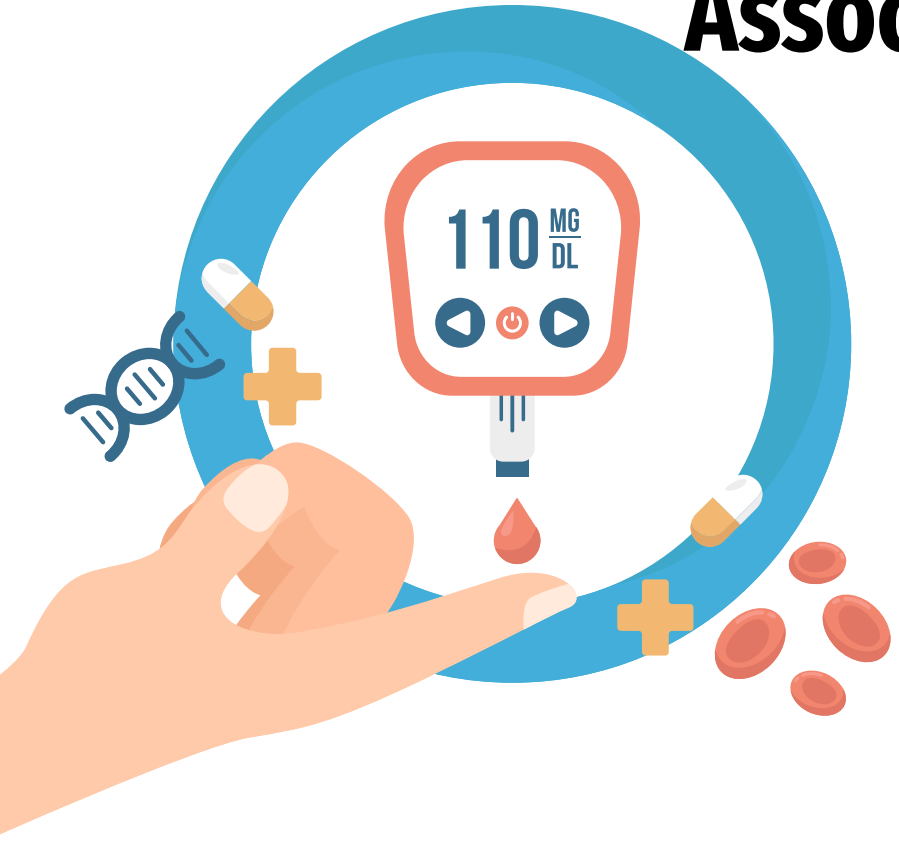
2023 American Diabetes Association (ADA) Standards of Care



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Presenter Disclosures

- The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:
    - I have no conflicts of interest to disclose

Learning Objectives

Pharmacist Objectives:

1. Describe lifestyle modifications and preventive screenings recommended in patient's with diabetes.
2. Review updated ADA guideline recommendations including new patient specific factors and new FDA- approved medications
3. Formulate patient centered treatment plans for people with diabetes
4. Discuss diabetic supplies including new continuous glucose monitoring devices and insulin pumps
5. Discuss comorbid complications including chronic kidney disease and updated lipid management recommendations.

Technician Objectives:

1. Describe lifestyle modifications and preventive screenings recommended in patient's with diabetes.
2. Review updated ADA guideline recommendations including new patient specific factors and new FDA- approved medications
3. Formulate patient centered treatment plans for people with diabetes
4. Discuss comorbid complications including chronic kidney disease and updated lipid management recommendations.

Social Determinants of Health

Socioeconomic status	Neighborhood and physical environment	Food environment	Health care	Social context
Education	Housing	Food security	Access	Social cohesion Social capital Social support
Income	Built environment	Food access	Affordability Quality	
Occupation	Toxic environmental exposures	Food availability		

American Diabetes Association. Standards of Medical Care in Diabetes—Diabetes Care 2023;44(1):258–279.

Lifestyle Modifications

Self Care:

• Self monitoring: Glucose, Continuous Glucose Monitoring
• Blood pressure checks (home)
• Routine foot inspection (daily)
• Hypoglycemia awareness
• A1c (every 3 to 6 months)
• Vaccinations
• Dilated eye exam (annual)
• Comprehensive foot exam (annual)
• Mental health screenings (annual)

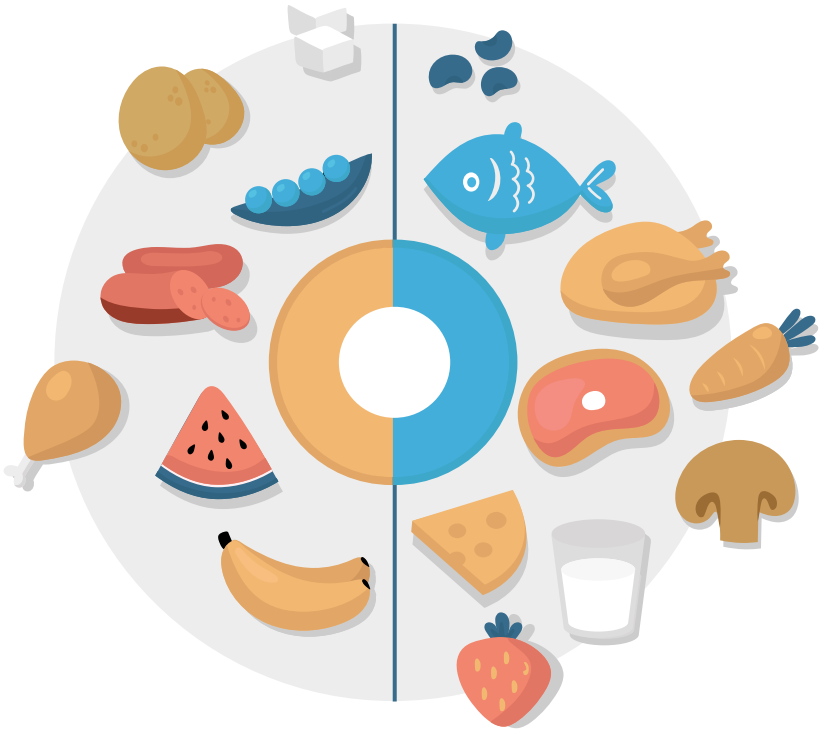
Lifestyle:

- Diabetes self-management education
- Healthy eating
- Physical activity
- Sleep behavior
- Weight management
- Tobacco, alcohol, substance use

American Diabetes Association. Standards of Medical Care in Diabetes—2023. *Diabetes Care*. 2020;43(suppl 1):S1-S212.

Nutrition Is As Effective As Some Medications

All providers should refer people with diabetes for individualized medical nutritional therapy (MNT) provided by a registered dietitian nutritionist (RD/RDN) who is knowledgeable and skilled in providing diabetes-specific MNT at diagnosis and as needed throughout the life span.



MNT is associated with A1C absolute decreases of 1.0-1.9% for people with type 1 diabetes and 0.3- 2.0% for people with type 2 diabetes.

American Diabetes Association. Standards of Medical Care in Diabetes—2023. *Diabetes Care*. 2020;43(suppl 1):S1-S212.

Exercise

Sitting / Breaking Up Prolonged Sitting

- Break prolonged sitting every 30 minutes
- Short bouts of walking
- Simple resistance exercise

Stepping

- Increasing 500 steps per day associated with 2-9% decreased risk of CVD and all-cause mortality

Sleep

- Aim for consistent, uninterrupted sleep
- Quantity: 6-8 hours
- Quality: irregular sleep results in poorer glycemic levels (insomnia, obstructive sleep apnea, restless leg syndrome, etc.)
- Chronotype: night owls vs. early bird

Physical Functional/Frailty/Sarcopenia

- Frailty phenotype in T2D unique
- Earlier age

Sweating (Moderate to Vigorous Activity)

- 150 + mins/week of moderate-intensity physical activity
- Or ≥ 75 mins/week vigorous-intensity activity
- Spread over ≥ 3 days/week
- No more than 2 consecutive days of inactivity
- Include resistance, flexibility, balance sessions

Strengthening

- Resistance exercise
- Improves insulin sensitivity
- Tai chi, yoga improve flexibility & balance

Management of hyperglycemia in type 2 diabetes, 2022. Consensus Report by the American Diabetes Association and the European Association for the Study of Diabetes. Diabetes Care. October 2022

Weight Management

- Promotion of lifestyle changes
- Use of obesity pharmacotherapy (e.g. glucagon like peptide-1 (GLP-1) agonists)
- Bariatric surgery
- Non-surgical weight loss referral
- Labs: lipids, A1c, glucose, fasting insulin, HOMA-IR
- Smart scales- look at visceral fat, subcutaneous fat, water, muscle mass, etc.

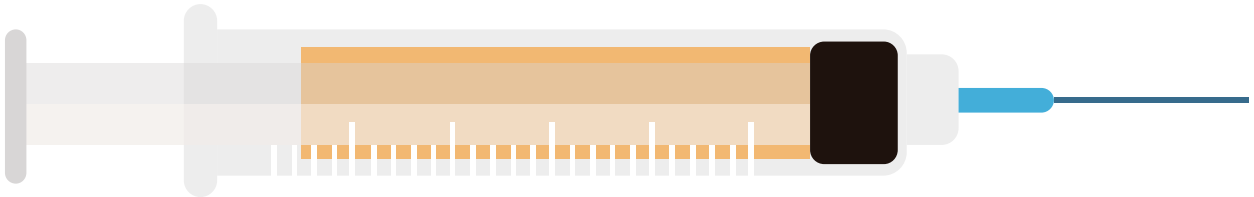
American Diabetes Association. Standards of Medical Care in Diabetes—2023. *Diabetes Care*. 2020;43(suppl 1):S1-S212.

Non-Alcoholic Fatty Liver Disease (NAFLD)

- **Risk factors:** obesity, sleep apnea, type 2 diabetes, metabolic syndrome, polycystic ovary syndrome, high cholesterol and/or triglycerides
- **Management:** diet, weight loss (Goal of at least 5%, preferably > 10%), exercise, surgical and non surgical weight loss
- **Pharmacotherapy**
- Pioglitazone (not FDA approved)
- Some GLP-1 RA (not FDA approved)
- Use of the fibrosis-4 index to assess the risk of liver fibrosis (fibrosis-4 index risk calculator).

American Diabetes Association. Standards of Medical Care in Diabetes—2021. *Diabetes Care*. 2020;43(suppl 1):S1-S212.

Immunizations



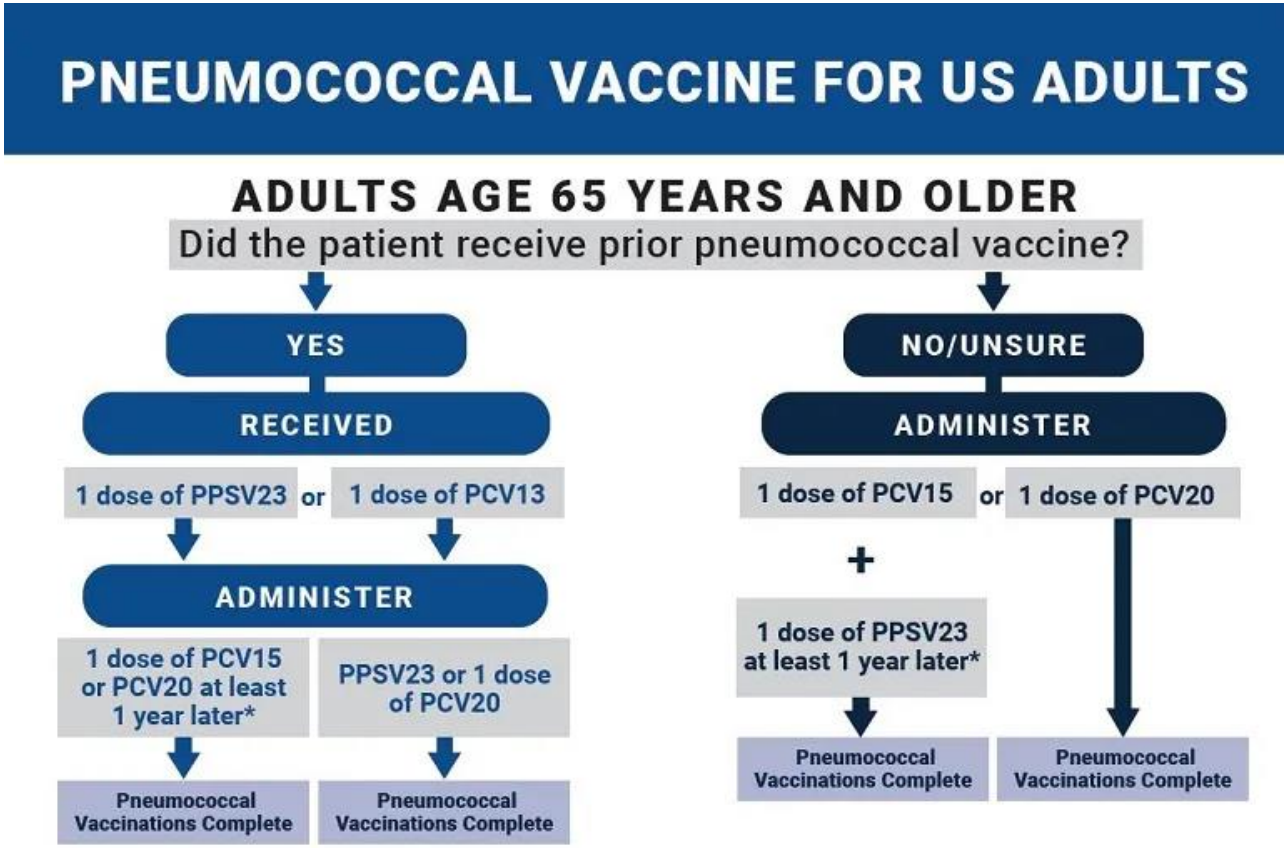
- Children and adults with diabetes should receive vaccinations according to age-appropriate recommendations.
- The importance of routine vaccinations for people living with diabetes has been elevated by the coronavirus disease 2019 (COVID-19) pandemic.
- Preventing avoidable infections not only directly prevents morbidity but also reduces hospitalizations, which may additionally reduce risk of acquiring infections such as COVID-19.

American Diabetes Association. Standards of Medical Care in Diabetes—2021. *Diabetes Care*. 2020;43(suppl 1):S1-S212.

Immunizations

Vaccine	Age Group Recommendations
Hepatitis B	• < 60 years of age • ≥ 60 years of age discuss with healthcare provider
Human papilloma virus (HPV)	• ≤ 26 years of age • 27–45 years of age may also be vaccinated against HPV after a discussion with health care provider
Influenza	• All patients (Advised not to receive live attenuated influenza vaccine)
Pneumonia (PPSV23)	• 19–64 years of age, vaccinate with pneumovax • ≥ 65 years of age, obtain second dose of Pneumovax, at least 5 years from prior Pneumovax vaccine
Pneumonia (PCV20 or PCV15)	• 19–64 years of age, with an immunocompromising condition (e.g., chronic renal failure), cochlear implant, or cerebrospinal fluid leak • 19–64 years of age, immunocompetent • ≥ 65 years of age, immunocompetent, have shared decision-making discussion with health care provider
Tetanus, diphtheria, pertussis (Tdap)	• All adults • Pregnant women should have an extra dose
Zoster	• > 50 years of age

Immunizations



A1c Testing

- Glycemic status (A1C or other glycemic measurement) should be assessed at least two times a year in patients who are meeting treatment goals.
- Assess glycemic status at least quarterly, and as needed, in patients whose therapy has recently changed and/or who are not meeting glycemic goals.

	HbA1c (percent)	Fasting Plasma Glucose (mg/dL)	Oral Glucose Tolerance Test (mg/dL)
Diabetes	≥ 6.5	≥ 126	≥ 200
Prediabetes	5.7 – 6.4	100 - 125	140 – 199
Normal	~ 5.7	≤ 99	≤ 139

Hypoglycemia:

- Individuals at risk for hypoglycemia should be asked about symptomatic and asymptomatic hypoglycemia at each encounter.
- Hypoglycemia is a medical emergency.
- **Any HYPOglycemic event requires intervention!!!**

Rule of 15: Glucose (~15-20 g) is the preferred treatment for the conscious individual with blood glucose 70 mg/dL, although any form of carbohydrate that contains glucose may be used.

Fifteen minutes after treatment, if SMBG shows continued hypoglycemia, the treatment should be repeated. Once the SMBG or glucose pattern is trending up, the individual should consume a meal
or snack to prevent recurrence of hypoglycemia.

Diabetes.org. 2021. *Hypoglycemia (Low Blood Glucose) | ADA*. [online] Available at: <https://www.diabetes.org/healthy-living/medication-treatments/blood-glucose-testing-and-control/hypoglycemia> [Accessed 8 June 2021].

Hypoglycemia is a Medical Emergency

- Glucagon should be prescribed for all individuals at increased risk of level 2 or 3 hypoglycemia so that it is available should it be needed.
- Caregivers, school personnel, or family members of these individuals should know where it is and when and how to administer it.

Level 1 Hypoglycemia	Glucose < 70 mg/dL and ≥ 54 mg/dL
Level 2 Hypoglycemia	Glucose < 54 mg/dL
Level 3 Hypoglycemia	Severe event characterized by altered mental and/or physical status requiring assistance for treatment of hypoglycemia

American Diabetes Association. Standards of Medical Care in Diabetes—2023. *Diabetes Care*. 2020;43(suppl 1):S1-S212.

Glucagon Treatment for Diabetes-Related Hypoglycemia

Name / Delivery	Supplied	Dose Range		Age / Route / Storage
		Adults	Peds / Age Wt Dosing	
Glucagon Emergency Kit Injection requires mixing glucagon powder + diluent filled syringe	1mg / 1mL vial + syringe	1 mg	0.03mg/kg or < 6yr or < 25 kgs | 0.5mg ≥ 6yr or > 25kgs | 1mg	All ages approved SubQ or IM admin Expires in 2 years at room temp.
Gvoke Injectable liquid stable glucagon solution	0.5mg/1.0mg prefilled syringe or 0.5mg/1.0mg HypoPen auto-injector	1 mg	< 2yr: not recommended 2- 12 yrs < 45kg | 0.5mg ≥ 45kg | 1mg 12 years or older | 1mg	Approved Age 2+ SubQ admin in arm, thigh, abdomen Expires in 2 years at room temp (keep in foil pouch).
Baqsimi Nasal glucagon powder	3 mg intranasal device	3 mg	< 4 yrs: not recommended 3 mg dose for 4 years or older	Approved Age 4+ Nasal admin Expires ~ 2 yrs at room temp (keep in shrink-wrapped tube)

**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.*

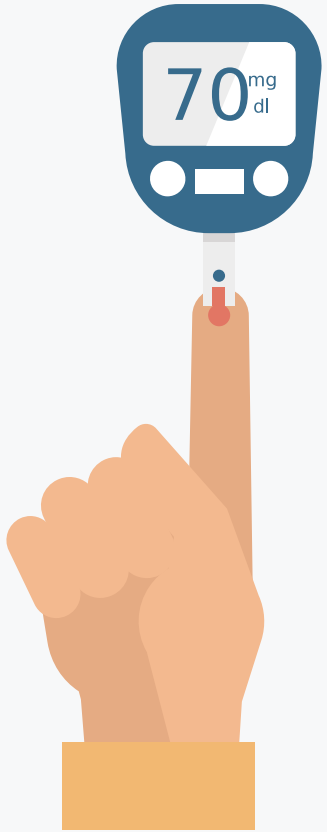
All PocketCard content is for educational purposes only. Please consult prescribing information for detailed guidelines.

Intranasal Glucose

- Approved for patients with diabetes 4 years and older.
- Administration process similar to intranasal naloxone. Given by caregiver, does not require
- Does not require mixing.
- Similar efficacy between products.

Continous Glucose Monitoring (CGM)

- Recent ADA guidelines have now changed to reflect that CGMs can be beneficial in all patients, even if not on basal insulin or multiple daily injections.
- Excessive Vitamin C as well as hypoxemia have been showed to cause inaccurate CGM readings.
- ADA guidelines show a goal time in range (TIR) (70–180 mg/dL) of ≥ 70% of the item, except in People with high risk of hypoglycemia or frailty should have a time in range (TIR) target of > 50% & < 1% time below range (TBR).



American Diabetes Association. Standards of Medical Care in Diabetes—2023. *Diabetes Care*. 2022;46(suppl 1):S1-S212.

FreeStyle Libre 3

SYSTEM	SYSTEM COMPONENTS	SENSOR	APPLICATOR	GLUCOSE READINGS
FREESTYLE LIBRE 3				
	Sensor + App*	Size: 21 x 2.9mm	One piece applicator	Real-time glucose reading sent every minute to smartphone*
FREESTYLE LIBRE 2				
	Sensor + Reader	Size: 30 x 5 mm	Two piece applicator	Scan to see glucose readings

https://res.cloudinary.com/usmed-com/images/f_auto,fl_lossy,q_auto:eco,g_auto:subject/f_auto,q_auto:eco/v1657592658/FreeStyle-Libre-3-vs-FSL2-Chart/FreeStyle-Libre-3-vs-FSL2-Chart.jpg?_i=AA

Dexcom G7

- 10 day lifespan
- All-in-one sensor and transmitter
- 30 minute warmup vs 2 hour
- 12 hour grace period
- Worn on the back of the arm
- Currently not integrated with any insulin pumps

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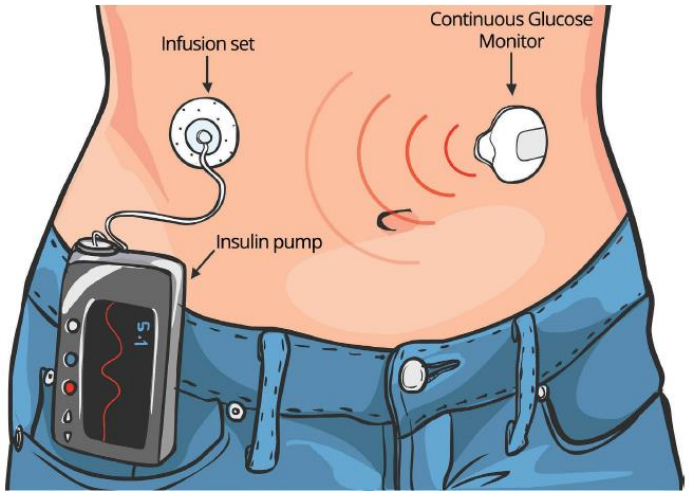
https://www.dexcom.com/en-us/compare-g6-and-g7

Insulin Pumps

- Omnipod systems
- Medtronics pump



https://cdn.shopify.com/s/files/1/0025/3581/7315/products/Omnipod-5-pump-sized_580x.jpg?v=1665001294
https://www.umassmed.edu/globalassets/diabetes-center-of-excellence-dcoe/images/thumbnails/insulin-pump-cgm/

OmniPod

- OmniPod 5 and OmniPod Dash
- Tubeless, waterproof, 72-hour insulin delivery, automatic cannula insertion and priming, 200 units
- OmniPod 5: compatible with a smartphone, integrated with Dexcom G6, does not require a PDM, automated insulin delivery, SmartBolus Calculator

https://www.diabeteseducator.org/docs/default-source/advocacy/op5-vs-dash-comparison.pdf?sfvrsn=77029158_2

Medtronics

- MiniMed 770G T1DM and MiniMed 630G T1DM and T2DM
- Hold 300 units
- Compatible with the Guardian CGM
- Automated insulin delivery
- BolusWizard Calculator

https://www.medtronicdiabetes.com/products/minimed-630g-insulin-pump-system

Pharmacologic Treatment Overview

Type 1 DM:

- Insulin
- Symlin

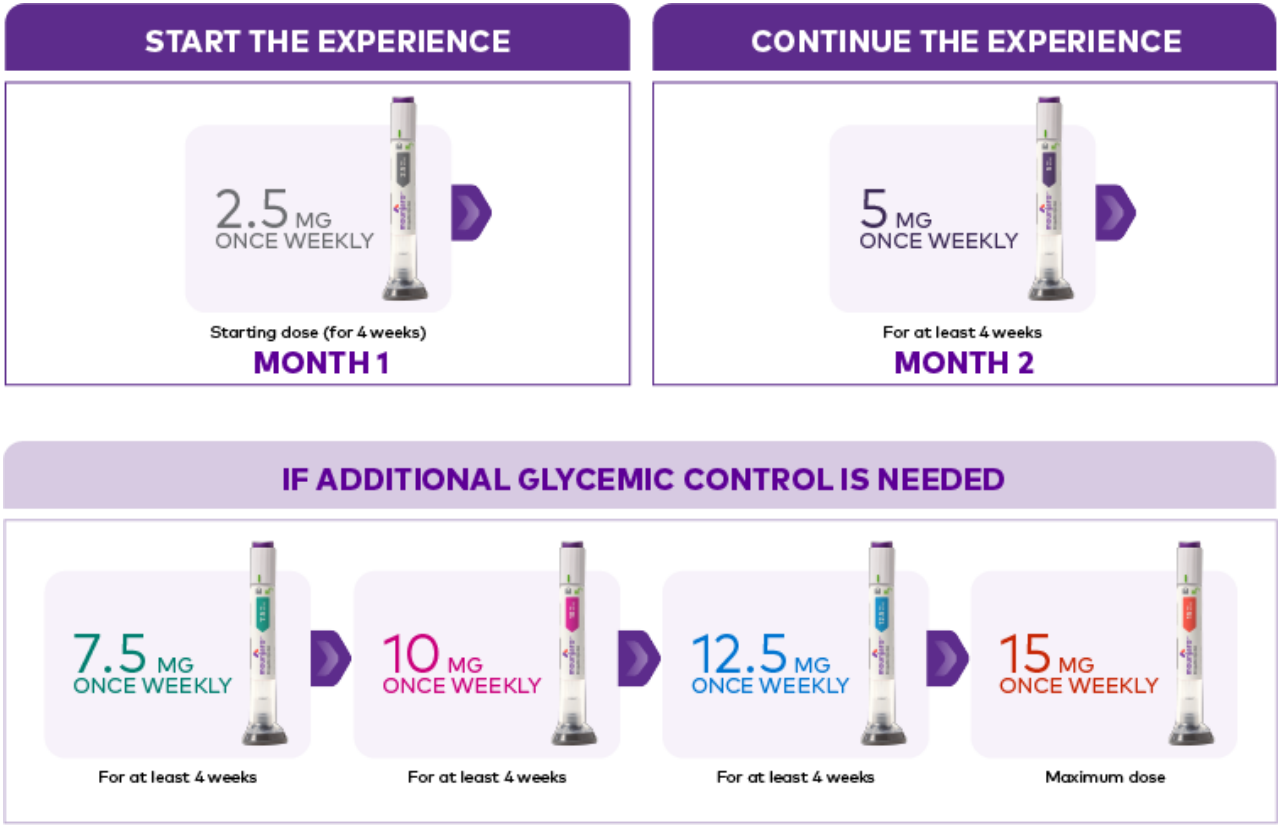
Type 2 DM Oral Agents:

- Metformin
- Sulfonylureas
- Meglitinides
- DPP-4 inhibitors
- SGLT-2 inhibitors
- Thiazolidinediones
- GLP-1

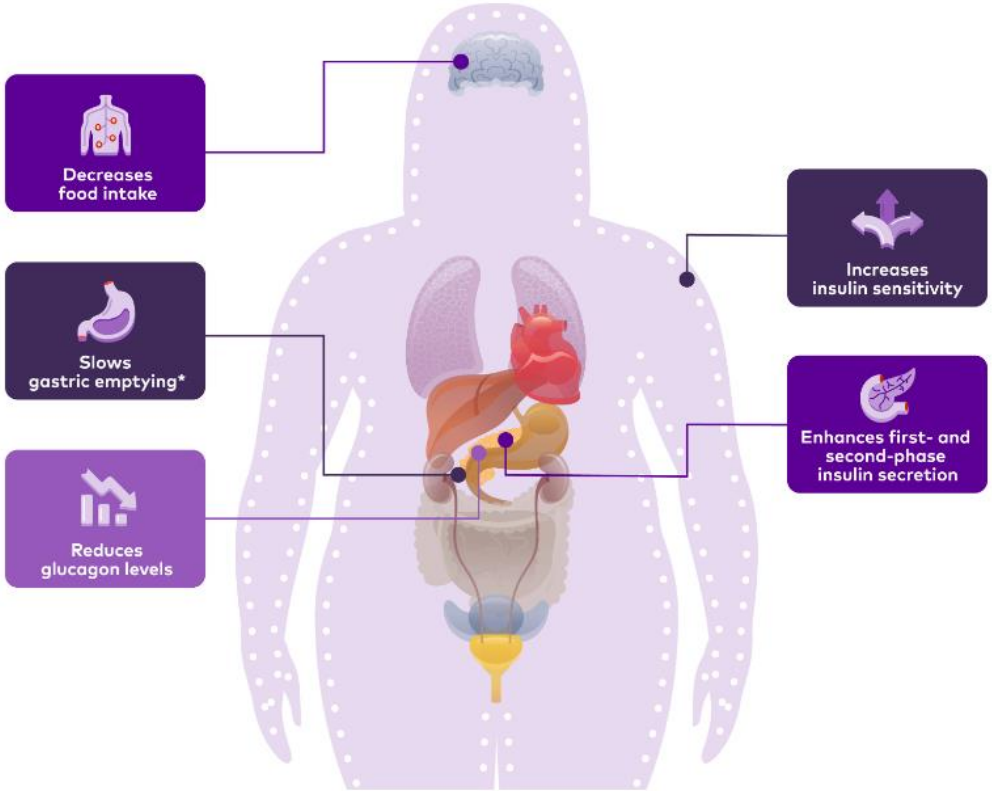
Type 2 DM Injectables:

- Insulin
- GLP-1 agonists
- **GLP-1/GIP agonists (New!)**

Mounjaro(Tirzepatide)



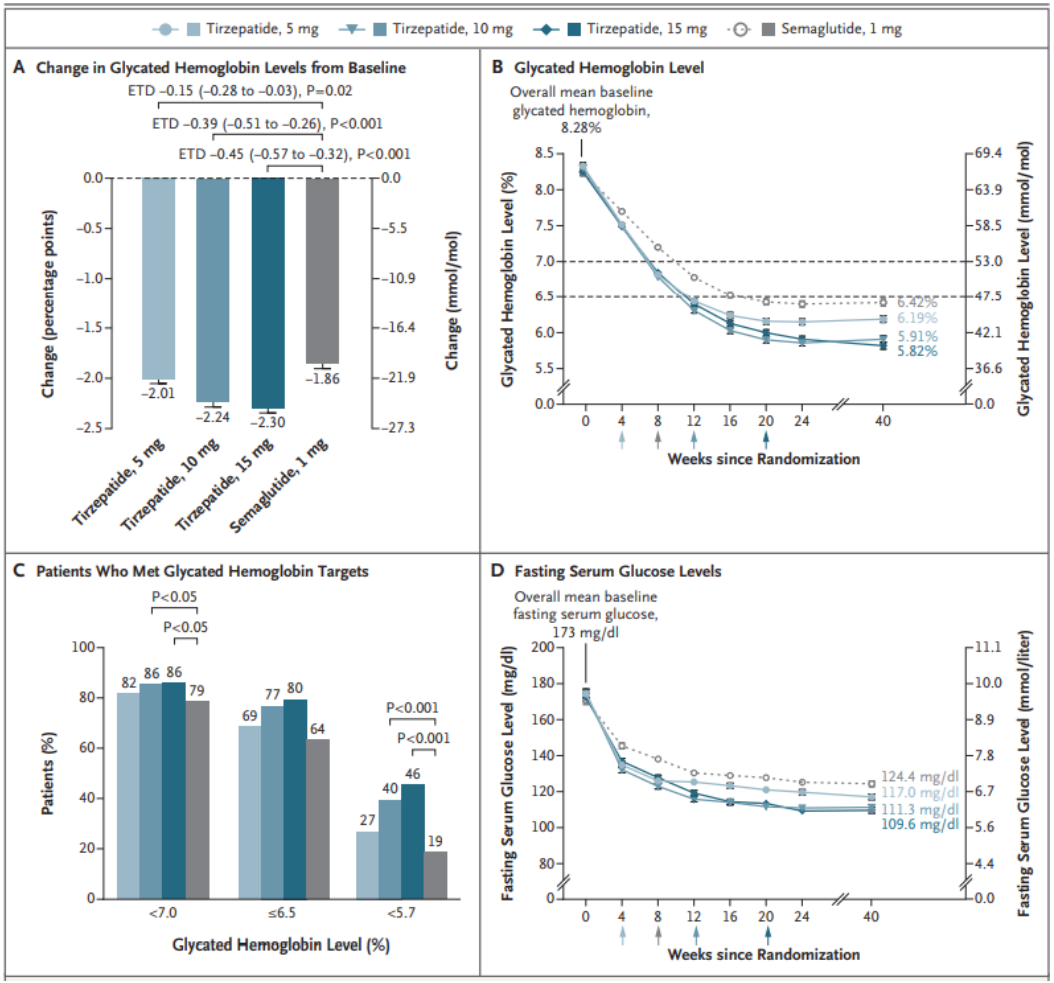
https://www.mounjaro.com/assets/images/hcp/start_and_continue_infographic.png



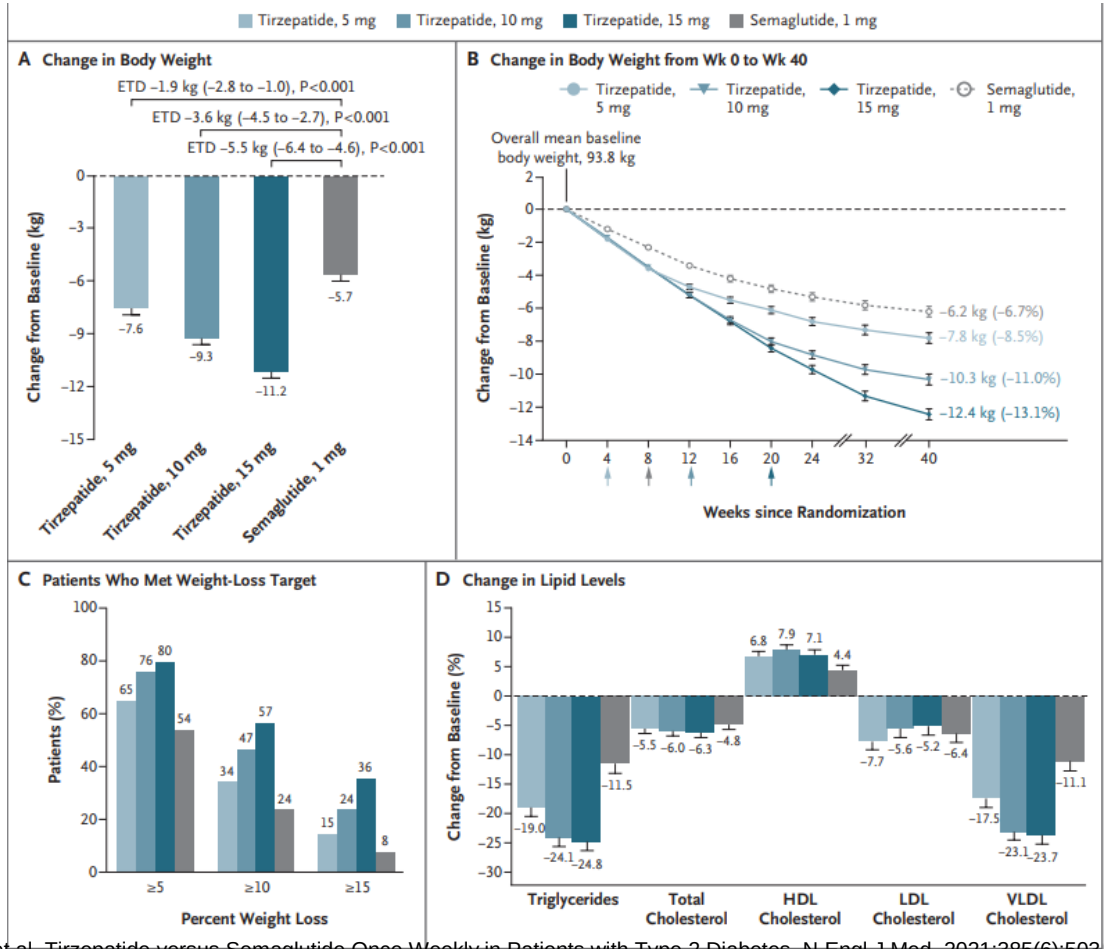
https://www.mounjaro.com/hcp/how-mounjaro-works

SURPASS-2 Trial

- Tirzepatide was compared to Semaglutide 1 mg in a 40 week RCT
- At baseline, the mean HbA1c was 8.28%,
- Mean age 56.6 years, and mean weight 93.7 kg.
- The primary end point was change in HbA1c from baseline to 40 weeks.

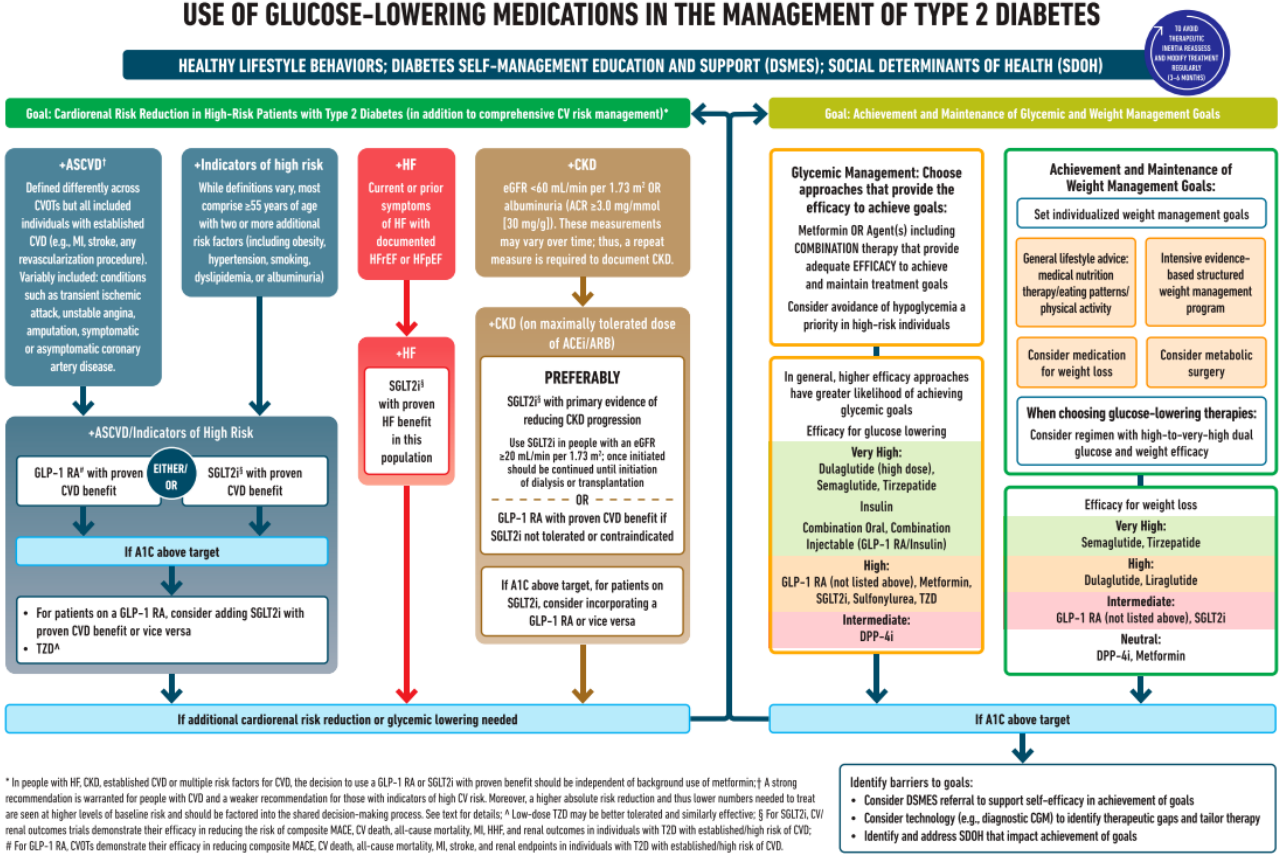


Frías JP, Davies MJ, Rosenstock J, et al. Tirzepatide versus Semaglutide Once Weekly in Patients with Type 2 Diabetes. N Engl J Med. 2021;385(6):503-515. doi:10.1056/NEJMoa2107519

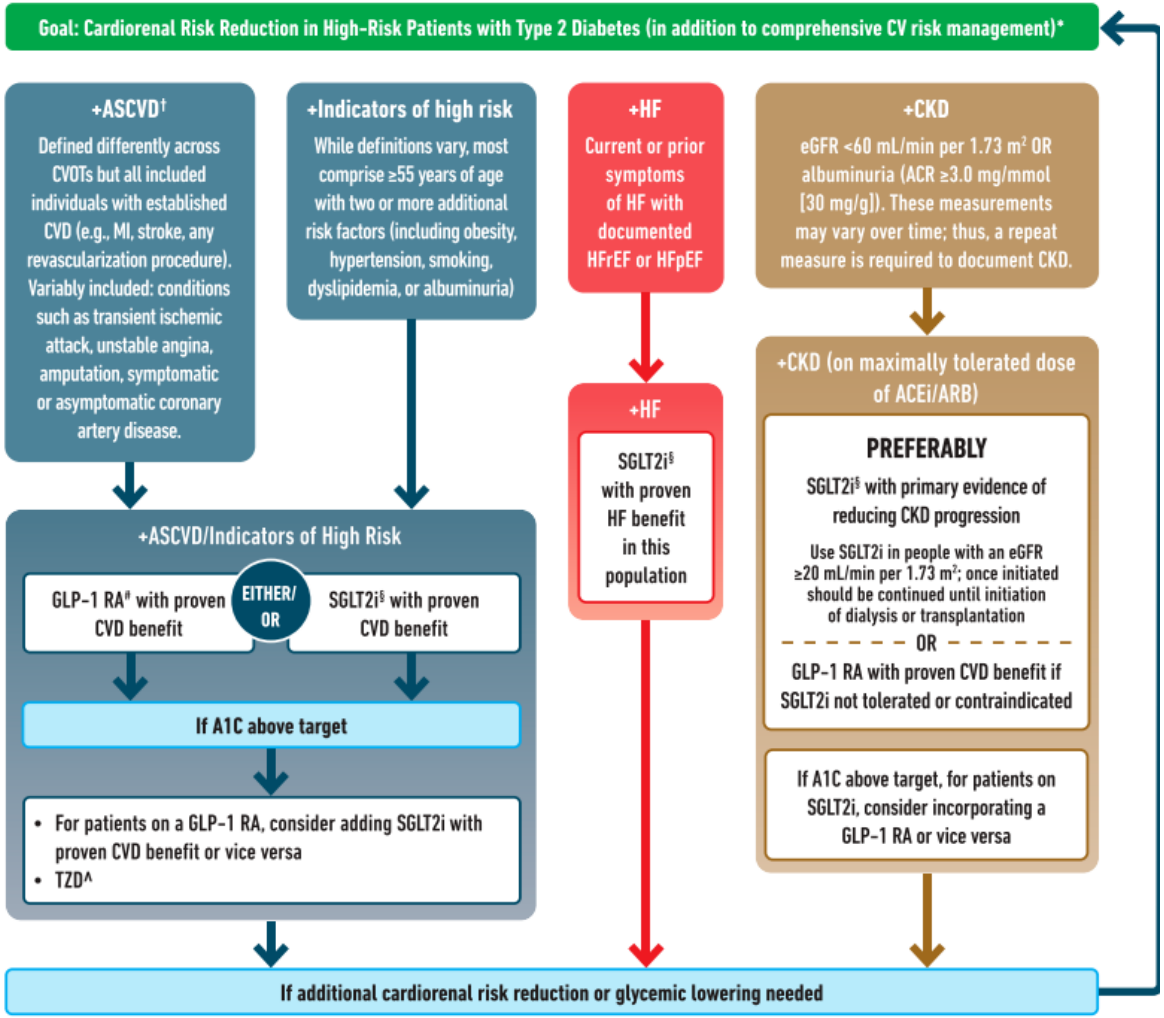


Frías JP, Davies MJ, Rosenstock J, et al. Tirzepatide versus Semaglutide Once Weekly in Patients with Type 2 Diabetes. N Engl J Med. 2021;385(6):503-515. doi:10.1056/NEJMoa2107519

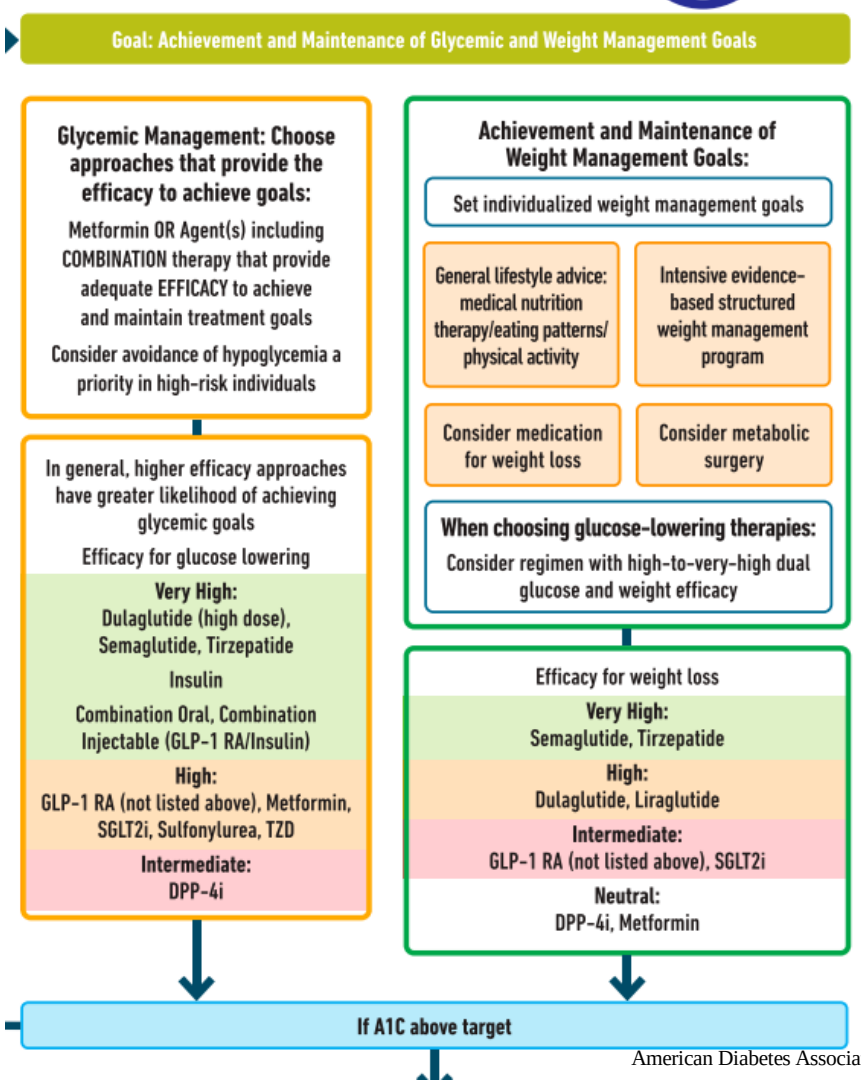
NEW 2023 ADA Guidelines



American Diabetes Association. Standards of Medical Care in Diabetes—2023. Figure 9.3



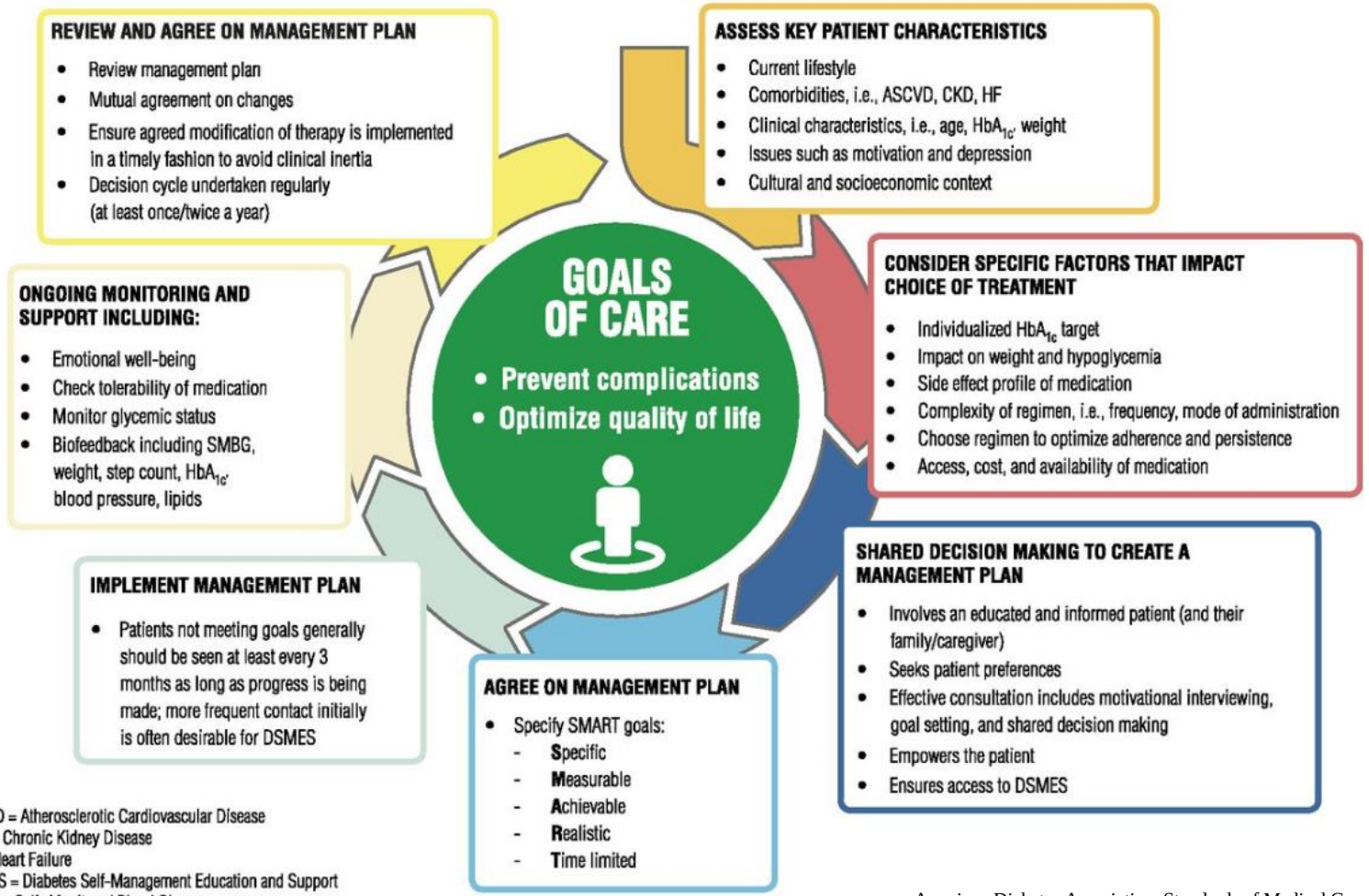
American Diabetes Association. Standards of Medical Care in Diabetes—2023. Figure 9.3



American Diabetes Association. Standards of Medical Care in Diabetes—2023. Figure 9.3

American Diabetes Association. Standards of Medical Care in Diabetes—2023. Figure 9.3

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



ASCVD = Atherosclerotic Cardiovascular Disease
CKD = Chronic Kidney Disease
HF = Heart Failure
DSMES = Diabetes Self-Management Education and Support
SMBG = Self- Monitored Blood Glucose

American Diabetes Association. Standards of Medical Care in Diabetes—2021. Figure 4.1

Chronic Kidney Disease

- Optimize glucose control to reduce the risk or slow the progression of CKD.
- First line- ACE/ ARB

- SGLT2 inhibitors reduce intra-glomerular pressure
- Slows progression of kidney damage with albuminuria
- Stabilizes long-term GFR
- Decreased incidence of dialysis

- GFR decreases slightly over initial 1-3 months
- Renal and cardioprotective effects are retained until ~GFR of 20/ml/min

- For patients with type 2 diabetes, consider use of an SGLT2 inhibitor in patients with an eGFR >30 mL/min/1.73 m2 and urinary albumin >300 mg/g creatinine.

Rabizadeh, ET AL. Cardiovascular and renal benefits of SGLT2 inhibitors: a narrative review. Int J Endocrinol Metab. 2019; 17(2):e84353

Finerenone

- Finerenone = selective nonsteroidal mineralocorticoid receptor antagonist that provides cardiorenal benefits predominantly in patients with stage 3 or 4 CKD with severely elevated albuminuria and type 2 diabetes
- Among patients with T2DM and CKD: finerenone group had a lower risk of the primary composite outcome of CV death, nonfatal MI, nonfatal stroke, or hospitalization for heart failure
- Consistent cardiovascular benefits of finerenone therapy were observed independent of and in combination with SGLT2 inhibitors/GLP-1
- Recommended the addition of finerenone in T2DM & CKD with albuminuria treated with max tolerated ACE/ARB.

American Diabetes Association. Standards of Medical Care in Diabetes—2023. *Diabetes Care*. 2022;46(suppl 1):S1-S212.

Lipid Management

High intensity statin therapy recommended in people with diabetes 40-75 years old with higher risk (atherosclerotic cardiovascular disease (ASCVD) risk factors) to reduce LDL cholesterol by ≥50% of baseline & **target LDL goal of < 70 mg/dl.**

Recommendation of use of high intensity statin therapy in people with diabetes with established ASCVD to reduce LDL cholesterol by ≥50% of baseline & target LDL **goal of < 55 mg/dl.**

Statin	High-Intensity	Moderate-Intensity	Low-Intensity
	Lowers LDL >50%	Lowers LDL 30% to 49%	Lowers LDL <30%
Atorvastatin	40 mg – 80 mg	10 mg – 20 mg	
Rosuvastatin	20 mg – 40 mg	5 mg – 10 mg	
Lovastatin		40 mg	20 mg
Simvastatin		20 mg – 40 mg	10 mg
Pravastatin		40 mg – 80 mg	10 mg – 20 mg
Fluvastatin (XL)		80 mg	
Fluvastatin		40 mg (twice daily)	20 mg – 40 mg
Pitavastatin		2 mg – 4 mg	1 mg

LDL=low-density lipoprotein.
Source: *Circulation*. 2013;129(25 suppl 2):S1-S45.

Table 1. Pharmacologic Characteristics of Statins

Drug	Dose (mg)	CYP450 Pathway	Bioavailability (%)	Absorption (%)	Lipophilicity	Half-life (h)
Atorvastatin	10-80	CYP2C9 (<10%)	12	30	Yes	15-30
Fluvastatin	20-80	CYP2C9, CYP3A4 (minor)	19-29	98	Yes	0.5-2.3
Lovastatin	10-80	CYP3A4	<5	30	Yes	2.9
Pitavastatin	1-4	Glucuronidation, CYP2C9 (minor), CYP3A4 (minor)	51	50	Yes	8-12
Pravastatin	40-80	None	18	24	No	1.3-2.8
Rosuvastatin	5-40	CYP2C (<10%), CYP2C19 (minor)	20	Rapid	No	15-30
Simvastatin	5-80	CYP3A4, CYP3A5	<5	60-80	Yes	2-3

Source: References 6, 9, 20-26.

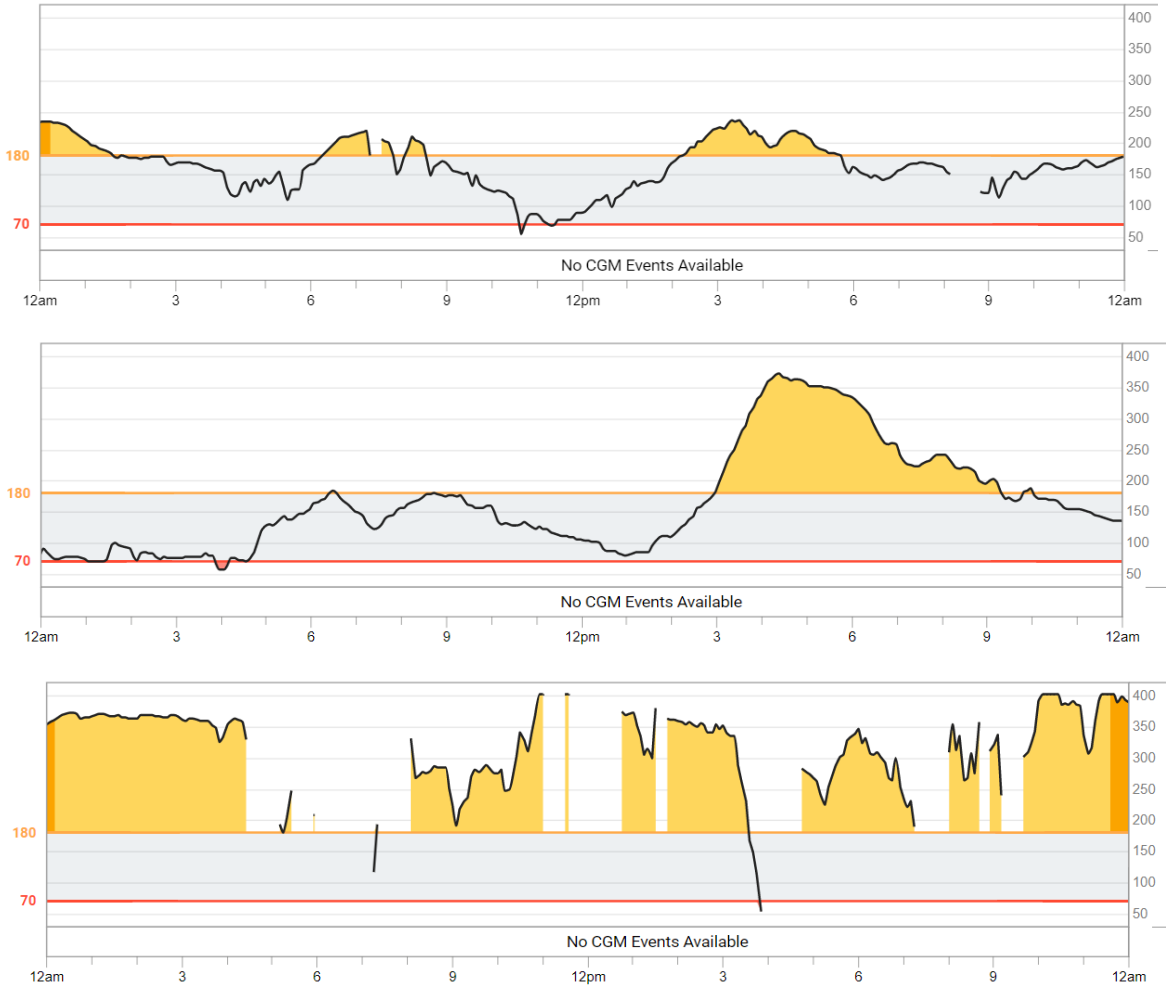
Patient Case

- Chief Complaint: diabetes
- History of Present Illness:
- TJ is a 81 yo male who presents for follow up on his T2DM.
- His current diabetes medications included Tresiba Flextouch 94 units per day Novolog Flexpen 12 units at breakfast and 14 units at dinner +/- 2 units depending on carb content of meal as well as maximum dose of Victoza.
- He also has a Dexcom CGM. When he presented for this visit he report having consistent lows in the morning and upon reviewing his Dexcom data his BG was all over the place with frequent highs and lows.
- Adherence: states that he is taking as directed.
- AEs: denies any side effects
- Vaccines: Flu shot- Given

CGM Data

Dexcom: CGM data reviewed from 11/18/22- 12/1/22

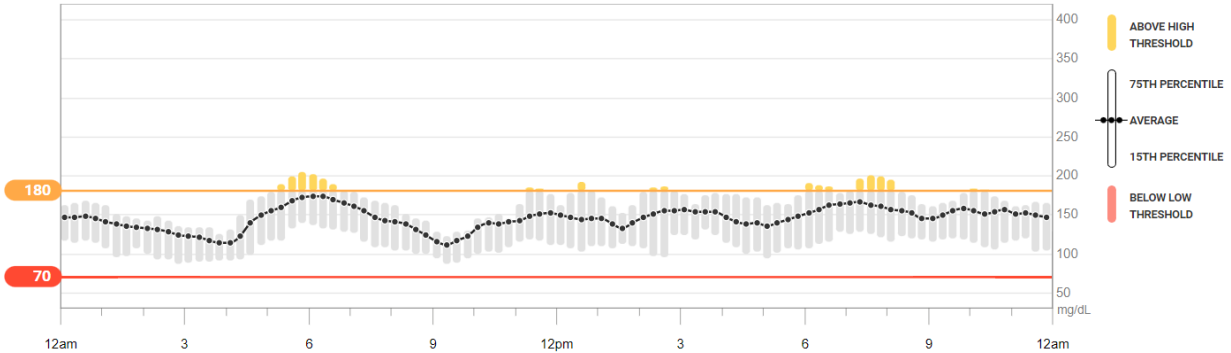
- Average: 174
- SD: 67
- Very high: 11%
- High: 25%
- In range: 62%
- Low: 1%
- Very low: <1%



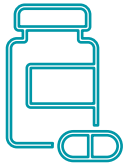
The patient was started on Mounjaro 2.5mg once weekly and over the next couple of months his insulin was decrease to 36 units per day and his Dexcom data was as follows:

Dexcom: CGM data reviewed from 02/02/23- 02/15/23

- Average: 145
- SD: 36
- Very high: <1%
- High: 16%
- In range: 82%
- Low: 1%
- Very low: <1%



Summary



- Focus on social determinants of health in guiding the design and delivery of care
- Emphasis on supporting weight loss and access to newer medications when appropriate
- The expanded role of SGLT2 inhibitor use in preserved and reduced heart failure ejection fraction
- Discuss new CGMs and insulin pumps
- New lipid management recommendations suggesting lower LDL goals for high-risk individuals

Assessment Questions

TD is a 65 year old male who presents to the clinic to meet with the clinical pharmacist regarding his diabetic treatment. He states he has not received any vaccinations since he was a child. Which vaccinations would be appropriate to recommend to TD? Select all that apply

A. Influenza
B. Pneumovax 20
C. Shingrix
D. Tdap

Assessment Questions

TD is a 65 year old male who presents to the clinic to meet with the clinical pharmacist regarding his diabetic treatment. He states he has not received any vaccinations since he was a child. Which vaccinations would be appropriate to recommend to TD? Select all that apply

A. Influenza
B. Pneumovax 20
C. Shingrix
D. Tdap

Assessment Questions

How often does the FreeStyle Libre 3 need to be changed?

A. 7 days
B. 14 days
C. 10 days
D. 28 days

Assessment Questions

How often does the FreeStyle Libre 3 need to be changed?

A. 7 days- Guardian
B. 14 days
C. 10 days-Dexcom CGMs
D. 28 days

Assessment Questions

What drug class is Tirzepatide?

A. SGLT2 inhibitors
B. GLP-1 agoists
C. GLP-1/GIP
D. Thiazolidinediones

Assessment Questions

What drug class is Tirzepatide?

A. SGLT2 inhibitors
B. GLP-1 agoists
C. GLP-1/GIP
D. Thiazolidinediones

Assessment Questions

Which drug class is associated with euglycemic DKA?

A. SGLT2 inhibitors
B. Biguanides
C. Meglitinides
D. Thiazolidinediones
E. GLP-1 agonists

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Thanks!

Do you have any questions?

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