JOSHI Health Foundation

Care Coach Inspire

Aghni

Diabetes: What is new in 2025?

Drs. Pramod Tripathi, Soni Srivastav and Renu Joshi

How to take care of yourself: Numbers, Monitors and a lot more!

Diet & Exercise: the King and Queen of Diabetes Prevention

New Medications for Diabetes: An Exciting Era!

Objectives

- Types of Diabetes
- Risk factors
- Prevalence
- Symptoms
- Type 1 Diabetes
- Type 2 Diabetes
- Diagnosis
- Screening
- Follow up

Types of Diabetes

- Prediabetes
- Type 1 Diabetes
- Type 1.5 Diabetes (Latent Autoimmune Diabetes of Adults)
- Type 2 diabetes
- Other types

Risk factors for development of Diabetes

MODIFIABLE RISK FACTORS

- Physical inactivity
- Overweight/obesity
- Hypertension
- Smoking
- Abnormal lipid level

NON MODIFIABLE RISK FACTORS

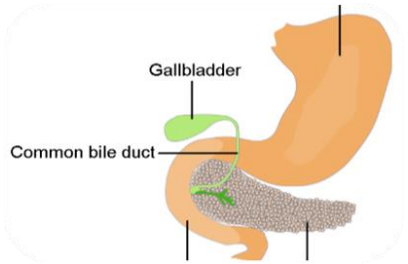
- Age
- Race/ethnicity
- Gender
- Family history

Prevalence in South Asian Americans*

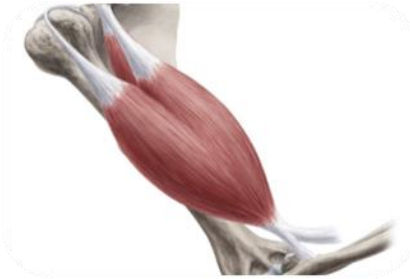
- South Asians have significantly higher prevalence of diabetes (23%) than other ethnic groups (6% in whites, 18% in African Americans, 17% in Latinos, and 13% in Chinese Americans)
- Men have the highest diabetes prevalence overall
- Women have a higher diabetes prevalence than white and Chinese American women but a similar prevalence to African American and Latino women

*Masala Study

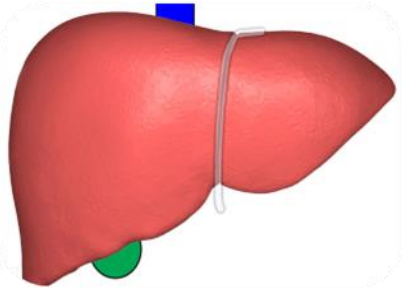
How it happens?



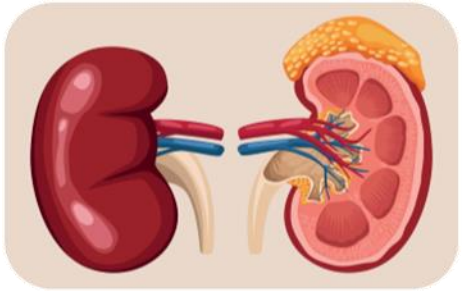
Reduced production of insulin from Pancreas



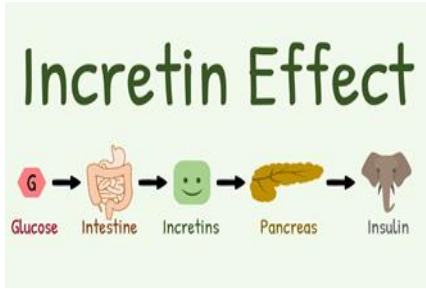
Reduced absorption of glucose



Increased production of glucose from Liver



Increased absorption of glucose from kidneys

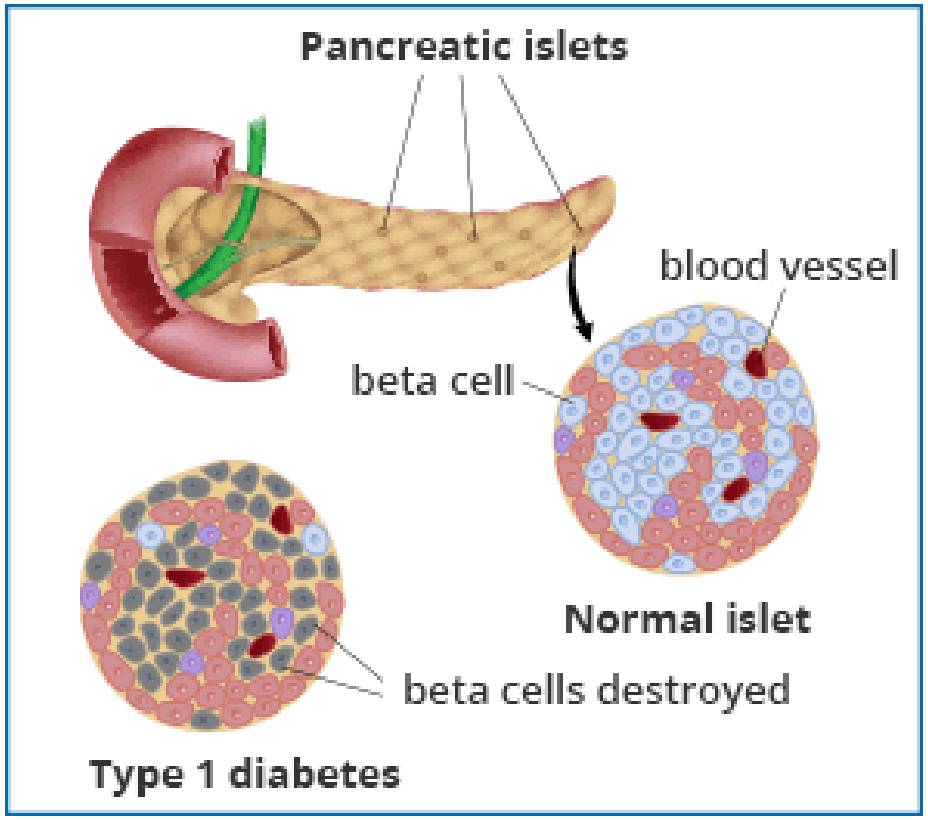


Deceased Incretin effect

Symptoms

- Feeling very thirsty
- Urinating often
- Feeling very hungry
- Extreme fatigue
- Cut or bruises slow to heal
- Unexplained weight loss: even though you are eating more (Type 1 diabetes)
- Tingling, pain or numbness in hands and feet
- Some have very mild symptoms and go unnoticed

Why it happens: Type 1 Diabetes



www.niddk.nih.gov

Autoimmune attack of Pancreas

- Autoimmune diseases are health conditions that happen when immune system attacks body instead of defending it
- Autoimmune markers for Type 1 DM can be obtained by a simple blood work

No insulin from Pancreas

Why it happens: Type 2 Diabetes

The body becomes resistant to its own insulin.

Pancreas pump out more insulin to make up for insulin resistance

Pancreas can’t keep up with insulin needs and blood sugar levels rise to levels high enough to diagnose diabetes = Relative insulin deficiency

Criteria for diagnosis of Diabetes or Prediabetes

PREDIABETES

- Hemoglobin A1c level of 5.7-6.4%
- Fasting blood glucose between 100-125
- 2 hour glucose tolerance test: Glucose level between 140-199

DIABETES

- Hemoglobin A1c level of ≥ 6.5%
- Fasting blood glucose ≥126
- 2 hour glucose tolerance test: Glucose level between ≥200
- Classic symptoms of High glucose and random glucose level of ≥ 200

Criteria for screening

People who are overweight or Obese (BMI ≥ 25, or ≥ 23 in Asian) with one or more following risk factors

- First-degree relative with diabetes
- History of heart disease
- High blood pressure (≥ 130/80)
- HDL<35 or triglycerides >250
- Physical inactivity
- Women with Diabetes during pregnancy should have testing at least every 1–3 years
- For all other people, testing should begin at age 35 years

Important Calculators

- 60-Second Risk Test for Type 2 Diabetes| ADA
- Calculate your Body Mass Index (BMI) | ADA
- Diabetes-Related Retinopathy Risk Test | ADA

Diabetes Prevention

Diabetes prevention Program (DPP)

Qualifications:

- Diagnosis of Prediabetes
- Must have BMI >25 kg/m^2 (or BMI >23 kg/m^2 if self-identified as Asian)

Focus on diet and exercise:

- Achieve and maintain a minimum of 7% weight loss (Most important factor)
- 150 min of moderate-intensity physical activity per week, such as brisk walking.
- Every kilogram of weight loss may cause 16% reduction in risk of progression of diabetes over 3.2 years

Metformin for prevention of type 2 diabetes:

- Age 25-59 years of age with BMI of >35
- Higher fasting blood glucose (>110)
- High Hb A1C >6
- Individual with prior diabetes during pregnancy
- Reduce the risk of Diabetes by 58 % over 3 years

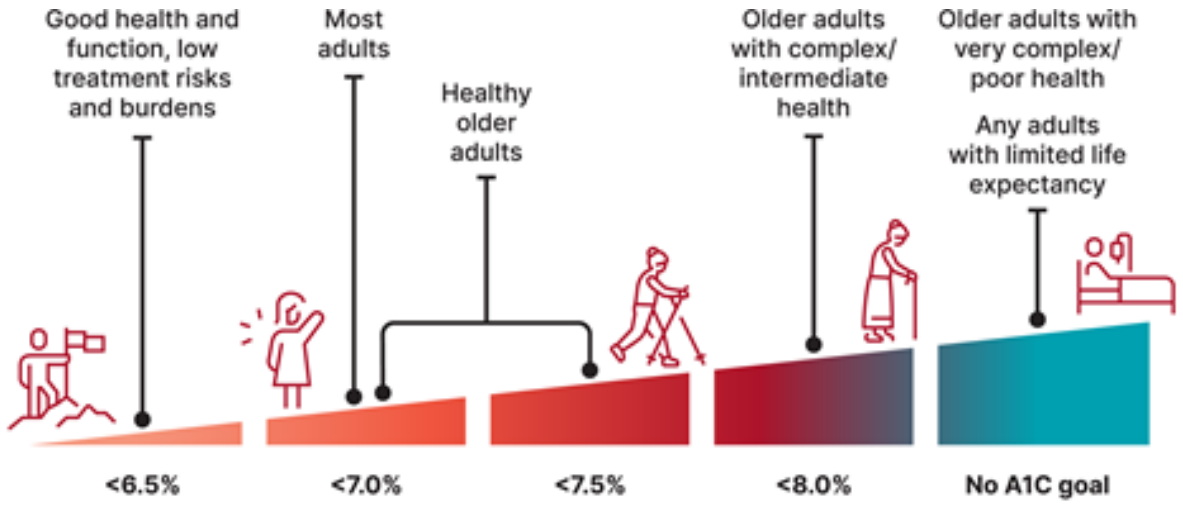
Complications of diabetes

- Eye disease
- Nerve disease
- Kidney disease
- Reduced circulation and nerve damage: Amputations
- Increase risk of infections
- Gum disease
- Hearing loss
- Heart disease
- Stroke
- Fatty liver
- Increase risk of fractures
- Increase risk of Dementia
- Erectile dysfunction
- These complications can be averted if diabetic control is achieved early in disease.

How often you should check Hb A1c

- Hemoglobin A1C should be checked initially and as part of continuing care
- For Prediabetes: Every 6 months to every one year
- For Controlled Type 1 or Type 2 Diabetes: Every 6 months
- For uncontrolled Diabetes: Every 3 months
- In some health conditions, hemoglobin A1c may not be reliable
  - Recent blood transfusion
  - Iron deficiency anemia
  - People on Hemodialysis
  - Sickle cell anemia
  - Pregnancy

Hemoglobin A1C and Glucose goals



Modifying Factors

Favor more stringent goal	Favor less stringent goal
Short diabetes duration	Long diabetes duration
Low hypoglycemia risk	High hypoglycemia risk
Low treatment risks and burdens	High treatment risks and burdens
Pharmacotherapy with cardiovascular, kidney, weight, or other benefits	Pharmacotherapy without nonglycemic benefits
No cardiovascular complications	Established cardiovascular complications
Few or minor comorbidities	Severe, life-limiting comorbidities

Glucose:
Before eating 80-130 mg/dl
After eating <180 mg/dl

diabetesjournals.org

Management

- Diet, Exercise and medications……
- Eye examination at least once a year
- Feet examination on a daily basis
- Statins for lowering cholesterol level (normal cholesterol on a lab test may not be normal for someone with Diabetes)
- Blood pressure control
- Lab work
  - Hemoglobin A1c
  - Lipid profile
  - Liver function tests
  - Urine test for Diabetes (check for protein and creatinine)
  - Kidney function tests
  - Thyroid hormone
  - Vitamin B12 level if taking metformin >5 years

Screening for kidney disease

- Urine test (Microalbumin creatinine ratio) at least annually to check protein in urine
  - It should be done twice a year, if lower kidney functions or high protein in urine

- Prevent progression of diabetic kidney disease
  - Blood pressure control
  - ACE inhibitor (Lisinopril etc.) or ARB (Losartan etc.) medications to slow down progression of kidney disease
  - SGLT2 inhibitors (Jardiance etc.)

Glucose monitoring at home

- How often you should check your glucose at home
  - It is individualized
  - If you are taking insulin: Check Glucose before each meal and at bedtime and before taking insulin
  - If you are on oral medications and have controlled Diabetes with not low glucose level: Glucose check can be once a day in a staggered fashion

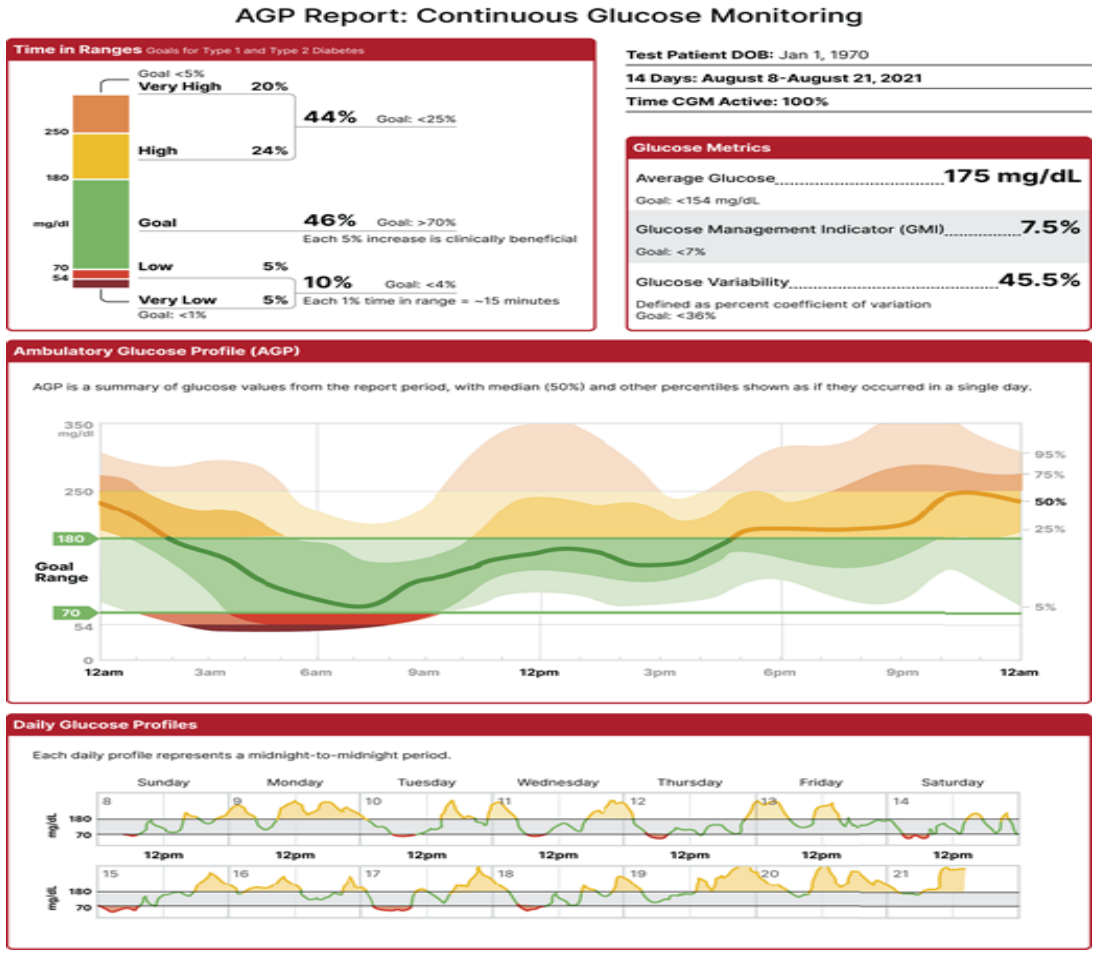
Continuous glucose monitoring (CGM)

Request your free Dexcom G7 trial today | Dexcom

Sign Up for the MyFreeStyle Program | FreeStyle Libre US

These are sensor-based systems that provide real-time glucose readings day and night, without the need for finger sticks

CGM Data Analysis



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Lifestyle management

- Diet
- Exercise
- Medications
- Sleep
- Stress

Calories – for maintenance

- Females : 1500Kcal
- Males : 1800 Kcal

- Range 1200- 2000Kcal

- Nutrition tool calculator (For Americans) – reduce final calories by 200-300 Kcal for yourself

- Calorie Calculator: https://www.myplate.gov/myplate-plan

Calorie Distribution

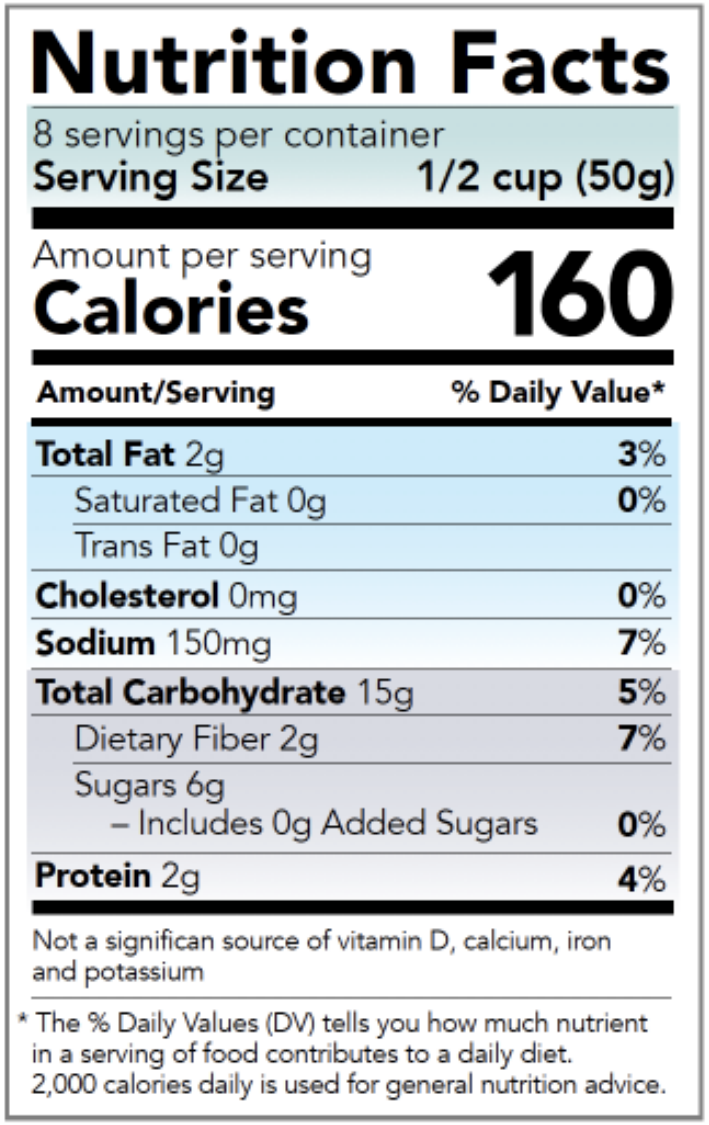
- Carbs 55-65%
- Protein 20%
- Fat 25%

- 1 g of carbohydrates contains 4 kcal
- 1 g of protein -4 kcal
- 1 g of fat - 9 kcal

Carbs: How much do I need?

- 55-65% of your calories come from carbs
- Have a larger and more immediate effect on blood sugars as compared to proteins or fat foods
- Simple and Complex Carbs
- 1 Carb equivalent is equal to 15 gm of carbs
- Preferred: minimally processed, nutrient-dense, high-fiber sources of carbohydrate (at least 14 g fiber per 1,000 kcal)

Food Labels



Nutrition Facts

8 servings per container

Serving Size 1/2 cup (50g)

Amount per serving

Calories 160

Amount/Serving	% Daily Value*
Total Fat 2g	**3%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 150mg	**7%**
Total Carbohydrate 15g	**5%**
Dietary Fiber 2g	**7%**
Sugars 6g	
– Includes 0g Added Sugars	**0%**
Protein 2g	**4%**

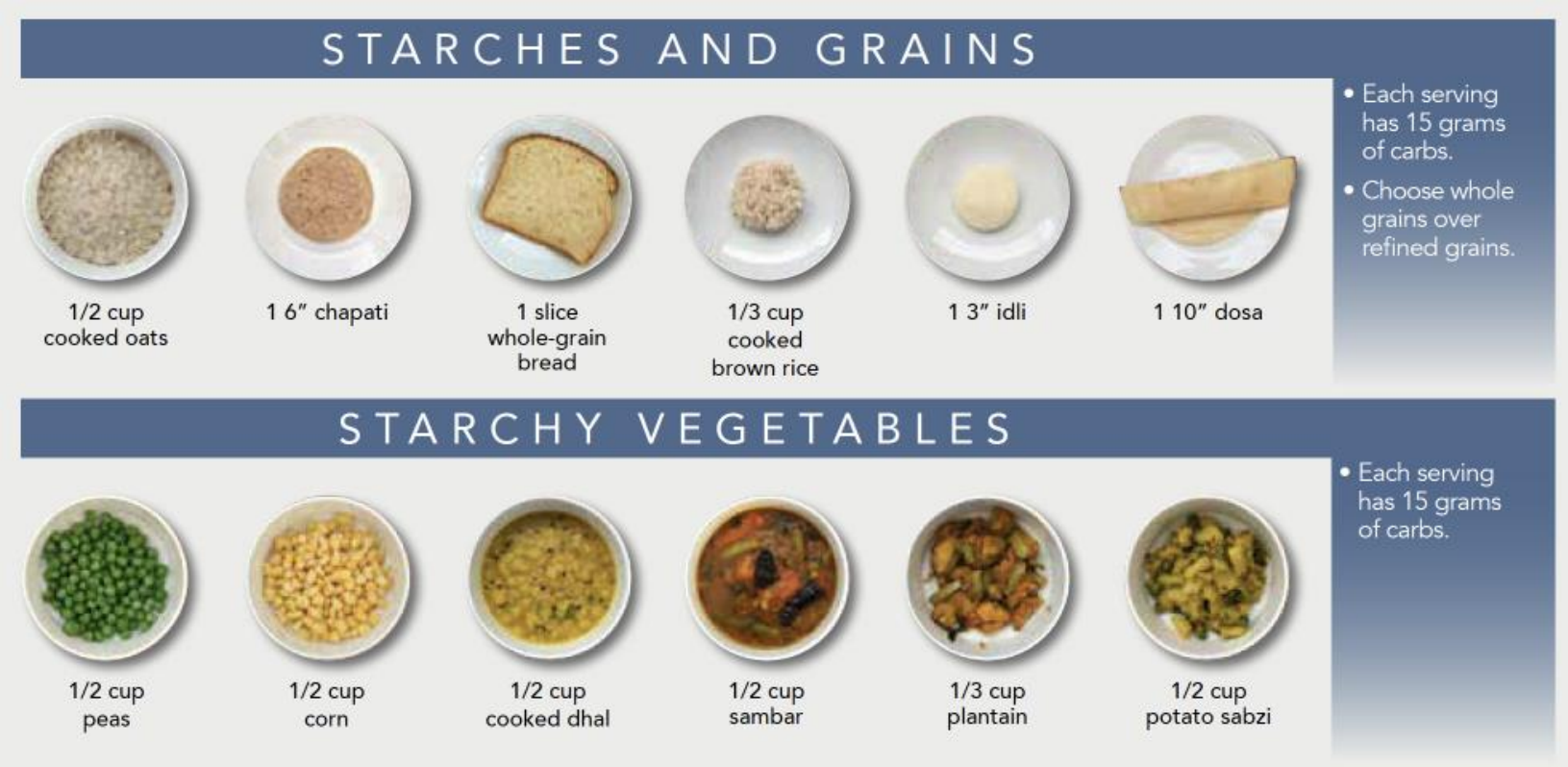
Not a significan source of vitamin D, calcium, iron and potassium

* The % Daily Values (DV) tells you how much nutrient in a serving of food contributes to a daily diet. 2,000 calories daily is used for general nutrition advice.

- Start with the serving size
- Total carbs include dietary fibers, sugars and starch.
- Good source of fiber: 3-5gm per serving
- Aim for 25-35gm of fiber per day
- Avoid foods with high saturated and trans fat- Aim for <3gm of fat per serving
- Avoid foods with high sodium - aim for <140mg per serving

Why count carbs?

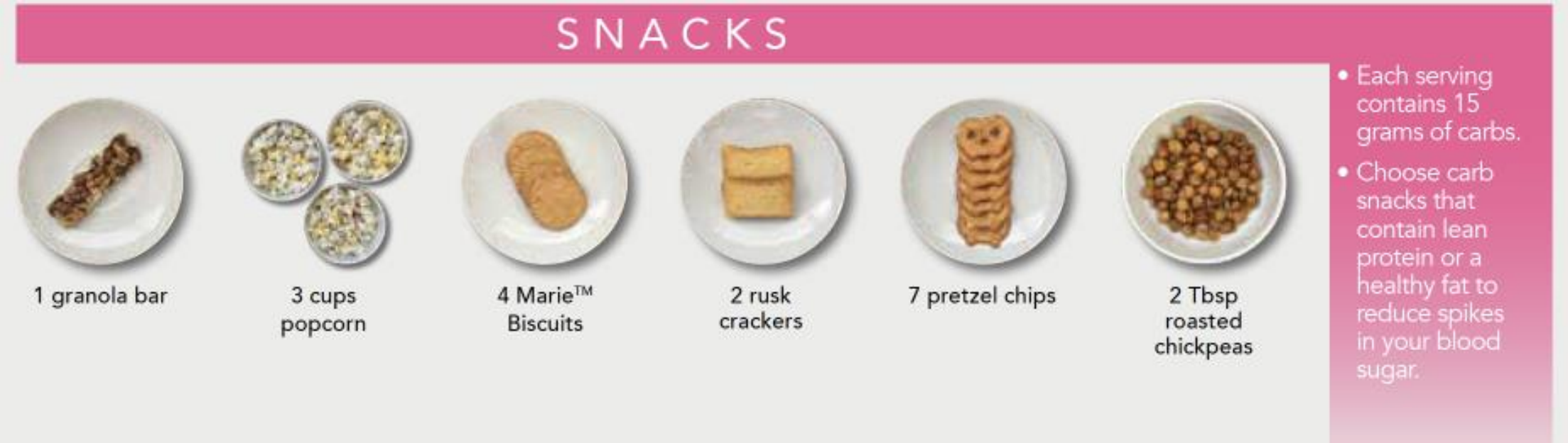
- 1/3 cup rice = 1/3 cup pasta = 1 chapati = 15gm of carbs
- Roti only 6 inches = 15gm
- 1 bagel = 60gm
- Cereals: ½- ¾ cups = 15gm some are higher
- Quinoa
- Myth: Rice and potatoes are like poison for people with diabetes



- All fruits have carbs
- Watermelon 1 cup is < 15gm of carbs
- Myth: All fruits are fine except Mango and Bananas is bad for diabetes

Daily carbs with each meal (Gm)

CALORIES	BREAKFAST	LUNCH	DINNER	SNACKS
1200	15-30 GM	30-45	*30-45*	15
1500	30-45	30-45	*30-45*	15-20
1800	30-60	45-60	*45-60*	30
2000	45-60	45-60	*45-60*	30-45



Myth: Namkeen snacks are ok because they have no sugar

Myth: People with diabetes cannot eat any sugar at all

Protein Sources

- In an Indian diet: Meat, fish, beans, dairy , lentils
- Green peas, chana and gram flour are good sources
- Soya, tofu
- Myth: Vegetarian diet is always better
- Less Salt, sugar, fats while cooking. Use spices to add flavor!

PROTEINS

Plant-Based Proteins

1 oz or 5 small paneer cubed

1/3 cup hummus

1/2 cup chickpeas curry

3/4 cup spinach and dhal

1/2 cup tofu

1/3 cup greek yogurt

Animal Proteins

4 large shrimp

1 egg

1 oz salmon

2 medium sardines

3 1" pieces of chicken tikka

1 oz chicken curry

- Each serving has 4-8 grams of protein.
- The amount of carbohydrate and fat varies per item.

- Each serving has 7-8 grams of protein.

Fats

- Cooking method matters: bake, broil , roast, grill
- Use heart-healthy oils like olive or avocado oil instead of ghee
- Limit: foods high in saturated fat (e.g., red meat, full-fat dairy, butter, coconut oil) to help reduce cardiovascular disease risk.
- Preferred: monounsaturated/ polyunsaturated fats/long-chain fatty acids- fatty fish, nuts, seeds.
- Desserts

PORTION SIZES

If you don't have the tools to measure the exact serving size per food lists' portions, use your hand as a reference to make approximations.

1 PALM = 3 OZ

1 FIST = 1 CUP

1 HANDFUL = 1/2 CUP OR 1 OZ

1 THUMB = 2 TBSP

1 FINGERTIP = 1 TSP

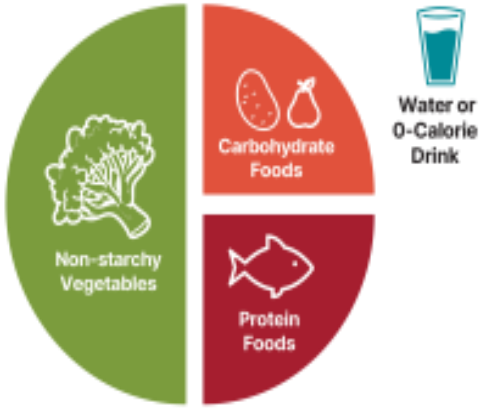
What about exercise?

What about it?

- 150 minutes a week: moderate intensity
- Even little changes make a big difference
- Track your activity
- Find an exercise buddy
- Do what you enjoy
- ADA 2025 guidelines: strength training 2-3/wk to improve muscle sensitivity.
- Lifting weights also builds strong bones and helps bolster a healthy metabolism.
- Monitor blood sugar levels before and after exercise and adjust insulin dos needed

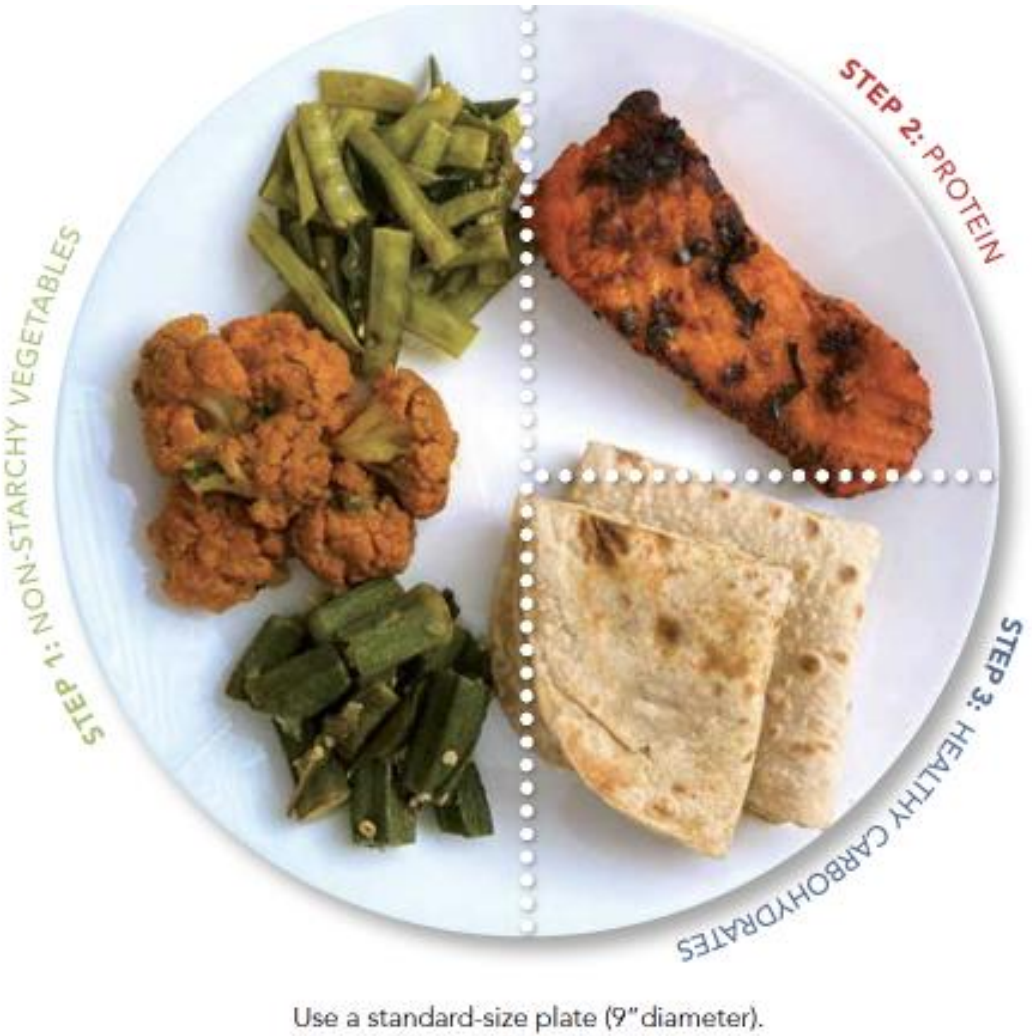
American Diabetes Association.

Take home points



- MEAL PREP
- Cut back on snacking
- Avoid skipping meals and playing “catch up”: stay consistent with your carbs.
- Eat slowly, chew your food

- Drink water instead of sweet dri
- Right portion sizes
- Avoid empty calories
- Use food labels
- Stay active



Use a standard-size plate (9" diameter).

Images: Memorialhermann.org

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NEW DRUGS TO IMPROVE DIABETES : AN EXCITING ERA

RENU JOSHI. M.D.

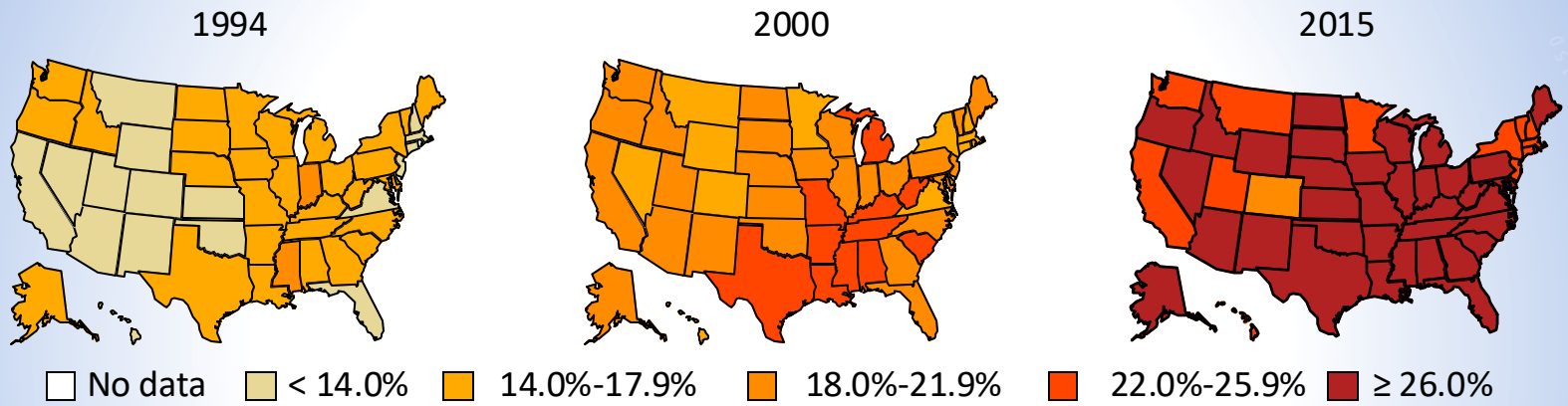
MOUNT NITTANY HEALTH AND JOSHI HEALTH FOUNDATION

OUTLINE

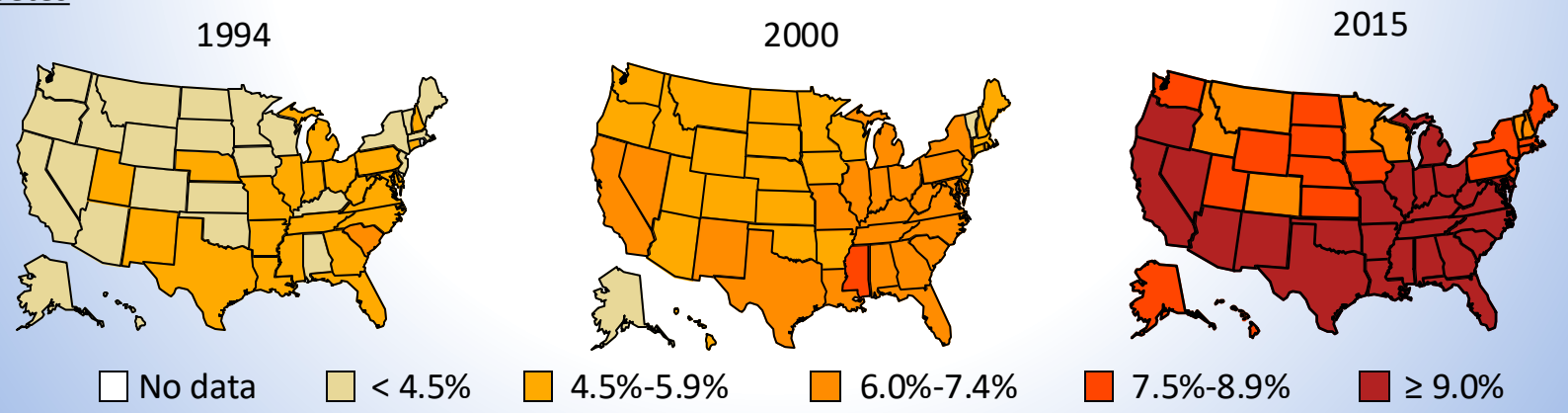
- Dm, Obesity and Heart Disease
- Older drugs
  - Metformin
  - Sulfonylureas like Glipizide, Glimepiride and Glyburide
  - Actos or Pioglitazone
- New drugs
- DPP 4 inhibitors – Januvia ,Tradjenta
  - SGL2 inhibitors- Jardiance , Farxiga, Invokana
  - GLP1 agonists
  - Injectable-Ozempic, Mounjaro, Trulicity , Oral -Rybelsus
  - New Insulins lantus, Basiglar Tresiba , Insulin pumps

AGE-ADJUSTED PREVALENCE OF OBESITY AND DIAGNOSED DIABETES AMONG U.S. ADULTS

Obesity (BMI ≥ 30)



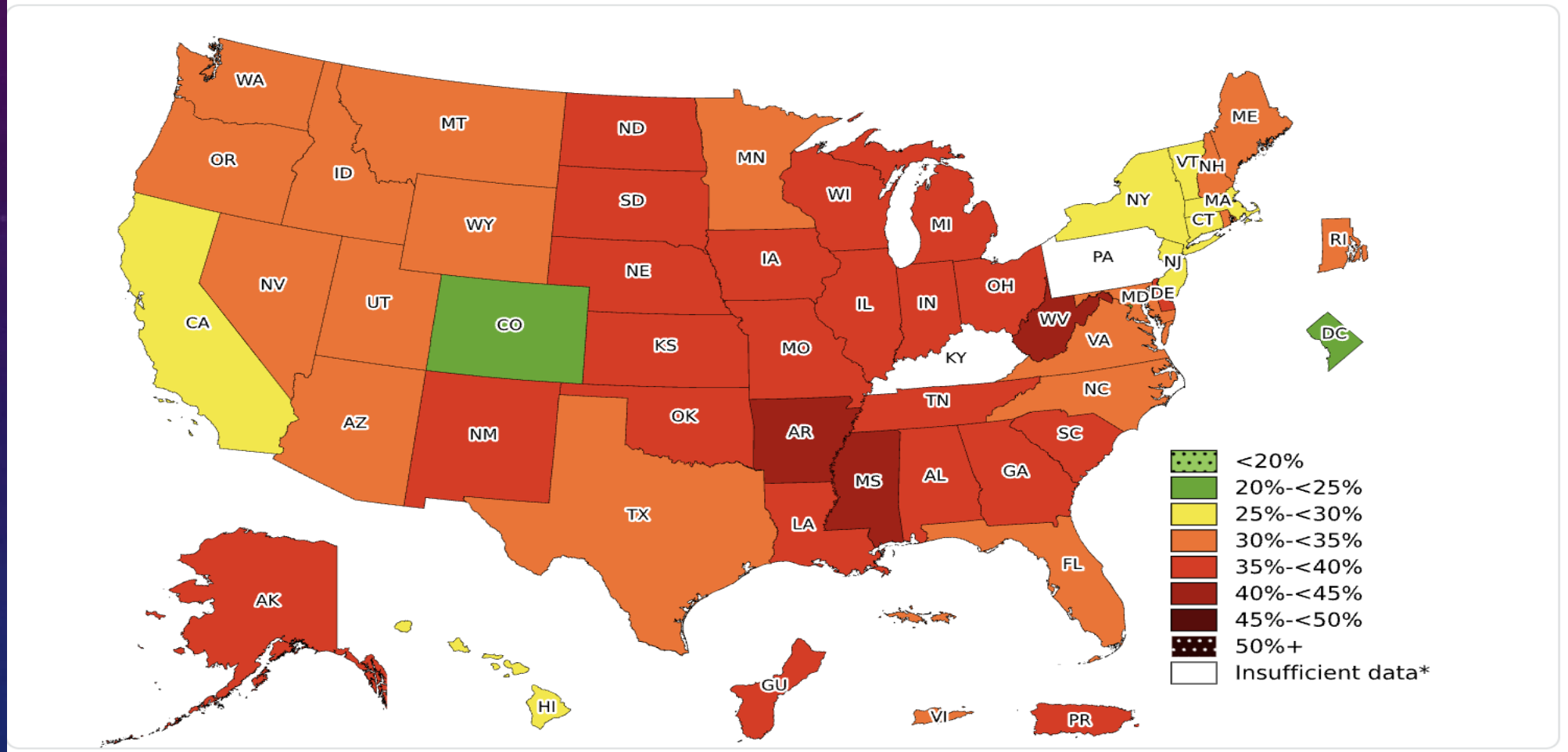
Diabetes



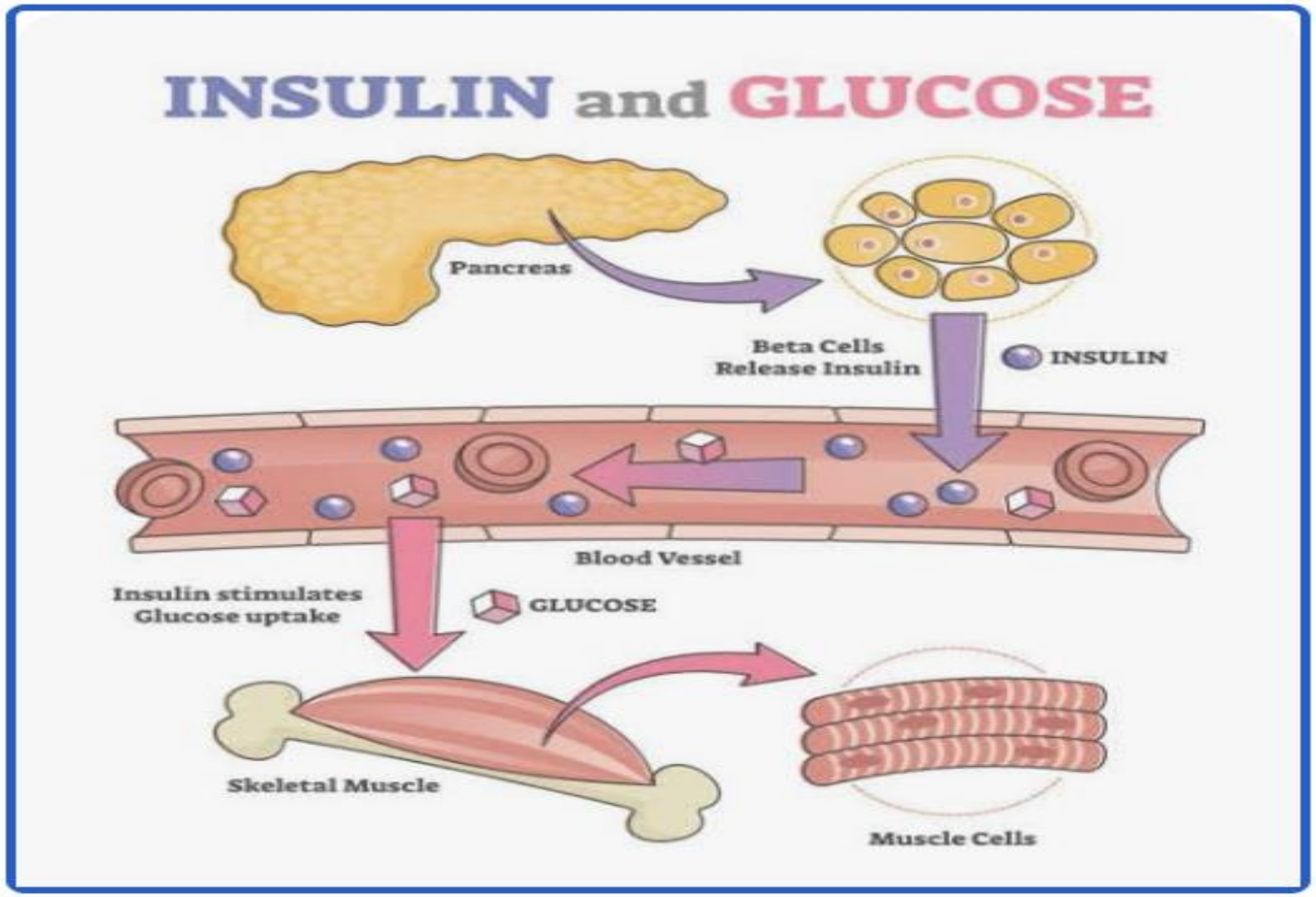
CDC's Division of Diabetes Translation. National Diabetes Surveillance System.

Slide credit: clinicaloptions.com

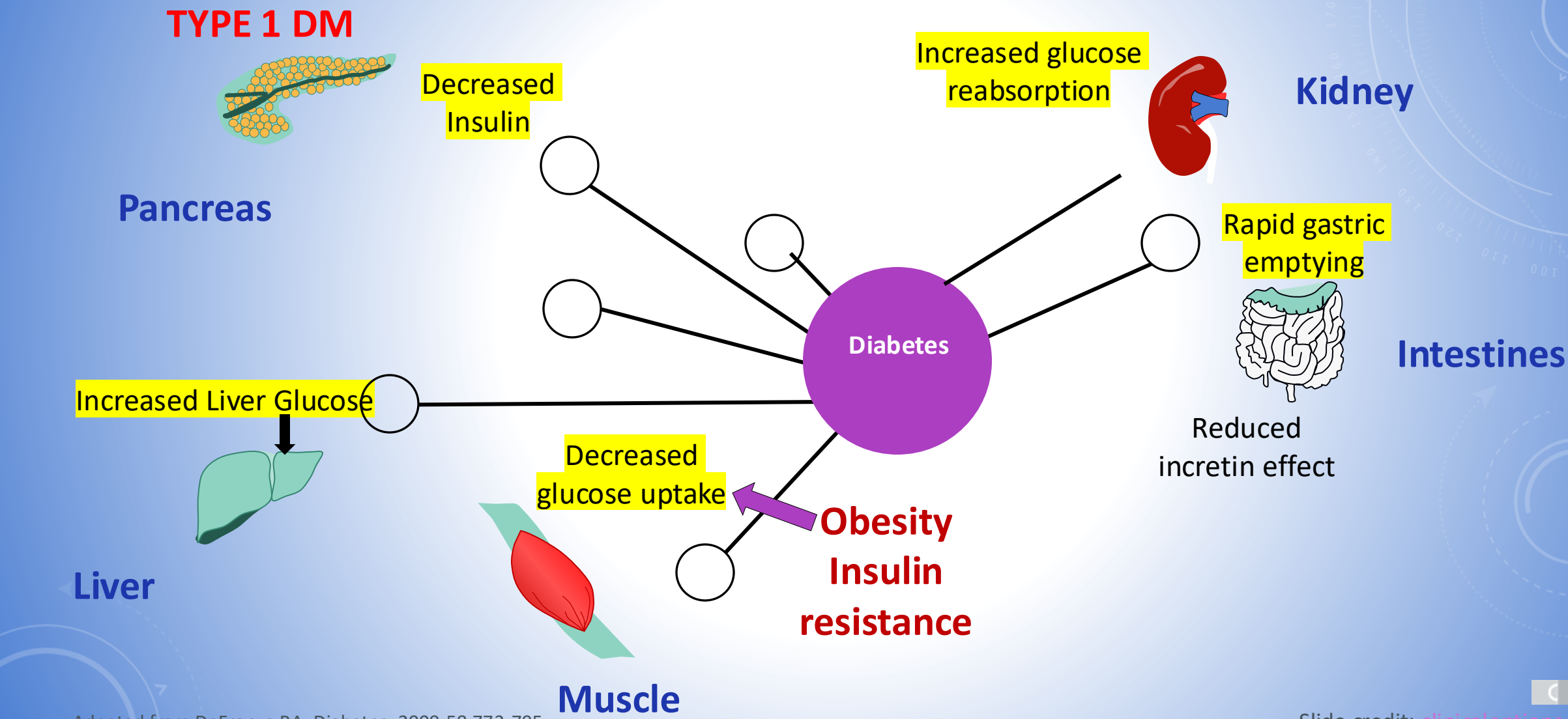
OBESITY 2024



PHYSIOLOGY OF SUGAR AND INSULIN



METABOLIC ABNORMALITIES IN T2D



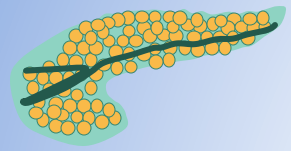
Adapted from DeFronzo RA. Diabetes. 2009;58:773-795.

Slide credit: clinicaloptions.com

DM AND HEART DISEASE

- Heart disease still remains number one cause of death in our diabetic populations
- it includes both CAD and Cardiomyopathy
- Diabetes is one of the most important contributor to heart disease along with Cholesterol and High BP
- FDA now mandates that all Diabetes drugs should be tested for their effect on heart.

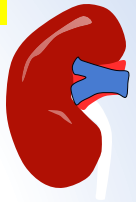
WHERE DO DRUGS WORK ??



Decreased Insulin

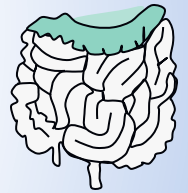
Glipizide

Increased glucose reabsorption



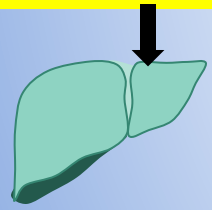
SGL2 inhibitors

Rapid gastric emptying



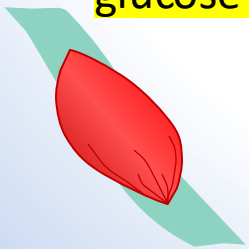
Diabetes

Increased Liver Glucose



Metformin

Decreased glucose uptake



Actos

Insulin resistance

Reduced incretin effect

GLP1 AGONIST

DPP 4 Inhibitor

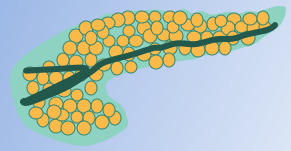
Adapted from DeFronzo RA. Diabetes. 2009;58:773-795.

Slide credit: clinicaloptions.com

METFORMIN

- Oldest and cheapest drug approved for DM . Works by making less Glucose from Liver and improving Insulin resistance.
- Completely safe for Kidneys.
- Improves DM HbA1c by 1-2 points
- Cannot be started If you have advanced kidney disease
- Can cause diarrhea and abdominal pain
- Causes wt loss due to decreased appetite .

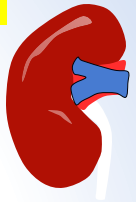
WHERE DO DRUGS WORK ??



Decreased Insulin

Sulfonylureas
Glipizide

Increased glucose reabsorption



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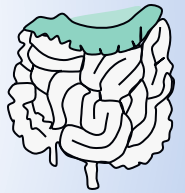

Diabetes

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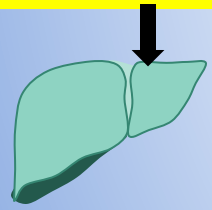

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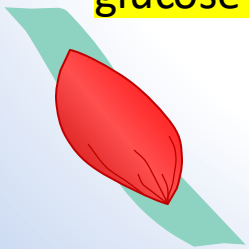

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Reduced incretin effect

GLP1 AGONIST

DPP 4 Inhibitor

Insulin resistance

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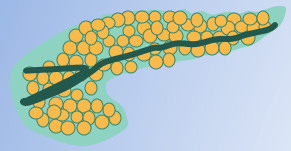
SULFONYLUREAS
GLIPIZIDE, GLIMEPIRIDE, GLYBURIDE

- Older and cheap drugs available to us
- Increase more insulin from pancreas
- Very potent . Improve A1c between 1-2 points
- Can cause low blood sugar if you miss a meal
- Safe until advanced kidney disease
- Can cause weight gain

WHERE DO DRUGS WORK ??



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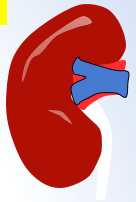
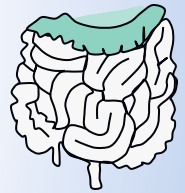


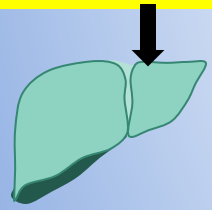
SGL2 inhibitors

Rapid gastric emptying



Diabetes

Increased Liver Glucose



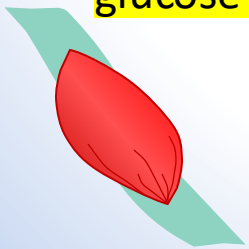
Metformin

Reduced incretin effect

GLP1 AGONIST

DPP 4 Inhibitor

Decreased glucose uptake



Actos

Insulin resistance

Adapted from DeFronzo RA. Diabetes. 2009;58:773-795.

Slide credit: clinicaloptions.com

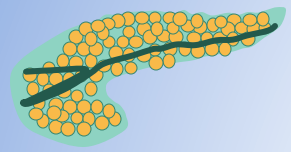
ACTOS (PIOGLITAZONE)

- Works on pushing Glucose from blood into muscle to use for energy .
- Great cheap early drugs to use
- Biggest problem is wt gain and swelling of feet
- Can not be used for liver disease although if you have fatty liver with normal liver functions it improves that condition

NEW THERAPIES

- SGL2 inhibitors
- GLP1 agonists
- DPP4 Inhibitors

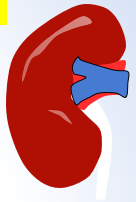
WHERE DO DRUGS WORK ??



Decreased Insulin

Glipizide

Increased glucose reabsorption



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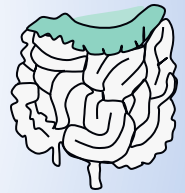

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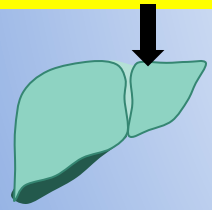

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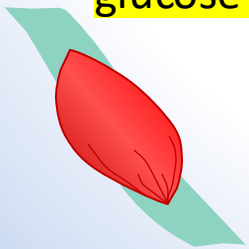

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DPP 4 Inhibitor

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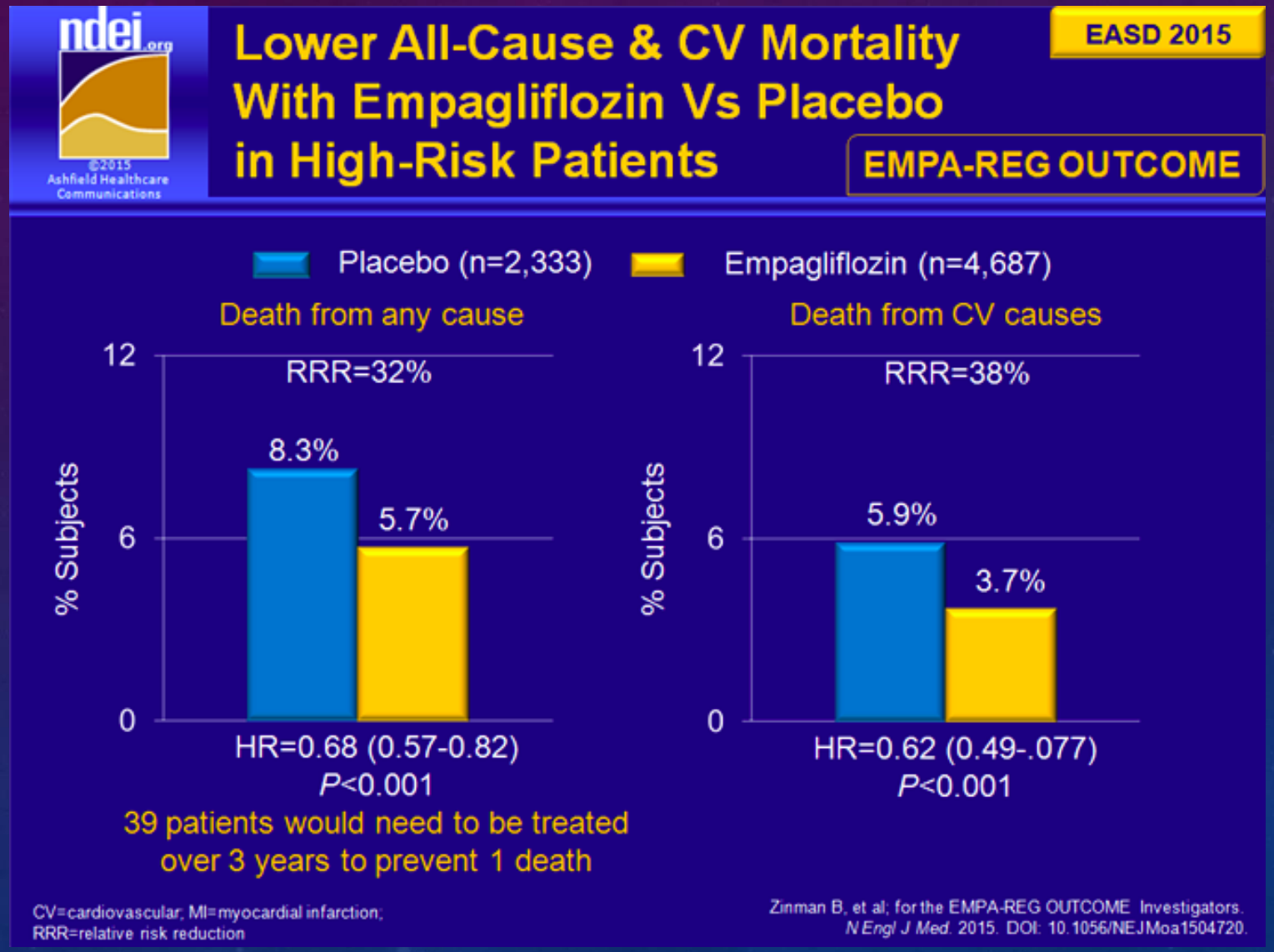
SGL2 INHIBITORS
INVOKANA, JARDIANCE, FARXIGA

- Work on excreting sugar into kidneys and thus lowering Blood sugar
- These drugs also has favorable effects on markers of arterial stiffness and vascular resistance, decreasing body fat , and reducing kidney protein (all markers of heart disease)
- Safe for kidneys and actually improve kidney disease

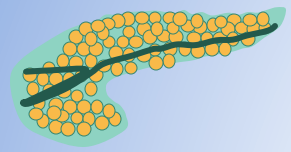
EMPA-REG STUDY JARDIANCE



SGL2 INHIBITORS CONT.…

- safety data up to 10 yrs .Over all Dec A1c between 0.7-1.2 .
- **causes wt loss**
- Inc Risk of UTI and Yeast infection(10%)
- Dizziness and hypotension in elderly.
- Hypersensitivity reactions have been noticed
- Good for patients with kidney disease and actually improves Kidney function
- Must drink lots of water.

WHERE DO DRUGS WORK ??



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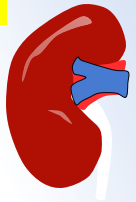

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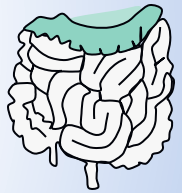

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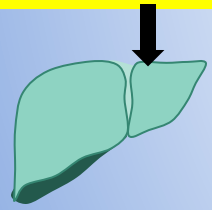

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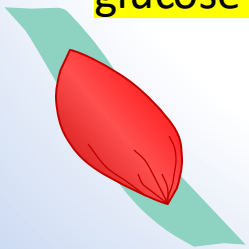

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GLP1 AGONISTS

- DAILY
  - Exenatide or Byetta
  - Liraglutide /Victoza
- weekly
  - Semaglutide -Ozempic and Wegovy (used for Obesity)
  - Dulaglutide or Trulicity
  - Tirzepatide or Mounjaro and Zepbound (used for Obesity)

GLP AGONISTS

- Main stay of action is Increase of Insulin after food .
- Delay Stomach emptying ..
- Most effect on post prandial hyperglycemia (after-meal) .
- DPP 4 inhibitors
  - -Work on increasing own body GLP1 so same effect but much less effective.
  - -Average A1c drop is 0.5-0.7 .
  - -No Weight loss

GLP1 AGONISTS EFFECTS

- High efficacy can reduce A1c between 1-2 %
- Low risk of hypoglycemia
- Weight loss common can lose up to 50 lbs
- Oral Semaglutide option Rybelsus
- Given weekly injection within 1 hr of meal
- Has to be started slowly and gradually titrated every 4 weeks

GLP1 AND HEART DISEASE

- **Reduce cardiovascular events**: GLP-1 agonists can reduce the risk of stroke, heart attack, and death from cardiovascular causes.
- **Improve myocardial ischemia**: can improve blood flow to the heart muscle.
- **Improve endothelial function**: can improve the function of the lining of blood vessels.
- **Reduce plaque formation**: can reduce the buildup of plaque in arteries.

GLP-1 AGONISTS LINKED TO REAL-WORLD CARDIOVASCULAR BENEFITS IN PATIENTS WITH CO-EXISTING DIABETES AND COPD
CLEVELAND CLINIC

- **15%** lower risk of heart failure and heart failure exacerbations
- **12%** reduced risk of Heat attacks
- **37**% reduced risk of cardiac arrest
- The GLP-1 group also had **a 41%** reduced risk of dying from all causes

SIDE EFFECTS

- Potential GI side effects (e.g. nausea, vomiting, diarrhea)
- Most are injectable (although pain is minimal): can affect adherence, injection-site reactions possible
- FDA black box warning: risk of thyroid c-cell tumors
- Minimal risk of pancreatic inflammation but cannot be used in strong H/O pancreatitis or F/H of pancreatic cancer

WEIGHT CHANGES WITH DIABETES MEDICATIONS

Drug	Expected Weight Change
GLP-1 RA	Loss
SGLT2 inhibitor	Loss
Metformin	Neutral (potential for modest loss)
DPP-4 inhibitor	Neutral
Sulfonylureas	Gain
TZD	Gain
Insulin	Gain

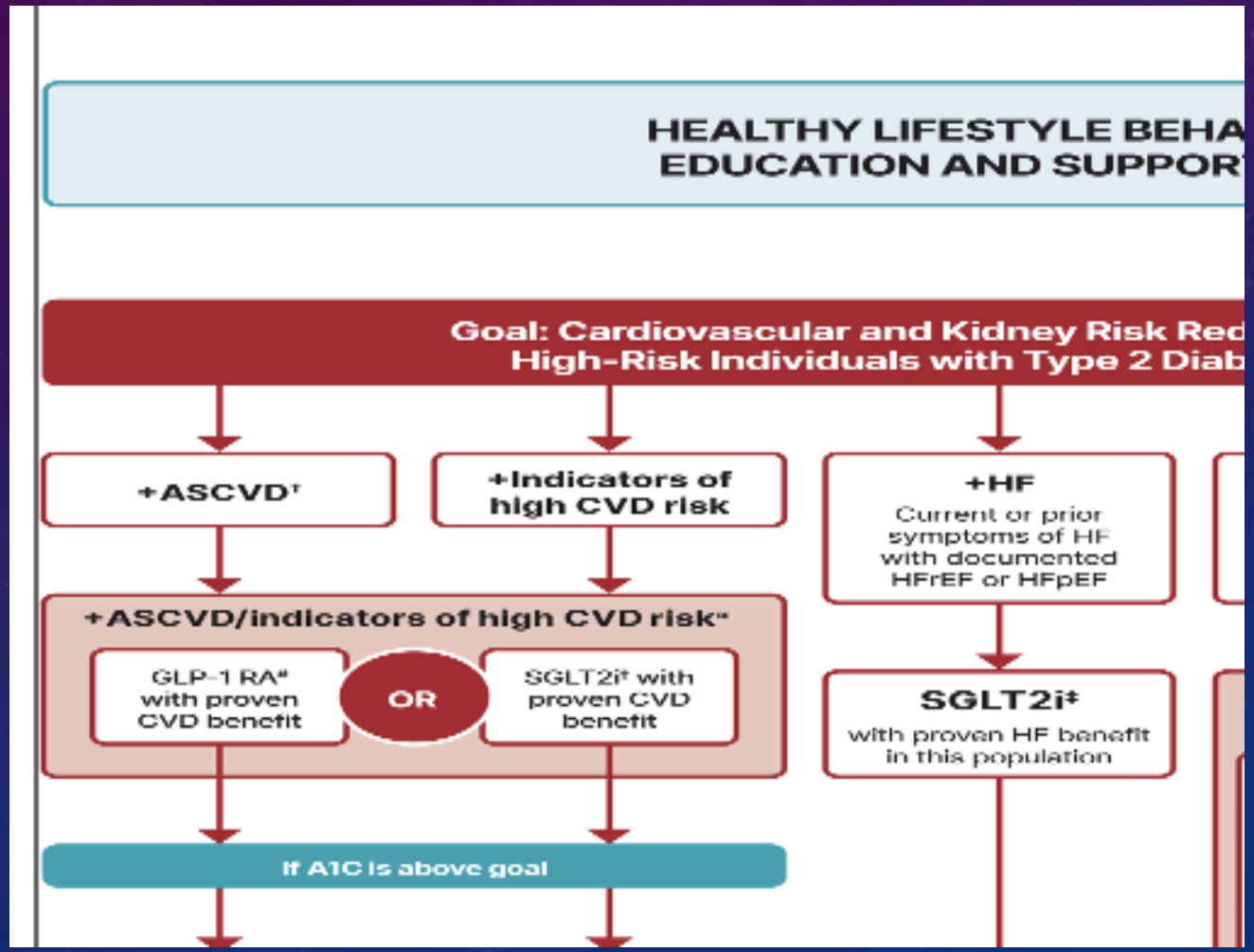
Slide credit: clinicaloptions.com

RENAL EFFECTS BY DRUG CLASS

Drug	Progression of DKD
Metformin	Neutral
Sulfonylureas	Neutral
TZDs	Neutral
DPP-4 blockers	Neutral
GLP-1 RAs	Benefit
SGLT2 blockers	Benefit
Insulin	Neutral

Slide credit: clinicaloptions.com

ADA RECOMMENDATIONS FOR 2025



NEW INSULINS

- Lantus- Long acting Insulin Lasts for 24 hrs
- Treseba -similar but lasts for 36 hrs
- Novolog, Humalog , Apidra and Fiasp- Quick acting insulin which can work within 15 min
- Pens - can calculate your insulin according to carbs
- Insulin pumps many types and very sophisticated

SUMMARY

- Heart disease is the most important sequelae of Diabetes
- Lot of new drugs are now available which are not only improving DM but also causing Wt loss and improving both Kidney disease and Heart disease
- Many of these drugs are being used for Obesity because of added benefits.
- Please talk to your doctor if your diabetes is uncontrolled and if you are over weight and you are not on these drugs .

JOSHI Health Foundation
Care Coach Inspire

Aghni

Diabetes: What is new in 2025?

QUESTION-ANSWER SESSION