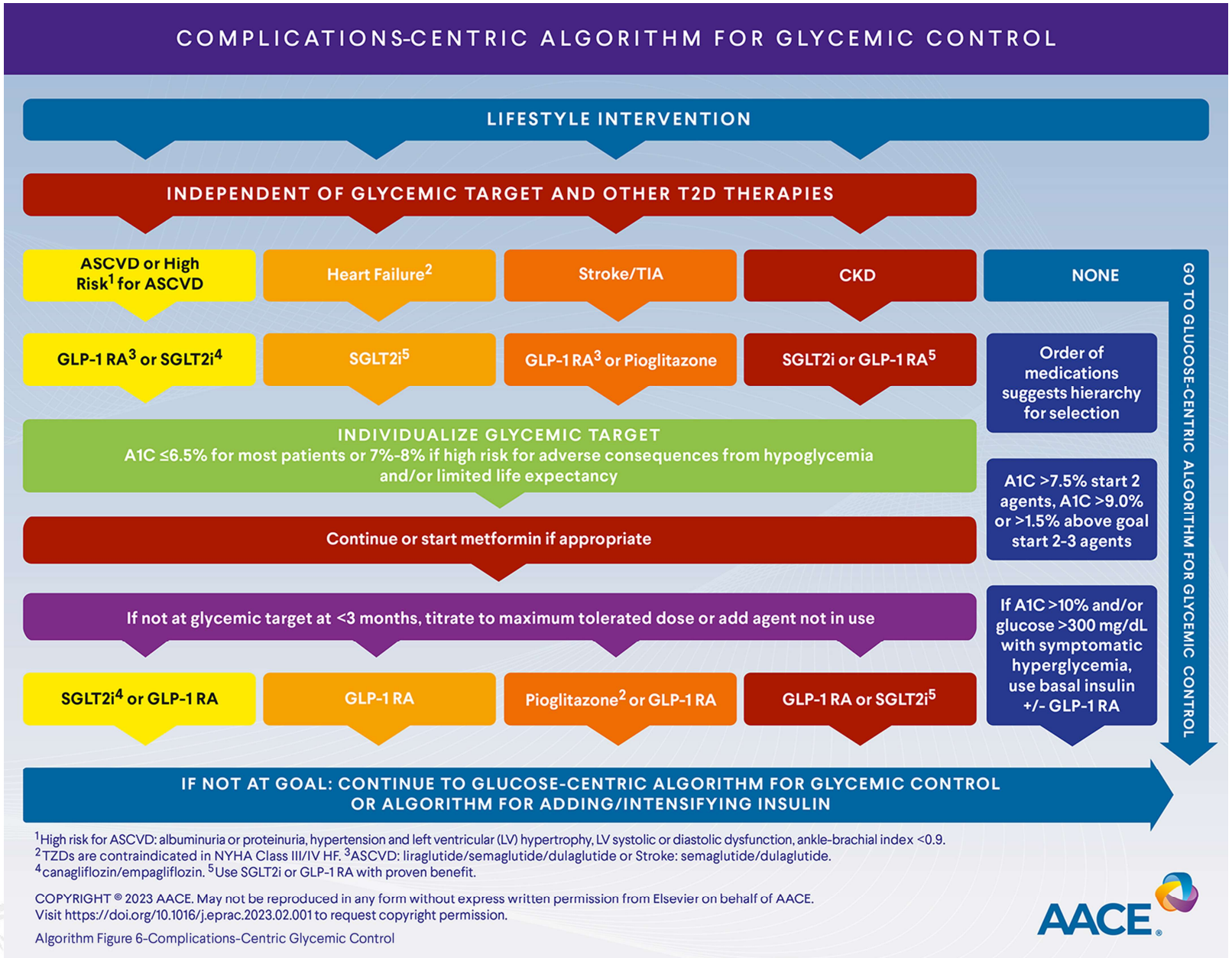


[1]Take with food with dose titration for enhanced tolerance. [2]See also COMPLICATIONS-CENTRIC MODEL FOR THE CARE OF PERSONS WITH OVERWEIGHT/OBESITY and PROFILES OF WEIGHT-LOSS MEDICATIONS table. [3]Evaluate for issues leading to hypoglycemia or hypoglycemia unawareness and manage with patient-centered strategies. [4]If A1C >10% and/or BG ≥300 with symptomatic hyperglycemia, reduce glucose/A1C as promptly and safely as possible. [5]See also ALGORITHM FOR ADDING/INTENSIFYING INSULIN. [6]GLP-1 RA requires titration phase which can delay glycemic control. After glucose toxicity is resolved,consider adding other agents. [7]See also PROFILES OF ANTIHYPERGLYCEMIC MEDICATIONS table. [8]GLP-1 RA and DPP-4i should not be combined. [9]TZD can cause fluid retention but have benefit for NAFLD, CVD prevention, dyslipidemia. [10]Access/Cost are dependent on location of the market. Insulin costs vary widely with devices (e.g., pens versus vials) and formulations (e.g., analogues versus combinations such as 70/30). [11]PRAML is used as an adjunct with prandial insulin.

Algorithm Figure 7-Glucose-Centric Glycemic Control

AACE

AACE 2023 Diabetes Guideline



[1]High risk for ASCVD: albuminuria or proteinuria, hypertension and left ventricular (LV) hypertrophy, LV systolic or diastolic dysfunction, ankle-brachial index <0.9.
[2]TZDs are contraindicated in NYHA Class III/IV HF. [3]ASCVD: liraglutide/semaglutide/dulaglutide or Stroke: semaglutide/dulaglutide.
[4]canagliflozin/empagliflozin. [5]Use SGLT2i or GLP-1 RA with proven benefit.

Algorithm Figure 6-Complications-Centric Glycemic Control

Thiazolidendiones (TZD's)

- TZD's include pioglitazone, rosiglitazone
- Dosed once daily without regard to food
- Mechanism: activates the nuclear transcription factor PPAR-gamma, increases peripheral insulin sensitivity
- Adverse effects
  - Bone fractures, Edema/fluid retention, Weight gain
- Avoid in heart failure
- Association with bladder cancer (pioglitazone)
- 12 weeks to full effect

Thiazolidinediones "TZDs" • Increases insulin sensitivity	pioglitazone (Actos) rosiglitazone (Avandia)	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%

TZDs – How Do They Rate?

Question	Answer
Cause hypoglycemia?	No
Cause weight gain?	Yes
Affordable?	Generic
Lowers CV risk?	??
Can most tolerate /use?	Watch
	HF

Alpha-glucosidase Inhibitors

- **Action**: blocks enzymes that digest starches in the small intestine
- **Name**: acarbose (Precose) or miglitol (Glyset)
  - Dosing: 25-100mg TID, max 300mg/day
- Efficacy
  - Decrease postprandial glucose 40-50 mg/dl
  - Decrease A1C 0.5-1.0%
- Other Effects
  - Flatulence or abdominal discomfort
  - Contraindicated in patients with inflammatory bowel disease or cirrhosis
- Special Consideration
  - In case of hypoglycemia, treat with glucose tabs or milk
  - (other starches are blocked by medication)

Check Your Knowledge

Which of the following medications is **least** affordable?

A. Pioglitazone (Actos)
B. Metformin (Glucophage)
C. Glimepiride (Amaryl)
D. Ozempic (semaglutide)

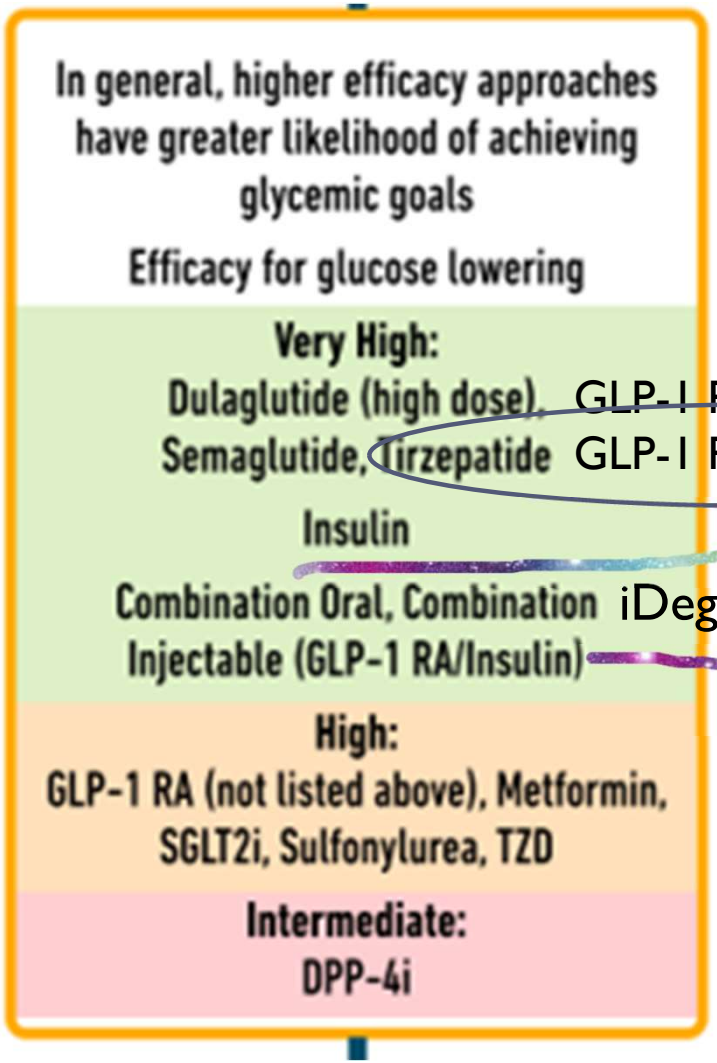
Medication Cost Considerations

- Lowest cost medications - AWP for a month
  - Metformin - $3
  - Sulfonylureas $3
  - TZD – Pioglitazone $3
  - Lower cost insulin
  - Brenzavvy-$48, costplus
  - Insulin-$35
- Highest cost medications – AWP for a month
  - GLP-1 RA - $1000+
  - GLP-1/GIP RA - 1000+
  - SGLT2i - $650
  - DPP-IV's - $550-600

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.

ADA Algorithm 2023



GLP-1 RAs; Trulicity, Ozempic

GLP-1 RA & GIP; Mounjaro

iDegLira, iGlarLixi

Combo Oral

Medications	Doses in mg
Trijardy XR (3 meds) empagliflozin linagliptin metformin XR	 5 - 25 2.5 -5 1000
Invokamet (canagliflozin/ metformin)	50/500 or 50/1000 150/500 or 150/1000
Synjardy (empagliflozin/ metformin)	5/500 or 12.5/500 5/1000 or 12.5/1000
Synjardy XR (empagliflozin/ metformin XR)	5/1000 or 10/1000 12.5/1000 or 25/1000
Xigduo XR (dapagliflozin/ metformin)	5/500 or 10/500 5/1000 or 10/1000

Insulin/Injectable Combos

PocketCards updated annually. Download FREE CDCES Coach App for latest updates and notifications.

Name	Combines	Considerations
IDegLira* Xultophy 100/3.6	Insulin degludec (IDeg or Tresiba) Ultra long insulin + Liraglutide (Victoza) GLP-1 Receptor Agonist (GLP-1 RA)	**Xultophy 100/3.6 pre-filled pen** = 100 units IDeg / 3.6 mg liraglutide per mL Once daily injection – Dose range 10 to 50 = 10 – 50 units IDeg + 0.36 -1.8 mg liraglutide **Recommended starting dose:** • 16 IDegLira (= 16 units IDeg + 0.58 mg liraglutide) Titrate dose up or down by 2 units every 3-4 days to reach target. Supplied in package of five single-use 3mL pens. Once opened, good for 21 days. AWP $944
iGlarLixi* Soliqua 100/33	Insulin glargine (Lantus) Basal Insulin + Lixisenatide (Adlyxin) GLP-1 Receptor Agonist	**Soliqua 100/33 Solostar Pen** = 100 units glargine / 33 µg lixisenatide per mL Once daily injection an hour prior to first meal of day. Dose range 15 – 60 = 15-60 units glargine + 5 – 20µg lixisenatide **Recommended starting dose:** • 15 units if not meeting glucose target on 30 units basal insulin or GLP-1 RA • 30 units if not meeting glucose target on 30-60 units basal insulin or GLP-1 RA Titrate dose up or down by 2-4 units every week to reach target. Supplied in package of five single-use 3mL pens. Once opened, good for 14 days. AWP $646

*Discontinue basal insulin /GLP-1 RA therapy before starting. If dose missed, resume with next usual scheduled dose.

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

Combo Oral Medications PocketCard™

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Medications	Doses in mg	Medications	Doses in mg	Medications	Doses in mg
Trijardy XR (3 meds) empagliflozin linagliptin metformin XR	 5 - 25 2.5 -5 1000	Janumet (sitagliptin/ metformin)	50/500 50/1000	Prandimet (repaglinide/ metformin)	1/500 2/500
ACTOplus Met* (pioglitazone/ metformin)	15/500 15/850	Janumet XR (sitagliptin/ metformin)	50/500 50/1000 or 100/1000	Qtern (saxagliptin / dapagliflozin)	5/10
ACTOplus Met XR (pioglitazone/ metformin	15/1000 30/1000	Jentadueto (linagliptin/ metformin)	2.5/500 2.5/850 or 2.5/1000	Segluromet (ertugliflozin/ metformin)	2.5/500 or 2.5/1000 or 7.5/500 or 7.5/1000
Duetact* (pioglitazone/ glimepiride)	30/2 30/4	Kazano (alogliptin/ metformin)	12.5/500 12.5/1000	Steglujan (ertugliflozin/ sitagliptin)	5/100 or 15/100
Glucovance* (glyburide/ metformin)	1.25/250 2.5/500 5/500	Kombliglize XR (onglyza/metformin XR)	2.5/1000 5/500 or 5/1000	Synjardy (empagliflozin/ metformin)	5/500 or 12.5/500 5/1000 or 12.5/1000
Glyxambi (empagliflozin and linagliptin)	10/5 25/5	Metaglip* (glipizide/ metformin)	2.5/250 2.5/500 or 5/500	Synjardy XR (empagliflozin/ metformin XR)	5/1000 or 10/1000 12.5/1000 or 25/1000
Invokamet (canagliflozin/ metformin)	50/500 or 50/1000 150/500 or 150/1000	Oseni (alogliptin/ pioglitazone)	12.5/15 or 25/15 12.5/30 or 25/30 12.5/45 or 25/45	Xigduo XR (dapagliflozin/ metformin)	5/500 or 10/500 5/1000 or 10/1000

Available in generic. Observe precautions of each component drug.

Diabetes + CKD – Increases CVD Risk

- Chronic kidney disease (CKD) is a frequent complication in diabetes
  - Type 1 diabetes ~30%
  - Type 2 diabetes ~40%
- In several studies, participants on SGLT2i with GFRs of 30-60 (stage 3) reduced ASCVD risk and improved renal function
  - Slowed kidney disease or death
  - Reduced albuminuria

National Kidney Foundation.
https://www.kidney.org/atoz/content/diabetes

ADA 2023 Standard 11 - Chronic Kidney Disease and Risk Management

- Optimize glucose and BP to protect kidneys
- Screen Urine Albumin Creatinine 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 ACEI 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* FREE

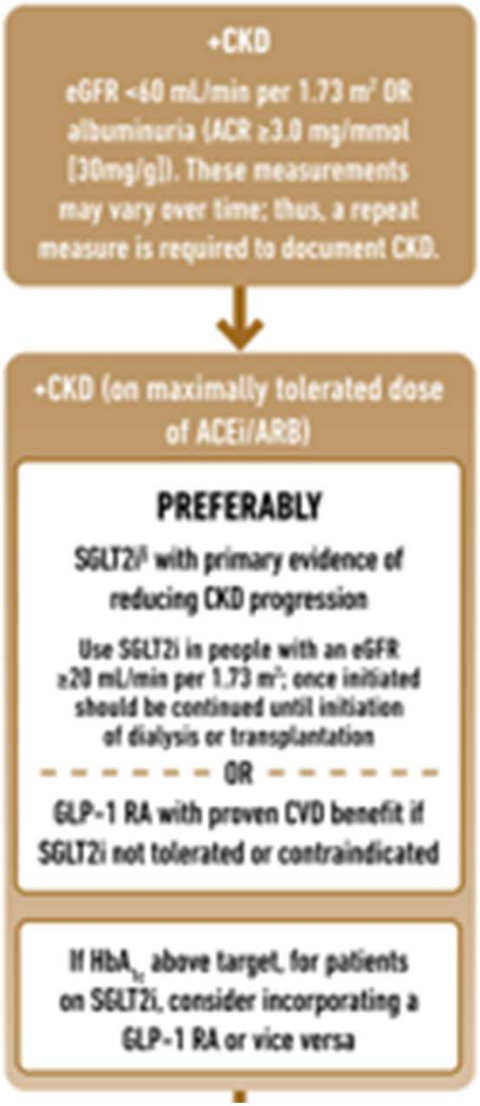
CKD Heat Map

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

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

Chronic Kidney Disease (CKD)

- Preferably use SGLT2i with primary evidence of reducing CKD progression if DKD (eGFR 30-60) and albuminuria (ex. UACR >200)
  - Canagliflozin (Invokana), dapagliflozin (Farxiga), empagliflozin (Jardiance)
- If can't tolerate, use GLP-1 RA with proven CVD benefit to reduce CV Event Risk
  - Semaglutide (Ozempic), liraglutide (Victoza), dulaglutide (Trulicity)



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SGLT2 Inhibitor CKD Evidence Summary

Trial Name	SGLT2 Inhibitor vs placebo	Outcomes (Primary Bolded)
CREDENCE	Canagliflozin	N=4401, Median follow-up 2.6 years, Prior CVD 50.4% **ESRD, doubling of create or death from renal or CV cause** (primary): 0.70 (0.59-0.82), 3 point MACE 0.80 (0.67-0.95)
DAPA-CKD	Dapagliflozin	N=4304, 2906 with diabetes, Median follow-up 2.4 years, Prior CVD 37.4% **>50% decline in eGFR, ESKD or renal/CV death (primary**): 0.61 (0.51-0.72)
EMPA-Kidney	Empagliflozin	N=6609, Median follow-up 2.0 years, Prior CVD 27%, 46% with DM **ESRD, >40% decline in eGFR, ESKD, or renal/CV death (primary**): 0.72 (0.64-0.82), stopped early due to positive benefit

Perkovic V, Jardine MJ, Neal B, et al. Canagliflozin and renal outcomes in type 2 diabetes and nephropathy. N Engl J Med. 2019;380:2295–2306.
Heerspink HJL, Stefansson BV, Correa-Rotter R, et al. Dapagliflozin in patients with chronic kidney disease. N Engl J Med. 2020;383:1436–1446.
EMPA-KIDNEY Collaborative Group, Herrington WG, Staplin N, Wanner C, et al. Empagliflozin in Patients with Chronic Kidney Disease. N Engl J Med. 2022 Nov 4. doi: 10.1056/NEJMoa2204233. Epub ahead of print. PMID: 36331190.

SGLT-2 Inhibitor Dosing & Indication

Once an SGLT2i is initiated, it is reasonable to continue an SGLT2i even if the eGFR falls below 20 ml/min/1.73 m2 , unless it is not tolerated or kidney replacement therapy is initiated.

Drug	Dose	Renal Adjustment	FDA Approved Indications
Ertugliflozin (Steglatro)	5-15 mg daily	Not recommended for eGFR < 45	As an adjunct to diet and exercise to improve glycemic control in adults with T2DM (All)
Dapagliflozin (Farxiga)	5-10 mg daily	Not recommended for eGFR <45 (glycemic control) or <25: avoid initiation, may continue for CV, CKD benefits	• To reduce the risk of hospitalization for HF in adults with T2DM and established CVD or multiple CV risk factors. • To reduce the risk of CV death and hospitalization for HF in adults with NYHA class II-IV with reduced ejection fraction. • To reduce the risk of sustained eGFR decline, ESKD, CV death, and hospitalization for HF in adults with CKD at risk of progression.
Empagliflozin (Jardiance)	10-25 mg daily	Not recommended for eGFR<30mL/min (glycemic control) or <20 :avoid initiation, may continue for CV, CKD benefits	• To reduce the risk of CV death in adults with T2DM and established CVD. • To reduce the risk of CV death and hospitalization for HF in adults with HF
Canagliflozin (Invokana)	100-300mg daily	eGFR 30 to <60:: 100 mg once daily eGFR < 30: avoid initiation, may continue 100mg daily until ESRD	• To reduce MACE in adults with T2DM and established CVD. • To reduce the risk of ESKD, doubling of serum creatinine, CV death, and hospitalization for HF in adults with T2DM and diabetic nephropathy with albuminuria >300 mg/day.
Bexagliflozin	20mg daily	Not recommended for eGFR < 30	As an adjunct to diet and exercise to improve glycemic control in adults with T2DM

Kidney Protective Med: Finerenone

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

Finereone's Place in Therapy

- In people with CKD and albuminuria who are at increased risk for CV events or CKD progression
  - a nonsteroidal mineralocorticoid receptor antagonist (finerenone) is recommended to reduce CKD progression and CV events.
- First optimize ACEI or ARB

ADA SOC 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 can be of concern

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

ADCES Focus – Diabetes Specialists and CVD Management

Demonstrate your expertise within the full range of cardiometabolic conditions: hypertension, obesity, prediabetes, diabetes and cardiac disorders.

CVD Resources (diabeteseducator.org)

Diabetes Bingo
“DiaBingo” Shout out Right Answer

DiaBingo - O

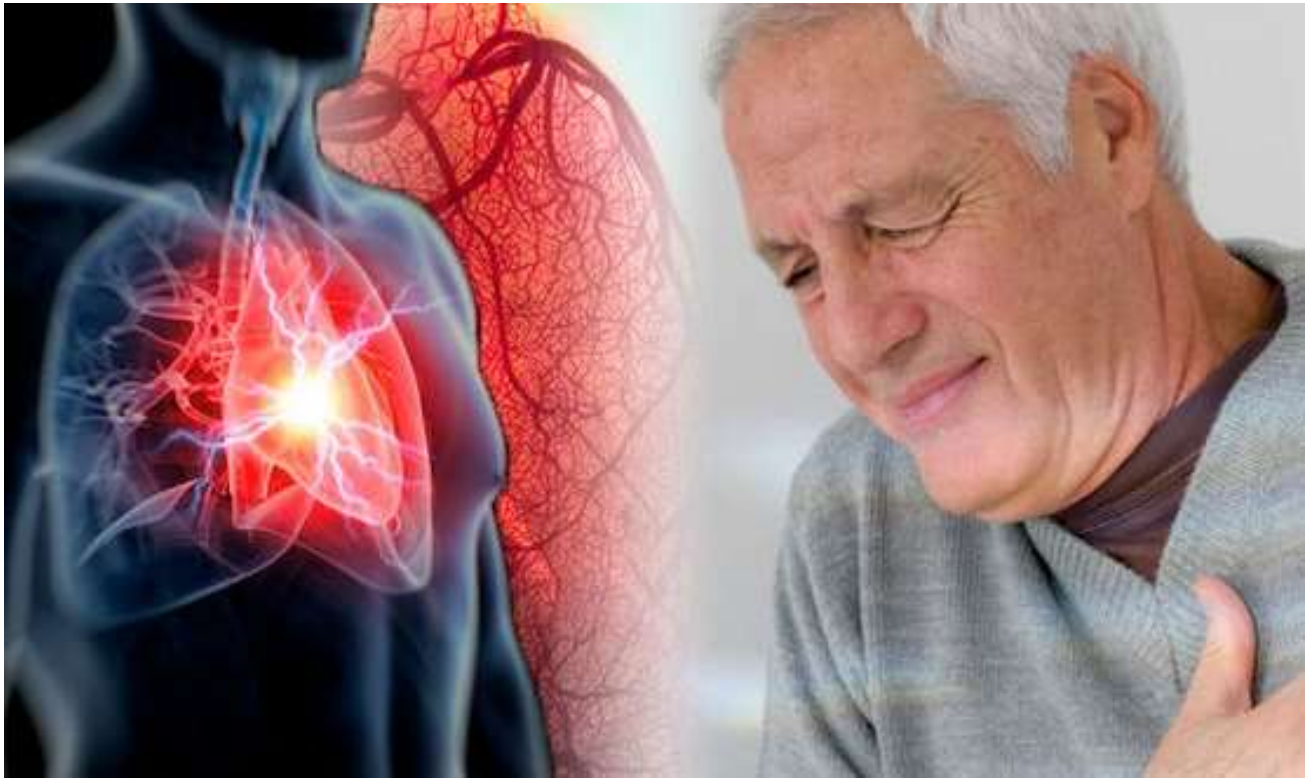
- SGLT-2 Inhibitors main action
- Januvia(sitagliptin) belongs to which class?
- These classes of diabetes pills increase insulin release
- Which treatments help lower elevated fasting BG
- On Acarbose (Precose) should treat hypo with ___
- On Metformin (Glucophage) stop med if GFR ___
- On which med should ind's know about hypoglycemia SE's
- Possible side effects of TZD's include
- Metformin can damage kidney function
- What warning for DPP- IV and GLP-1 RA
- GLP-1 Receptor agonists cause increased satiety
- Side effects of Canagliflozin (Invokana) include
- If GI side effects on Metformin try ____

Activity Break with Iris

- Iris McDuffie
- Activity Volunteer
- Scholarship Recipient

- Tomorrow
- Stephany Gholston

Cardiovascular Disease is the Leading Cause of Death in Diabetes



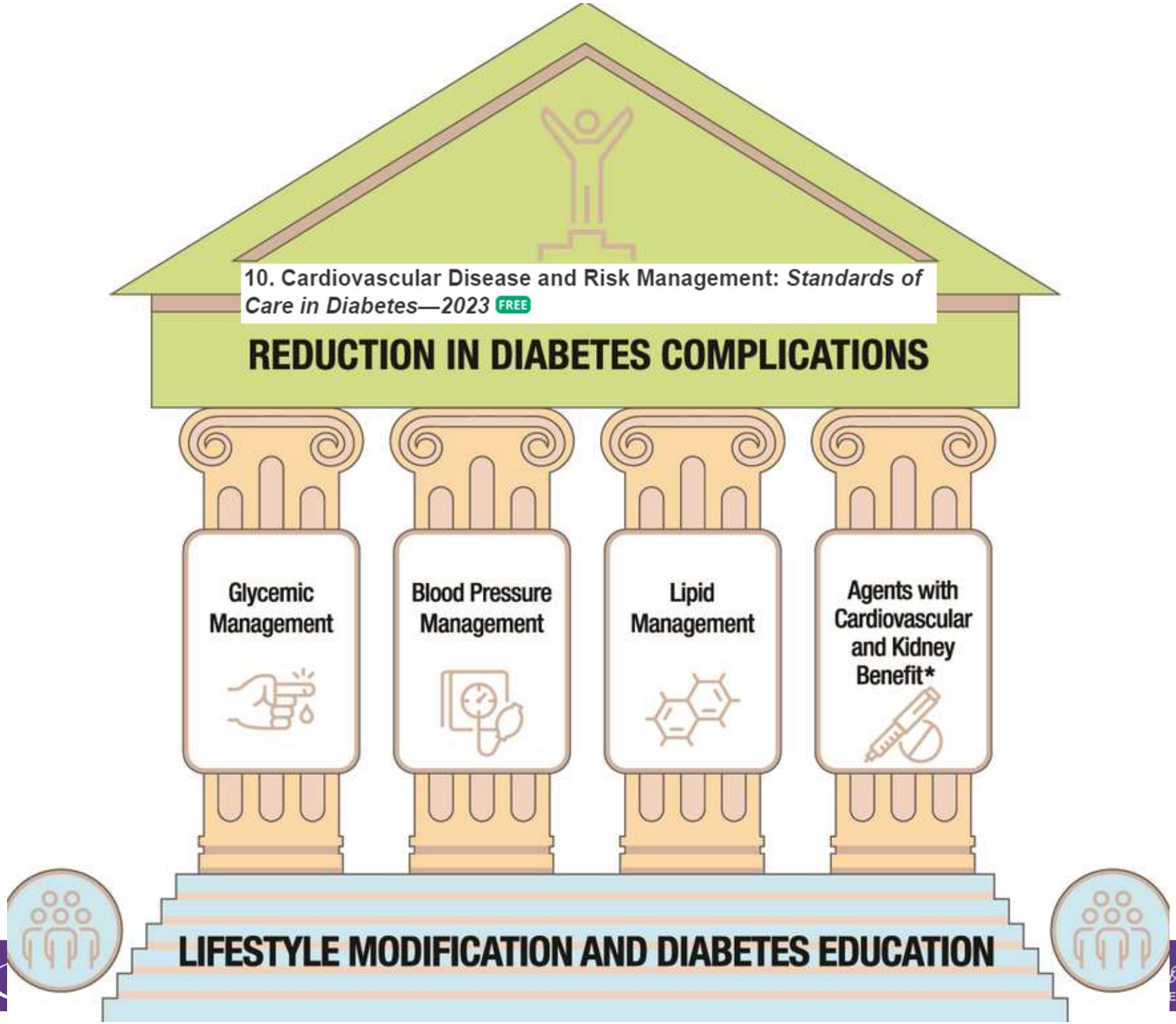
Atherosclerotic Cardiovascular Disease (ASCVD)

- ASCVD is defined as:
  - Coronary heart disease
  - Cerebrovascular disease
  - Peripheral arterial disease

- The leading cause of morbidity and mortality in people with diabetes
  - Largest contributor to direct and indirect costs
  - $37.3 billion/year

- Rates of heart failure hospitalization are 2x higher in people with diabetes

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



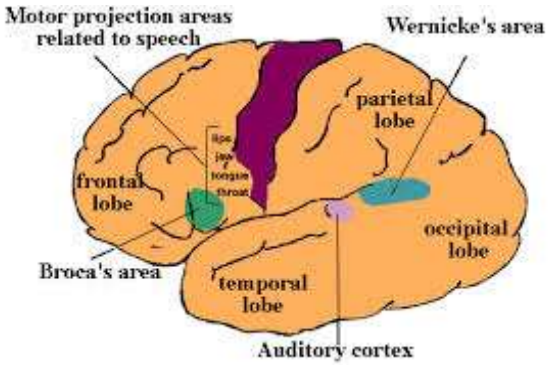
Stroke and Heart Attack

- Pain or discomfort in your arms, back, jaw, neck, or stomach
- Shortness of breathing
- Sweating
- Nausea
- Light-headedness

Make sure people with diabetes know the signs and seek immediate help.

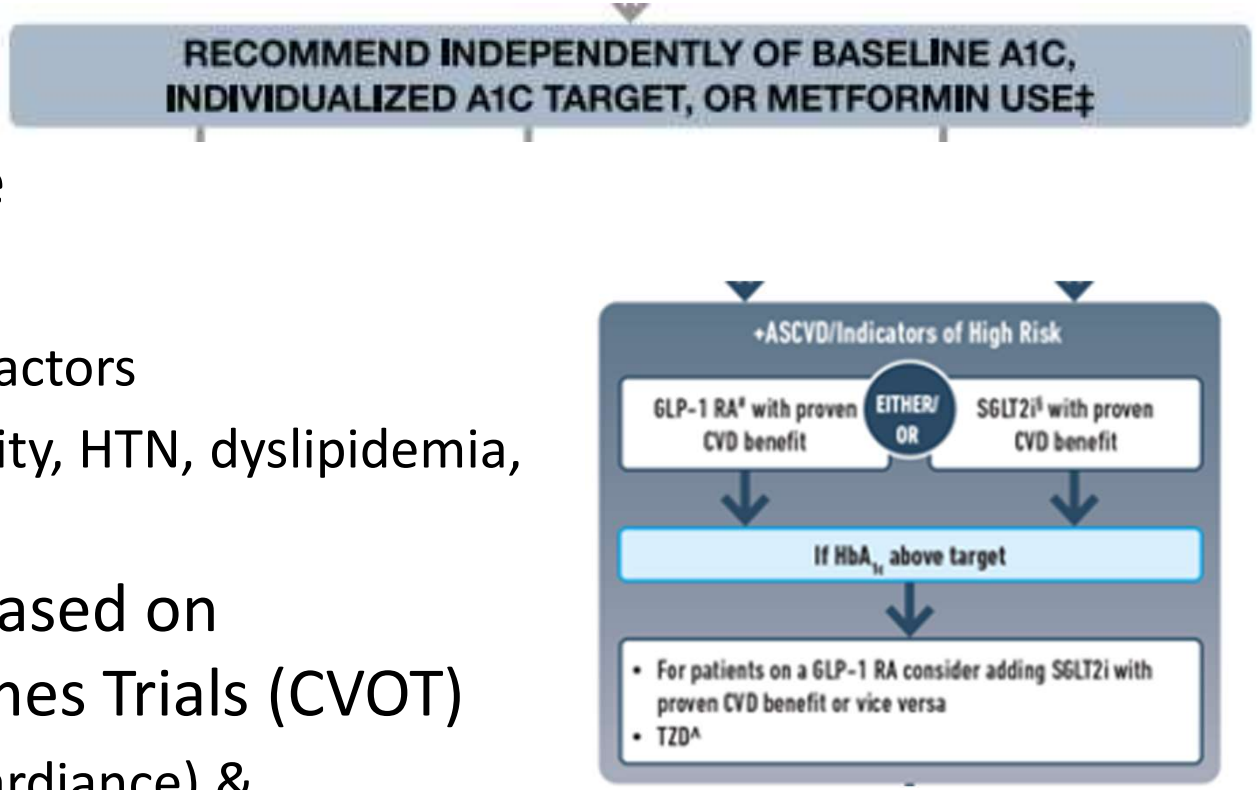
People with diabetes may not experience intense chest or jaw pain during heart attack due to neuropathy.

Stroke of Luck



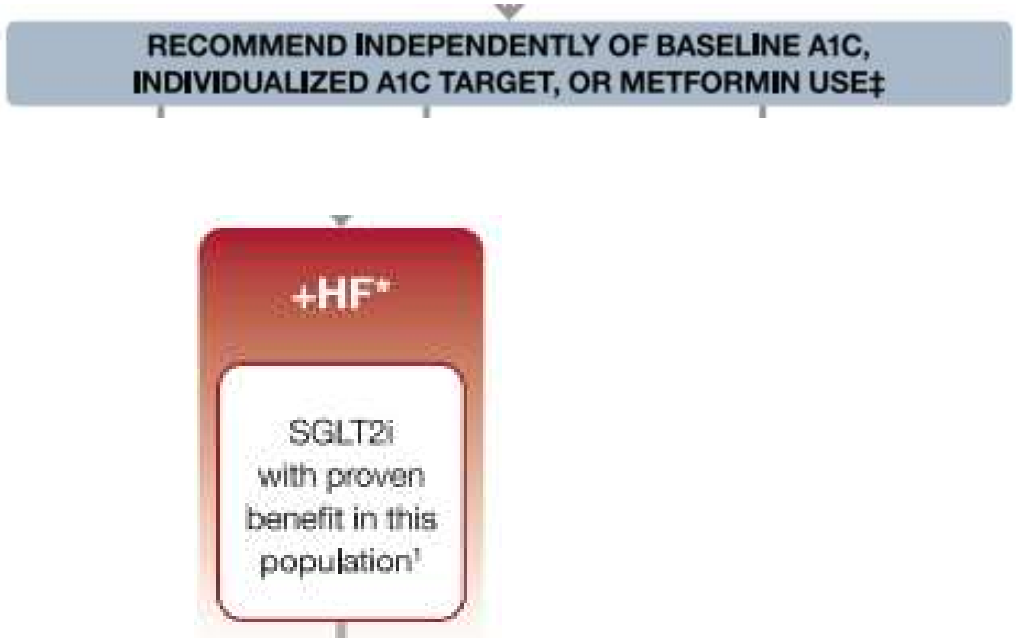
Atherosclerotic Cardiovascular Disease

- ASCVD risk
  - Established CV disease
  - High CV Risk
    - 55+ with 2 or more risk factors
    - Risk factors include obesity, HTN, dyslipidemia, albuminuria, smoking
  - Most effective meds based on Cardiovascular Outcomes Trials (CVOT)
    - SGLT2i - Empagliflozin (Jardiance) & canagliflozin (Invokana)
    - GLP-1 RAs - Semaglutide (Ozempic), liraglutide (Victoza), dulaglutide (Trulicity)



Diabetes Care 2023;46(Suppl. 1):S125-S143.

Heart Failure



- If HF or reduced Ejection Fraction (rEF) and Left Ventricular Ejection Fraction (LVEF) <45%
- Empagliflozin FDA approved for preserved EF
- SGLT-2 inhibitor if eGFR is adequate (>20 to start, may continue until ESRD)
- Avoid TZD
- If using a DPP4 inhibitor, avoid saxagliptin and alogliptin

Proven benefit: All

Diabetes Care 2023;46(Suppl. 1):S125-S143.

SGLT2 Inhibitor HF/ASCVD Evidence Summary

Trial Name	SGLT2 Inhibitor vs. placebo	Outcomes (Primary Bolded)
EMPA-REG Outcome	Empagliflozin	N=7020, Median follow-up 3.1 years, Prior CVD 99% **3 Point MACE (primary)**: 0.86 (0.74-0.99), CV death: 0.62 (0.49-0.77)
EMPEROR Reduced	Empagliflozin	N=3730, 1856 with diabetes, Median follow-up 1.3 years, 100% HF with reduced EF **CV death or HF hospitalization (primary)** 0.75 (0.65-0.86)
EMPEROR Preserved	Empagliflozin	N=5988, 2938 with diabetes, Median follow-up 2.2 years, 100% HF with EF > 40% **CV death or HF hospitalization (primary)** 0.79 (0.69-0.90)
CANVAS Program	Canagliflozin	N=10142, Median follow-up 3.6 years, Prior CVD 65.6% **3 point MACE (primary)**: 0.86 (0.75-0.97), Worsening nephropathy 0.60 (0.47-0.77)
DECLARE-TIMI 58	Dapagliflozin	N=17160, Median follow-up 4.2 years, Prior CVD 40% **3 point MACE (primary)**: 0.93 (0.84-1.03) CV death or HF hospitalization: 0.83 (0.73-0.95),
DAPA-HF	Dapagliflozin	N=4744 (1983 with diabetes), Median follow-up 1.5 years, 100% HF **Worsening Hf or CV death (primary)** 0.74 (0.65-0.85)
DELIVER	Dapagliflozin	N=6263, 2807 with diabetes, Median follow-up 2.3 years, 100% with HF with EF > 40% **Worsening HF or CV death (primary)** 0.82 (0.73-0.92)
VERTIS-CV	Ertugliflozin	N=8246, Median follow-up 3.5 years, Prior CVD 99.9% **3 point MACE (primary)** 0.97 (0.85-1.11), HF hospitalization 0.70 (0.51-0.90)

American Diabetes Association. 10. Cardiovascular disease and risk management: Standards of Care in Diabetes—2023. Diabetes Care 2023;46(Suppl. 1):S158–S190

GLP-1 Analog CVOT Data Summary

Trial Name	GLP-1 Agent/ Comparator	Outcomes (Primary Bolded)	FDA Indication
LEADER	**Liraglutide**/placebo	81% Prior CVD**, 3 point MACE** 0.87 (0.58-0.95) N=9340, Median follow-up 3.8 years Worsening nephropathy 0.78 (0.67-0.92)	As an adjunct to diet and exercise to improve glycemic control in patients **10 years and older** with type 2 DM To reduce the risk of **major adverse CV events** in adults with type 2 DM and **established CVD**
ELIXA	**Lixesenatide**/placebo	100% Prior CVD, **4 point MACE** 1.02 (0.89-1.17) N=6068, Median follow-up 2.1 years	As an adjunct to diet and exercise to improve glycemic control in adults with type 2 DM
SUSTAIN-6	**Semaglutide inj**/ placebo	60% Prior CVD, **3 point MACE** 0.74 (0.58-0.95) N=3297, Median follow-up 2.1 years Worsening nephropathy 0.64 (0.46-0.88)	As an adjunct to diet and exercise to improve glycemic control in adults with type 2 DM To reduce the risk of **major adverse CV events** in adults with type 2 DM and **established CVD**
PIONEER-6	**Semaglutide oral**/ placebo	84.7% Prior CVD, **3 point MACE** 0.79 (0.57-1.11) N=3183, Median follow-up 1.3 years	As an adjunct to diet and exercise to improve glycemic control in adults with type 2 DM
EXSCEL	**Exenatide** – (weekly)/ placebo	73.1% Prior CVD, **3 point MACE** 0.91 (0.83-1.00) N=14752, Median follow-up 3.2 years	As an adjunct to diet and exercise to improve glycemic control in patients **10 years and older** with type 2 DM
REWIND	**Dulaglutide**/placebo	32% Prior CVD, **3 point MACE** 0.88 (0.79-0.99) N=9901, Median follow up 5. 4 years Worsening nephropathy 0.85 (0.77-0.93)	As an adjunct to diet and exercise to improve glycemic control in adults with type 2 DM To reduce the risk of **major adverse CV events** in adults with type 2 DM and **established CVD** or **multiple CVD risk factors**

American Diabetes Association. 10. Cardiovascular disease and risk management: Standards of Care in Diabetes—2023. Diabetes Care 2023;46(Suppl. 1):S158–S190

GLP-1 RA Outcomes: CV, HF, Renal

Drug/ Size	Trial	Major Adverse Cardiovascular Events (MACE- stroke, nonfatal MI, CV death)	MACE Benefit	Hospitalization for Heart Failure (HHF)	HHF Benefit	Renal Outcomes	Renal Benefit
Lixisenatide N=6,068	ELIXA	1.02 (0.89-1.17)*^	N	0.96 (0.75-1.23)	N	NA	NA
Liraglutide N=9,340	LEADER	0.87 (0.78-0.97)*	Y	0.87 (0.73-1.05)	N	0.78 (0.67-0.92)	Y
Semaglutide N=3,297	SUSTAIN-6	0.76 (0.78-0.97)*	Y	0.82 (0.47-1.44)	N	0.64 (0.46-0.88)	Y
Semaglutide oral N=3,183	PIONEER-6	0.78 (0.57-1.11)*	N	0.86 (0.48-1.55)	N	NA	NA
Exenatide N=14,752	EXSCEL	0.91 (0.83-1.0)*	N	1.05 (0.74-1.50)	N	NA	NA
Dulaglutide N=9,901	REWIND	0.88 (0.79-0.99)*	Y	0.93 (0.77-1.12)	N	0.85 (0.77-0.93)	Y

MACE refers to 3-point MACE (stroke, nonfatal MI, CV death) except lixisenatide (4-point MACE included hospitalization for unstable angina).
*: primary outcome, renal outcomes refer to worsening nephropathy; Y-yes, N-no. HHF: hospitalizations for heart failure
Confidence interval <1 means that the drug was beneficial compared to placebo

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* FREE

Meet Alice

Alice is a 56yo AAF presenting for follow-up for type 2 diabetes. Alice reports that her blood pressure has been higher lately. Denies s/sx of hypoglycemia.

- **PMH**
  - Type 2 diabetes x5 years
  - HTN x 5 years
  - Depression
- **Meds**
  - Metformin1000mg PO bid
  - Glipizide 10mg PO qam
  - Chlorthalidone 25mg PO daily
  - Escitalopram 10mg PO daily
- **PE**
  - Ht: 5'3" Wt: 185lbs , BMI:32.8kg/m^2
  - BP: 140/88mmHg
  - A1c=6.9%, K: 4.5mEq/L, Scr:0.8mg/dL, ACR 202 mg/g
  - Tchol=204mg/dL, HDL=34mg/dL, LDL=120mg/dL, TG=250mg/dL

- Social history
  - (+)Alcohol: 1-2 drinks/week
  - (+) Tobacco use: 1/2ppd
  - Exercise: walks 15 min twice/week
  - Occ: receptionist
- Home monitoring
  - FBG and pre-meal: 110-130 mg/dL
  - BP: 140-150/80-90mmHg

Questions to Think About

- What are Alice's blood pressure, cholesterol and glucose targets?
- What lifestyle changes should be advised to reduce cardiovascular risk?
- What changes should be made to optimize Alice's medication regimen?

Hypertension Management in People with Diabetes

Classifying Hypertension

BP Category	SBP		DBP
Normal	<120 mmHg	And	<80mmHg
Elevated	120-129mmHg	And	<80mmHg
Hypertension			
Stage 1	130-139 mmHg	Or	80-89mmHg
Stage 2	≥140mmHg	Or	≥90mmHg

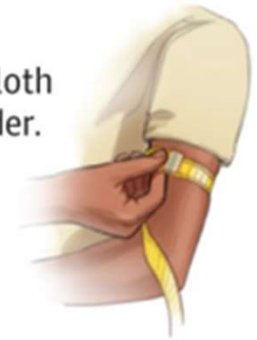
Individuals with SBP and DBP in 2 categories should be designated to the higher BP category

Whelton et al. 2017 High Blood Pressure Clinical Practice Guideline

Taking an accurate Blood Pressure

Choosing the correct blood pressure cuff size

Measure the circumference of your upper arm with a cloth measuring tape midway between the elbow and shoulder. Choose a cuff size that includes this measurement.



Position for taking your blood pressure at home

1. Rest for 5 minutes before measuring your blood pressure.
2. Sit in a chair with both feet flat on the ground and back straight.
3. Place your arm at the level of your heart or chest.
4. Stay still and do not talk as your blood pressure machine operates.

Measure your blood pressure in the morning right after you wake up or in the evening before you go to bed.

Try to measure your blood pressure at the same time every day.

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 individual assessment, shared decision making and potential adverse effects
- Monitor BP at home and at each visit
- During pregnancy, with previous history of HTN
  - BP Target of 110 -135/85

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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

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

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 BP Drugs if 130/80 +**
  - With albuminuria* or ASCVD
    - Start either ACEI or ARB
  - No albuminuria - Any of the 4 classes of BP meds can be used:
    - ACEI, ARBs, thiazide-like diuretics or calcium channel blockers.
  - Avoid ACEI and ARB at same time
  - Multiple Drug Therapy often required
- **If BP ≥ 160/100 of target, start 2 drug combo**

*Albuminuria = Urinary albumin creatinine ratio of 30+

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Back to Alice

Alice is a 56yo AAF presenting for follow-up for type 2 diabetes. Alice reports that her blood pressure has been higher lately. Denies s/sx of hypoglycemia.

- **PMH**
  - Type 2 diabetes x5 years
  - HTN x 5 years
  - Depression
- **Meds**
  - Metformin1000mg PO bid
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  - Chlorthalidone 25mg PO daily
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- **PE**
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  - BP: 140/88mmHg
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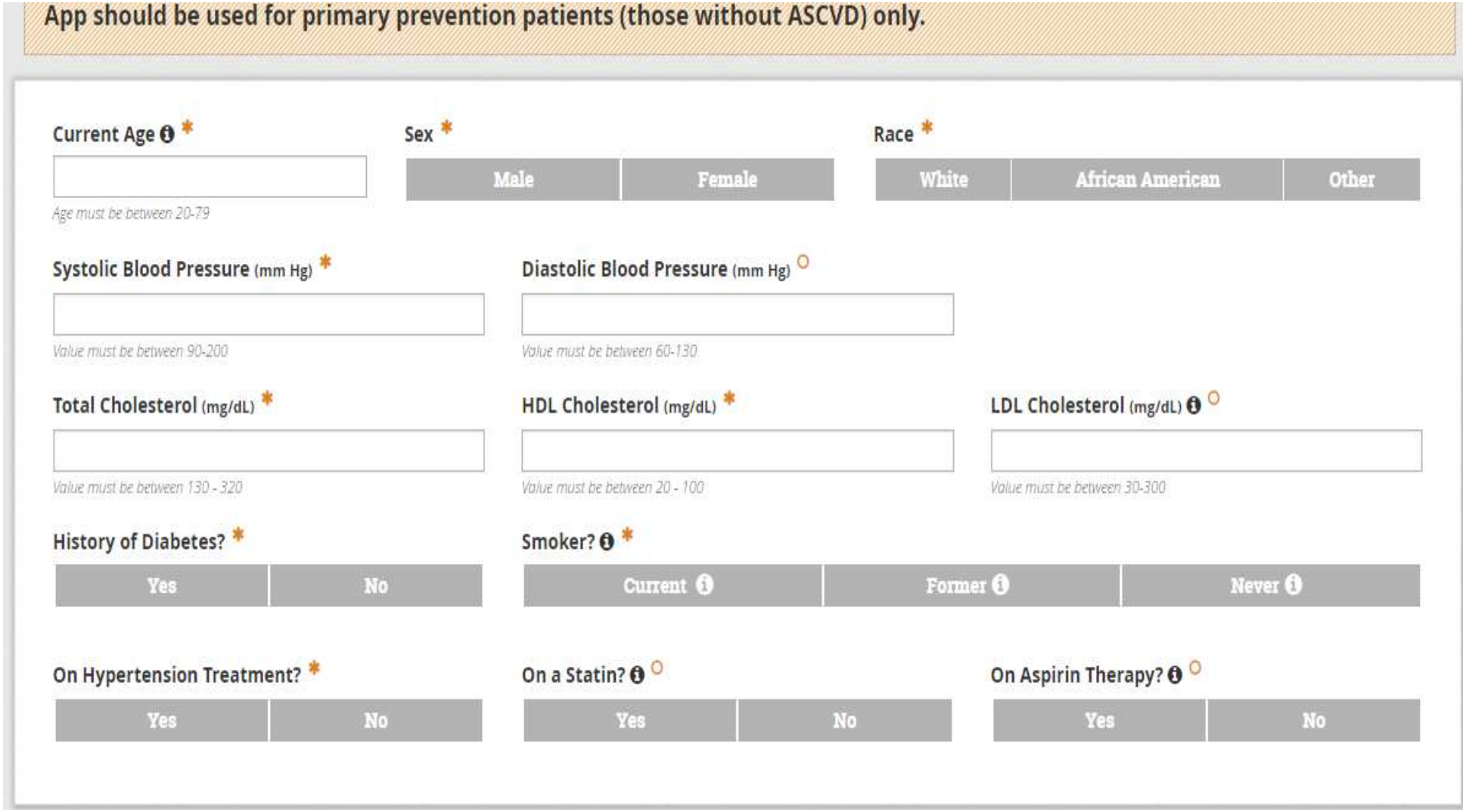
- Social history
  - (+)Alcohol: 1-2 drinks/week
  - (+) Tobacco use: 1/2ppd
  - Exercise: walks 15 min twice/week
  - Occ: receptionist
- Home monitoring
  - FBG and pre-meal: 110-130 mg/dL
  - BP: 140-150/80-90mmHg

Calculating ASCVD Risk

- http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/



What Is Alice's ASCVD risk?

- 42% risk of a cardiovascular event in the next 10 years
- This puts Alice at HIGH risk

Poll 7 - What is the blood pressure goal for Alice?

A. BP<120/80 mmHg

B. BP<130/80 mmHg

C. BP<140/80 mmHg

D. BP<140/90 mmHg

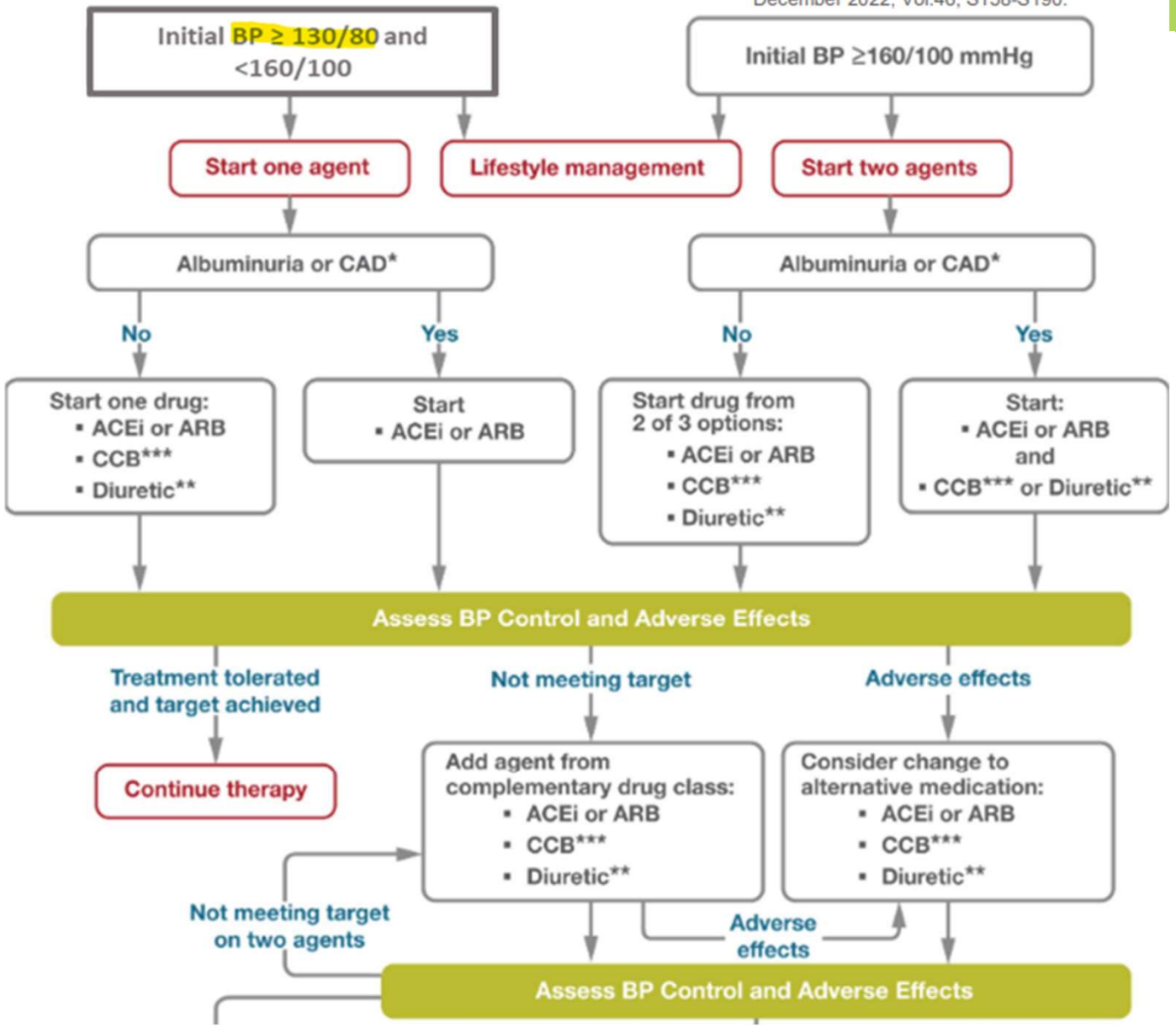
Does Alice have albuminuria?

Albumin to Creatinine ratio (ACR)= 202 mg/g

YES

Recommendations for the Treatment of Confirmed Hypertension in People With Diabetes

ADA 2023 Standards of Diabetes Care
December 2022, Vol.46, S158-S190.



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ACE Inhibitors

Class / Action	Generic / Trade Name	Usual Daily Dose Range	Frequency	Considerations
ACE Inhibitors Angiotensin Converting Enzyme **Action -** Block the conversion of AT-I to AT-II. Also stimulates release of nitric oxide causing vasodilation.	benazepril / Lotensin†	10 – 40 mg	1 x a day	Try to take same time each day. Effects seen w/in 1 hr of admin, max effects in 6 hrs. **Side effects**: Can cause cough (due to increased bradykinin) – can try different med in same class. Also can cause fatigue, dizziness, hypotension. †These meds are also available as a combo w/ low dose HCTZ (hydrochlorothiazide). ‡These meds are also available as a combo w/ CCB (calcium channel blocker) usually amlodipine
	captopril /Capoten*†	12.5 - 100 mg	2-3 x a day	
	Enalopril/ Vasotec*†	2.5 - 40 mg	1-2 x a day	
	Fosinopil / Monopril†	10- 40 mg	1 x a day	
	Lisinopril *† Prinivil Zestril	 10 – 40 mg 10 - 40 mg		
	Ramipril / Altace*†	2.5 – 10 mg		
	Moexipril / Univasc†	3.75 - 15 mg		
	Perindopril/Aceon‡ Perindopril/ Indapamide combo (Coversyl)	2-16 mg 2 - 8 mg 0.625 - 2.5 mg		
	Quinapril /Accupril†	5 – 40 mg		
	Trandolapril/ Mavik Trandolapril/ Verapamil combo (TARKA)	1.0 – 4 mg 1-4 mg 180 to 240 mg		

Initial dose adjustment may be needed for renal dysfunction or elderly

Angiotensin Receptor blockers (ARB's)

Class / Action	Generic / Trade Name	Usual Daily Dose Range	Frequency	Considerations
ARBs -Angiotensin Receptor Blockers **Action -**Block AT-I receptor which reduces aldosterone secretion and vasoconstriction	Azilsartan/Edarbi	40 - 80 mg	1 x daily	Try to take same time each day **Side effects**- Can cause dizziness, drowsiness, diarrhea, hyperkalemia, hypotension. †These meds are also available as a combo w/ low dose HCTZ (hydrochlorothiazide). ‡These meds are also available as a combo w/ CCB (calcium channel blocker) usually amlodipine
	Azilsartan/ Chlorthalidone combo (Edarbyclor)	40 mg 12.5 - 25 mg		
	Candesartan/Atacand†	8 – 32 mg		
	Eprosartan/Teveten†	400 - 600 mg		
	Irbesartan/ Avapro†	75 – 300 mg		
	Losartan / Cozaar*†	25 – 100 mg		
	Olmesartan / Benicar†‡ Tribenzor (triple combo)	20 – 40 mg		
	Telmisartan / Micardis	20 – 80 mg		
	Valsartan / Diovan†‡ Exforge HCT (triple combo)	80 – 320 mg		
	Valsartan/ Nebivolol combo (Byvalson)	80 mg 5 mg		

Initial dose adjustment may be needed for renal dysfunction or elderly

ACEI/ARB Adverse Effects

- Adverse effects
  - Dry cough with ACEI
    - Caused by inhibition of bradykinin breakdown
  - Hyperkalemia
  - Angioedema (< 1%)
    - Occurs 2-4x more frequently in African Americans
  - Bump in SCr
    - Up to 30% is acceptable
  - Orthostatic hypotension (initial dose)
  - Skin rash (captopril)

- Contraindications
  - Pregnancy
  - Bilateral renal artery stenosis

Thiazide diuretics

Class / Action	Generic / Trade Name	Usual Daily Dose Range	Considerations
Thiazide Diuretics **Action:** cause diuresis and decrease vascular resistance. (Many meds combined with this class)	Hydrochlorathiazide (HCTZ)* HydroDIURIL Microzide	12.5 – 25 mg Most frequently prescribed	1 x daily in am with or w/out food **Side effects**: lyte imbalances; hypokalemia, hypomagnesemia, hyperuricemia, hyperglycemia, hyperlipidemia and hyper/hypocalcemia. S/S include muscle cramps, fatigue, dizziness and cardiac arrhythmias .
	Chlorthalidone / Clorpres*	12.5 – 25 mg	
	Metolazone / Zaroxolyn*	2.5 – 20 mg	
	Indapamide / Lozol*	1.2 – 2.5 mg	

Calcium Channel Blockers

Calcium Channel Blockers are usually second or third line BP med for diabetes, since they have less impact on CVD. They may also be used for those who can't tolerate ACE or ARB Therapy.

Class / Action	Generic / Trade Name	Usual Daily Dose Range	Frequency	Considerations
Calcium Channel Blocker *Nondihydropyridine* Relaxes coronary blood vessels to decrease heart rate and cardiac output.	**Diltiazem immediate release***	30 – 360 mg	4 x day	**Monitor** BP, heart rate, liver enzymes and cardiac function a baseline and periodically. Take at the same time each day (with meals if possible). Take in evening if experience drowsiness. **Side Effects**: Watch for cardiac conduction abnormalities, bradycardia, CHF and edema. Can cause peripheral edema and constipation. Metabolized through CYP3A4, so review package insert for drug and food interactions (ie grapefruit).
	Diltiazem extended release*			
	Cardizem CD	120 – 480 mg	1 x day	
	Tiazac	120 – 540 mg	1 x day	
	Dilacor, Diltia	180 – 540 mg	1 x day	
	Verapamil immediate release* Calan	80 -320 mg	3 x day	
	Verapamil sustained release* Calan SR, Veralan	120 mg – 480 mg	1 -2 x day	
	Verapamil extended release*			
	Covera-HS	120 – 480 mg	1 x day	
	Verelan PM	100 – 400 mg		
Calcium Channel Blocker – *Dihydropyridine* Causes vasodilation and decreases peripheral vascular resistance.	Amlodipine/Norvasc	2.5 – 10 mg	1 x day	
	Felodipine / Plendil	2.5 – 10 mg	1 x day	
	Isradipine controlled release DynaCirc CR	2.5 – 10 mg	1 x day	
	Nicardipine sustained release / Cardene SR	30 – 60 mg	2 x day	
	Nifedipine long-acting* Adalat CC /Procardia XL	30 – 120 mg	1 x day	
	Nisoldipine / Sular	10 – 40 mg	1 x day	

Resistant hypertension

- Not meeting BP targets on 3 classes of antihypertensive meds (including a diuretic) at optimal doses
- Consider mineralocorticoid receptor antagonist
  - Spironolactone (Aldactone®) 25-100mg daily
  - Eplerenone (Inspira®) 50-100mg daily
- Monitor serum creatinine, potassium
- Avoid use with finerenone

Beta Blockers

- Use in recurrent MI, heart failure
- Side effects: depression, sexual dysfunction, exercise intolerance, sedation, dizziness
- Monitor BP, lipids, heart rate, glucose
- When stopping, taper dose gradually
- Can elevate glucose and mask adrenergic symptoms of hypoglycemia (ex. tachycardia)
  - Sweating will still occur (cholinergic mediated)

Beta Blockers are commonly prescribed as an add-on to other B/P meds for people with DM. Beta Blockers are beneficial for persons w/ concurrent cardiac problems and prevention of recurrent MI and heart failure. Caution in DM since Beta Blockers can cause hyperglycemia and mask hypoglycemia induced tachycardia (but do not block hypoglycemia related dizziness and sweating). Monitor B/P, heart rate, lipids and glucose.

Beta Blockers *β1- Selective* **Action:** Blockade β1 receptors & reduce cardiac output & kidney renin activation.g	Acebutolol / Sectral*	200 – 800 mg	2 x daily	Side Effects: Usually CNS related including sedation, dizziness, lightheaded . Watch for bradycardia, hypotension, depression and sexual dysfunction. Check heart rate each visit, adjust dose if HR <50. Can cause heart block – review package insert for drug-drug interactions. Watch for exercise intolerance. When stopping beta blockers, taper dose gradually. Use cautiously at lowest dose. †These meds are also available as a combo w/ low dose HCTZ (hydrochlorothiazide).
	Atenolol / Tenormin*	25 – 100 mg	1 x daily	
	Atenolol with Chlorthalidone/ Tenoretic	50 -100 mg 25 mg	1 x daily 1 x daily	
	Betaxolol / Kerlone	5 – 10 mg	2 x daily	
	Bisoprolol/ Zebeta†	2.5 – 10 mg		
	Metoprolol tartate/Lopressor*†	25 – 100 mg	1 x daily	
	Metoprolol succinate / Toprol XL	25 - 100 mg		
	Nebivolol/Bystolic	5 to 40 mg		
	Nebivolol with Valsartan/ Byvalson	5 mg 80 mg		
Beta Blockers *Non Selective* **Action**: Blockades β1 & β2	Nadolol / Corgard*	40 - 120 mg	1 x daily	
	Nadolol with Bendroflumethiazide	40-80 mg 5 mg		
	Penbutolol / Levatol	10 - 40 mg	1 x daily	
	Pindolol / Visken	10 – 40 mg	2 x daily	
	Propanolol / Inderal* Inderal LA (extended)	40 – 160 mg 60 – 180 mg	2 x daily 1 x daily	
	Timolol / Blocadren*	10 – 60 mg	2 x daily	
Combined α- and β- Blockers	Corvedilol / Coreg	6.25 – 50 mg	2 x daily	Same precautions as beta blockers.
	Coreg CR	20 – 80 mg	1 x daily	
	Labetalol / Normodyne*	100 – 2400 mg	2 x daily	

Other Hypertension Meds

- Direct renin inhibitors (Alsikiren-Tekturna®)
  - Similar side effects to ACEI/ARB, rarely used in clinical practice
- Combined alpha and beta blockers (ex. Carvedilol)
  - Similar precautions as beta blockers, additional MOA
- Loop diuretics (Furosemide, Torsemide, Bumetanide)
  - Use when eGFR<30 or if greater diuresis is needed, monitor electrolytes
- Potassium sparing diuretics (ex. Amiloride, Triamterene)
  - Use in combination with thiazide to retain potassium, minimal effect on BP

Other hypertension meds (cont)

- Alpha 1 blockers (Doxazosin, Prazosin, Terazosin)
  - Vasodilator, risk of orthostatic hypotension
  - Often used for people with DM + benign prostatic hypertrophy (BPH)
- Alpha 2 agonists (Clonidine, Methyldopa)
  - Centrally acting
  - Administer with a diuretic
  - Side effects: sedation, dry mouth, orthostatic hypotension, impotence
  - Avoid abrupt discontinuation

α1 – Receptor Blockers - Often used for pts with DM & benign prostatic hypertrophy (BPH).				
α1 – Receptor Blockers Vasodilation	Doxazoxin/Cardura*	1 – 8 mg	1 x day	Take at hs and low dose to reduce risk of postural hypotension/syncope.
	Prazosin / Minipress*	2 – 20 mg	2 - 3 day	
	Terazosin/ Hytrin*	1 – 10 mg	1 – 2 day	
α2 agonists- Not usually first line due to side effects. Effective in pts w/ renal disease, since does not compromise renal function.				
α2 agonists – Centrally act to block influence of norepinephrine on the heart and lower B/P	Clonidine / Catapres*	0.1 to 0.8 mg	2 x day	Administer w/ diuretic. Side effects: sedation, dry mouth, bradycardia orthostatic hypotension, impotence. Do not stop abruptly, can cause hypertensive crisis.
	Methyldopa / Aldomet*	250 – 1000 mg	2-3 x day	

Poll - What Changes are Best to Make to Alice's Hypertension Regimen?

A. Add lisinopril
B. Replace chlorthalidone with lisinopril
C. Add amlodipine
D. Replace chlorthalidone with amlodipine

Assume all choices include lifestyle modifications

Cholesterol Management in People with Diabetes

- 1 minute stretch and Questions?

New for 2023
Lipid Goals – Primary Prevention

- For people with diabetes aged 40–75 at higher cardiovascular risk*
  - (*HTN, Smoke, CKD, BMI 30+ albuminuria, family hx ACSVD)
  - **High-intensity statin** therapy is recommended
  - **Reduce LDL cholesterol by at least 50% of baseline**

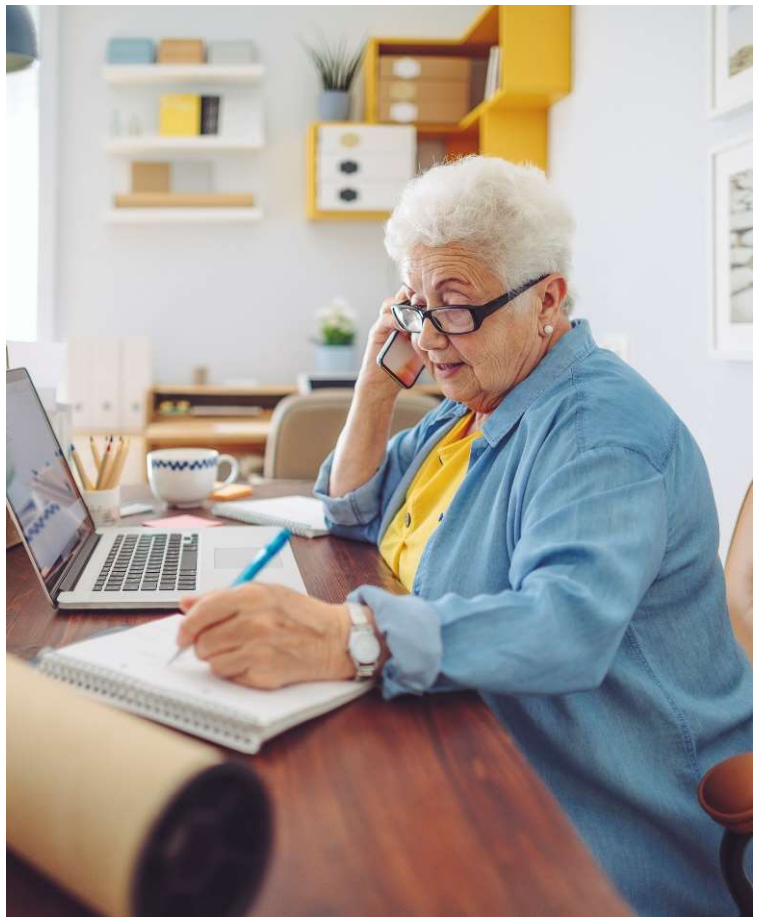
    AND
  - **Target LDL cholesterol <70 mg/dL.**

- **If LDL cholesterol 70 +**
  - it may be reasonable to add ezetimibe or a PCSK9 inhibitor to maximum tolerated statin therapy.

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

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.



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

New for 2023
Lipid Therapy in Diabetes by Age

- All ages 20+ *with* ASCVD, add high-intensity statin
- 20–39 and additional ASCVD risk factors
  - may be reasonable to initiate statin therapy
  - 40-75 without ASCVD and low CV risk
    - Moderate intensity statin
  - 40-75 without ASCVD with 1 or more CV risk factor,reduce LDL by 50%, use high-intensity statin, LDL goal <70
- 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—2023* FREE

Statin Dosing

High Intensity:
Lowers LDL ≥50%

- Lipitor (atorvastatin)
  - 40-80mg
- Crestor (rosuvastatin)
  - 20-40mg

Moderate Intensity:
Lower LDL 30-<50%

- Lipitor (atorvastatin)
  - 10-20mg
- Crestor (rosuvastatin)
  - 5-10mg
- Zocor (Simvastatin)
  - 20-40mg
- Pravachol (pravastatin)
  - 40 – 80mg
- Mevacor (lovastatin) 40 mg
- Lescol (fluvastatin) XL 80mg
- Livalo (pitavastatin) 2-4mg

*****If person can't tolerate intended statin dose, use maximally tolerated dose**

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 – Diabetesed.net

Lipid Monitoring and Lifestyle Treatment Strategies

- Lipid Goals
  - HDL >40
  - Triglycerides <150
  - LDL target based on risk

Monitoring:
If **not** taking statins and unde rage 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—2023* FREE

Statin: Then What?

- Consider fibrates or fish oil when TG>500mg/dL and definitely when TG>1000mg/dL
  - High TG puts people at increased pancreatitis risk
  - Rule out secondary causes
- In People with ASCVD on a statin with controlled LDL but elevated TG (135-499mg/dL), adding icosapent ethyl can be considered to reduce CV risk (REDUCE-IT trial)
- Additional agents to lower LDL
  - Bempedoic acid (Nexltetol), lowers LDL by ~23% when added to statin
  - Iclisiran (Leqvio), lowers LDL by ~50% when added to statin

Clinical Trials Showing CVD Risk Reduction

Source of Evidence	Mean LDL-C Achieved, mg/dL	Outcome	RR (95% CI)	Median Duration, years
Statins:				
CTT meta-analysis[a] (high-intensity vs standard statin; subgroup < 2.0 mmol/L)	66 vs 50	MI, CHD death, stroke, coronary revasc	0.71 (0.56, 0.91)	5.1
Ezetimibe:				
IMPROVE-IT[b] (ezetimibe plus statin vs statin)	70 vs 54	CV death, MI, stroke, UA, coronary revasc	0.94 (0.89, 0.99)	6
PCSK9 Monoclonal Antibodies:				
FOURIER[c] (evolocumab vs placebo on background moderate-to-high intensity statin ± eze)	92 vs 30	CV death, MI, stroke, UA, coronary revasc	0.85 (0.79, 0.92)	2.2
ODYSSEY OUTCOMES[d] (alirocumab vs placebo on background moderate-to-high intensity statin ± eze)	92 vs 53	MI, CHD death, stroke, UA	0.85 (0.78, 0.93)	2.8

a. CTT Collaborators, et al. *Lancet*. 2010;376:1670-1681; b. Cannon CP, et al. *N Engl J Med*. 2015;372:2387-2397; c. Sabatine MS, et al. *N Engl J Med*. 2018;379:2097-2107; d. Schwartz GG, et al. *N Engl J Med*. 2018;379:2097-2107.

Back to Alice

- Alice's lipid panel is as follows:
  - Total cholesterol: 204mg/dL
  - LDL: 120mg/dL
  - HDL: 34mg/dL
  - Triglycerides: 250mg/dL

- Which ASCVD risk factors does Alice have?

  Low HDL, smokes, obesity, HTN, albuminuria

- 10 year ASCVD risk=42%

Poll 9 - What is the best Lipid Recommendation for Alice?

A. Optimize lifestyle modifications only
B. Lifestyle + initiate a moderate intensity statin
C. Lifestyle + initiate a high intensity statin
D. Lifestyle + initiate high intensity statin + icosapent ethyl
E. Lifestyle + initiate high intensity statin + bempedoic acid

Antiplatelet Agents

Click to edit Master subtitle style

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
  - Dual antiplatelet therapy with a P2Y12 inhibitor for 1 year after acute coronary syndrome and may have benefits beyond
- Aspirin may be considered as a primary prevention strategy in diabetes (usually over age 50) with increased CV risk.
  - Requires **comprehensive discussion** w/ person on benefits versus increased risk of bleeding.
- Aspirin allergy, consider different agent

Coronary Vessel Disease

- With known CVD and HTN, use:
  - Aspirin
  - Statin
  - BP Med
    - If prior MI, continue Beta Blockers for at least 2 years after the event
  - Don’t use TZD (pioglitazone, rosiglitazone) with HF
  - Diabetes Meds that decrease CV events:
    - SGLT2 Inhibitors – empagliflozin, canagliflozin, dapagliflozin
    - GLP-1 RAs – liraglutide, dulaglutide, semaglutide

Should Alice start aspirin?

A. Yes

B. No

Individualized discussed with shared decision making

Would you change Alice's Diabetes Regimen?

- Current meds
  - Metformin1000mg PO bid
  - Glipizide 10mg PO qam
  - Chlorthalidone 25mg PO daily
  - Escitalopram 10mg PO daily

- Home monitoring
  - FBG and pre-meal: 110-130mg/dL
  - Denies s/sx hypoglycemia.

- A1C=6.9%

Which of the Following Changes Would you Make to Alice's regimen? Poll 11

A. No changes since A1C is at target
B. Add empagliflozin (Jardiance)
C. Add dulaglutide (Trulicity)
D. Add linagliptin (Tradjenta)

If you add an agent, would you stop or decrease any of the others?

Lifestyle Modifications to Reduce CV risk

Lifestyle modifications

Category	Recommendations
Nutrition	• Maintain optimal weight • Calorie restriction • Plant based diet-high in polyunsaturated and monounsaturated fats • Avoid trans fats, limit saturated fats • Consider DASH/Mediterranean meal plans • Increase omega-3 fatty acids, viscous fiber, plant stanols/sterols (lipids)
Physical Activity	• 150 minutes/week moderate exertion • Strength training
Sleep	6-8 hours per night
Alcohol	• 2 drinks/day for men • 1 drink/day for women
Tobacco Cessation	Avoid tobacco products
Salt Intake	<2300mg/day

Diabetes Care 2020;43(Suppl. 1):S111-134
ENDOCRINE PRACTICE Vol 26 No. 1 January 2020

Poll - What Lifestyle Modifications are Recommended for Alice?

A. Tobacco cessation
B. Weight loss
C. Increase physical activity
D. Reduce alcohol intake
E. Reduce salt intake

- Social history
  - (+)Alcohol: 1-2 drinks/week
  - (+) Tobacco use: 1/2ppd
  - Exercise: walks 15 min twice/week
  - Occ: receptionist
- BMI:32.8kg/m^2

Select all that apply

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

Thank You – We DID IT

SCAN ME

- Please complete online evaluation
- Take a walk then come by and
- Join the party tonight at 5:45 on the terrace. Snacks and Treats.
- Join us tomorrow morning at 7:00am for breakfast.

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DiabetesEd.net

25 years

Diabetes Bingo “DiaBingo”
Shout out Right Answer

DiaBingo - I

- Inhaled insulin
- Glargine, Detemir, NPH are types of
- Breakdown of glycogen into glucose
- Anabolic hormone made by pancreatic beta cells
- Insulin is released when glucose levels are low
- In which injection site is insulin most rapidly absorbed?
- Elevated post-prandial glucose indicate need for pre-meal
- Epinephrine increases insulin resistance
- Creation of glucose from amino acids and lactate
- Decreasing renal function for people on insulin can cause
- Bolus insulins
- A hormone that increases blood glucose

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

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 my HDL cholesterol is more than

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

DiaBingo - O

- SGLT-2 Inhibitors main action
- Januvia(sitagliptin) belongs to which class?
- These classes of diabetes pills increase insulin release
- People with high am fasting glucose may benefit from pm
- On Acarbose (Precose) should treat hypo with ___
- On Metformin (Glucophage) stop med if GFR ___
- On which med should ind's know about hypoglycemia SE's
- Possible side effects of TZD's include
- Metformin can damage kidney function
- What warning for DPP- IV and GLP-1 RA
- GLP-1 Receptor agonists cause increased satiety
- Side effects of Canagliflozin (Invokana) include
- If GI side effects on Metformin try ____

Break Time & 5 minute Q&A

- Energizing Ideas
  - Dance
  - Walk outside
  - Get a nourishing snack
  - Drink some spa water
  - Do some jumping jacks
  - Stretch and Breathe

Scholarship Recipients

We honor Rufina for her outstanding contribution as a dedicated volunteer and fierce advocate for change in her community. Rufina works as a charge nurse for the intensive care unit, and in spare time volunteers at her church by teaching a 10-week course on diabetes information, prevention, and management.

She hopes to further educate others on diabetes, particularly in the African American community. Rufina's commitment to go above and beyond for her students in and outside of class epitomize empathy and compassion.

We honor Nicole for her dedication to volunteering and providing care to all populations. Nicole hopes to become a CDE to help educate both the people living with diabetes, and the other nurses in her hospital. She has dedicated her off time to volunteering at the Miami Jails for over 8 years. Nicole also volunteers at her church, teaching a class on diabetes which is open to the community.

Rufina Greene
and
Nicole Carty-Mullings