TYPE 2 DIABETES MELLITUS

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REGISTERED DIETITIAN

BEARTOOTH BILLINGS CLINIC

PRESENTER DISCLOSURE INFORMATION

I HAVE NO DISCLOSURES

INTRODUCTION

- Originally from Duluth, MN
  - University of MN, Twin Cities
  - DI at Minneapolis VA
- Why Dietetics?
  - Where the rubber meets the road.
- Why Red Lodge, MT?

AGENDA

- What is diabetes?
- Types of diabetes
- How does DM develop and who is at risk
- Early signs/symptoms
- Criteria for dx DM
- Treatment of DM
- Complications

WHAT IS DIABETES MELLITUS?

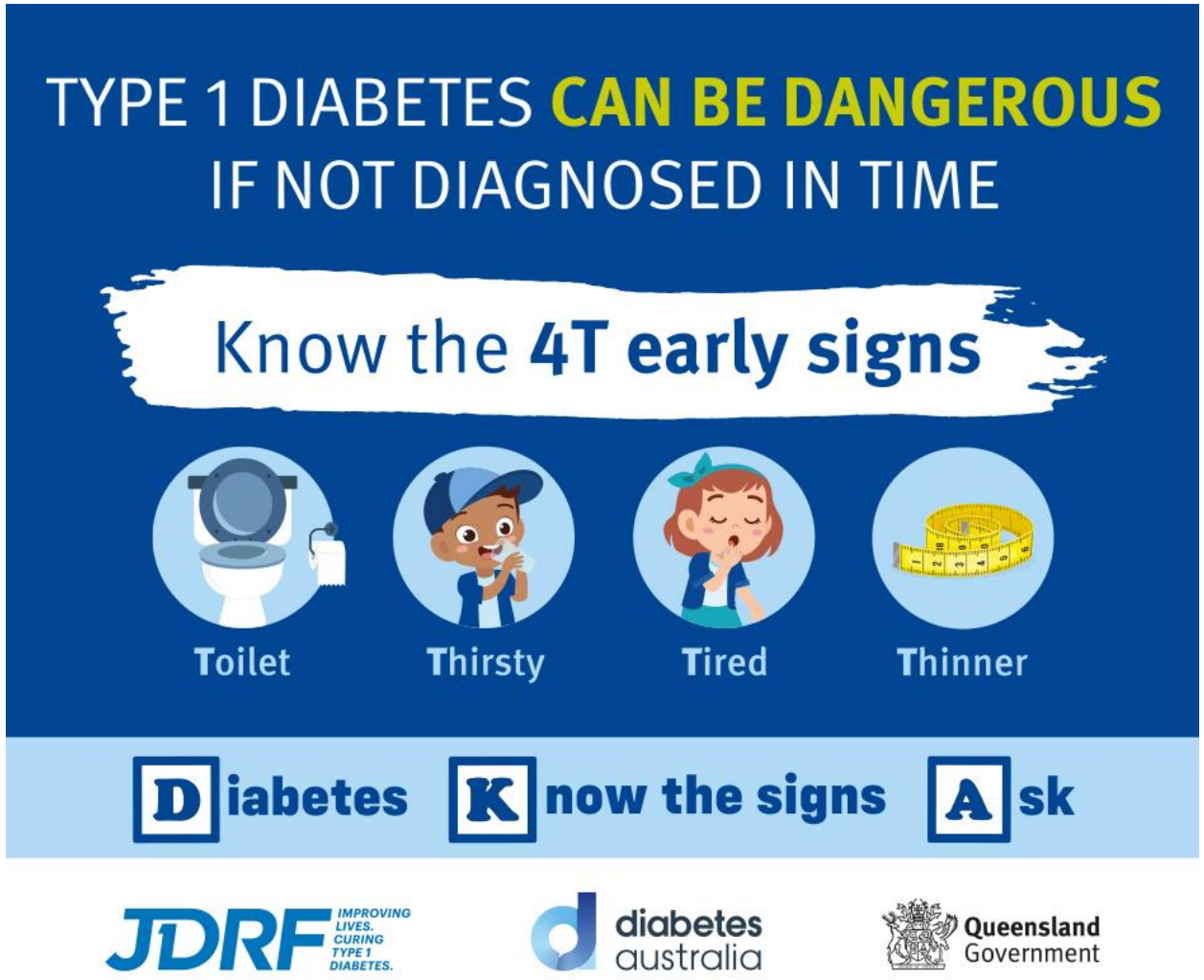
A chronic, or autoimmune condition, where the body is unable to produce or respond to the hormone insulin, which causes abnormal metabolism of carbohydrates and hyperglycemia

TYPES OF DM

- Type 1
- Type 2
- Gestational diabetes

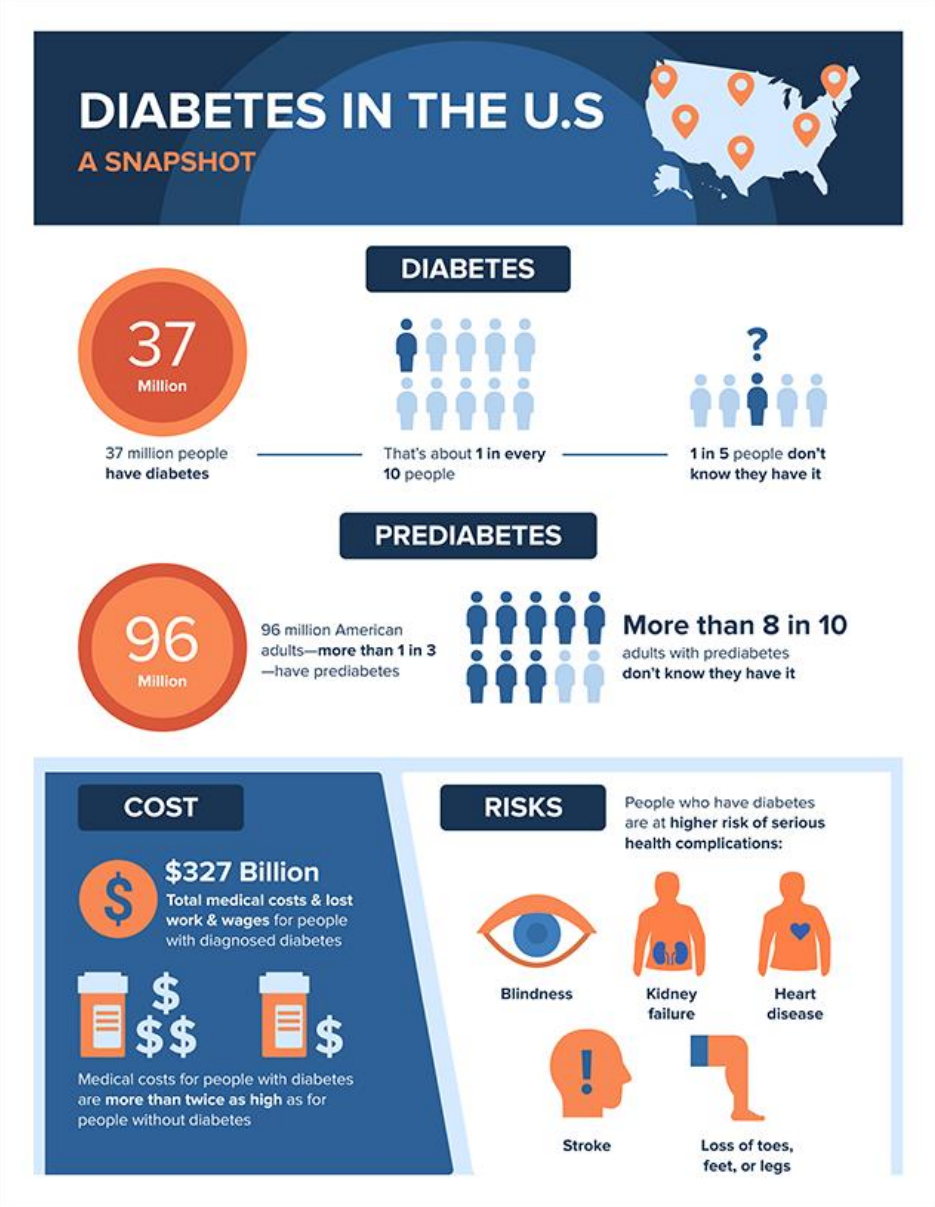
WHAT IS T1DM

- Autoimmune
- Generally, dx in teens
- Insulin deficient



WHAT IS GESTATIONAL DIABETES (GDM)

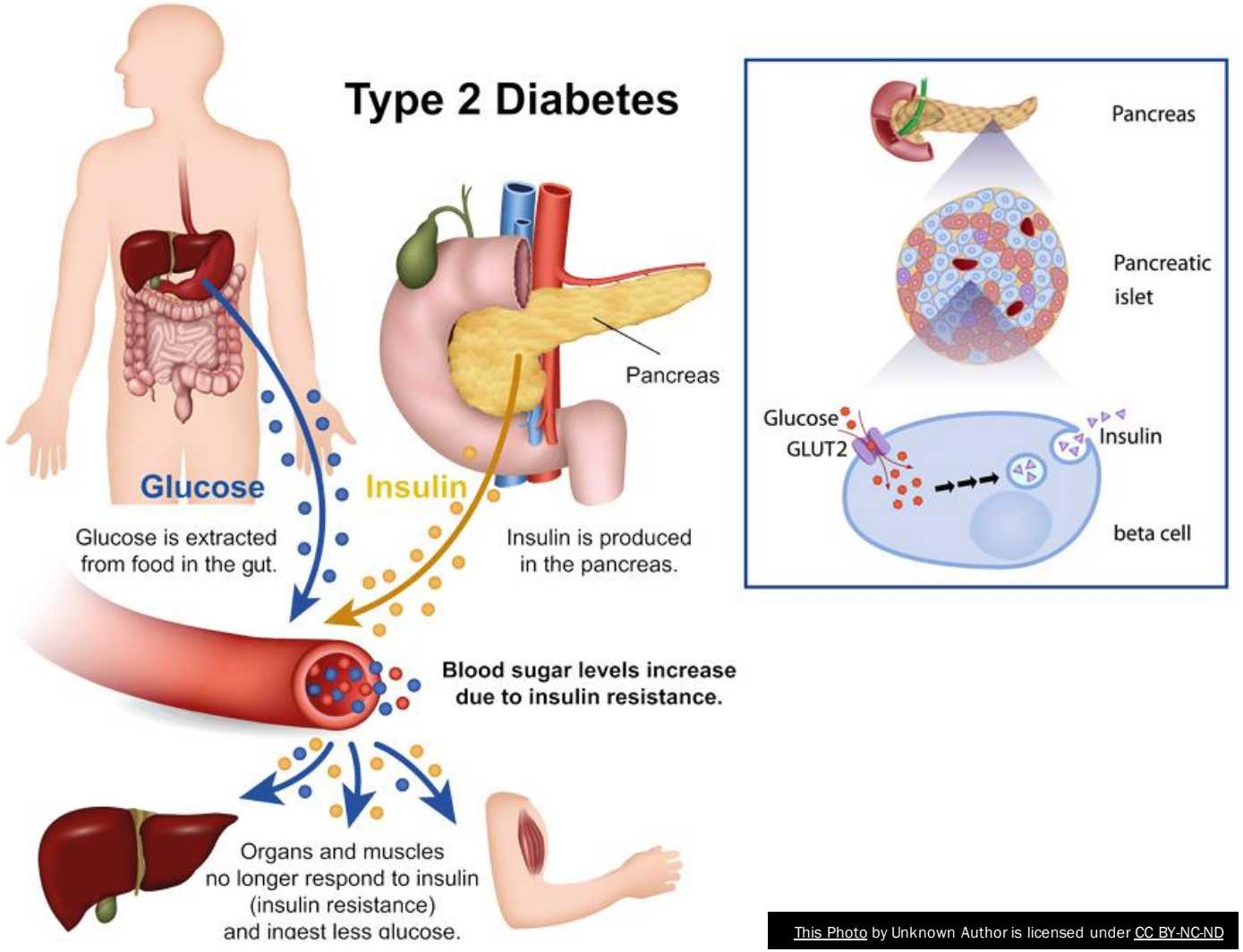
- Pregnancy
- Minimal symptoms
- Genetics?
- OGTT 24-28 weeks
- Increased risk of T2DM



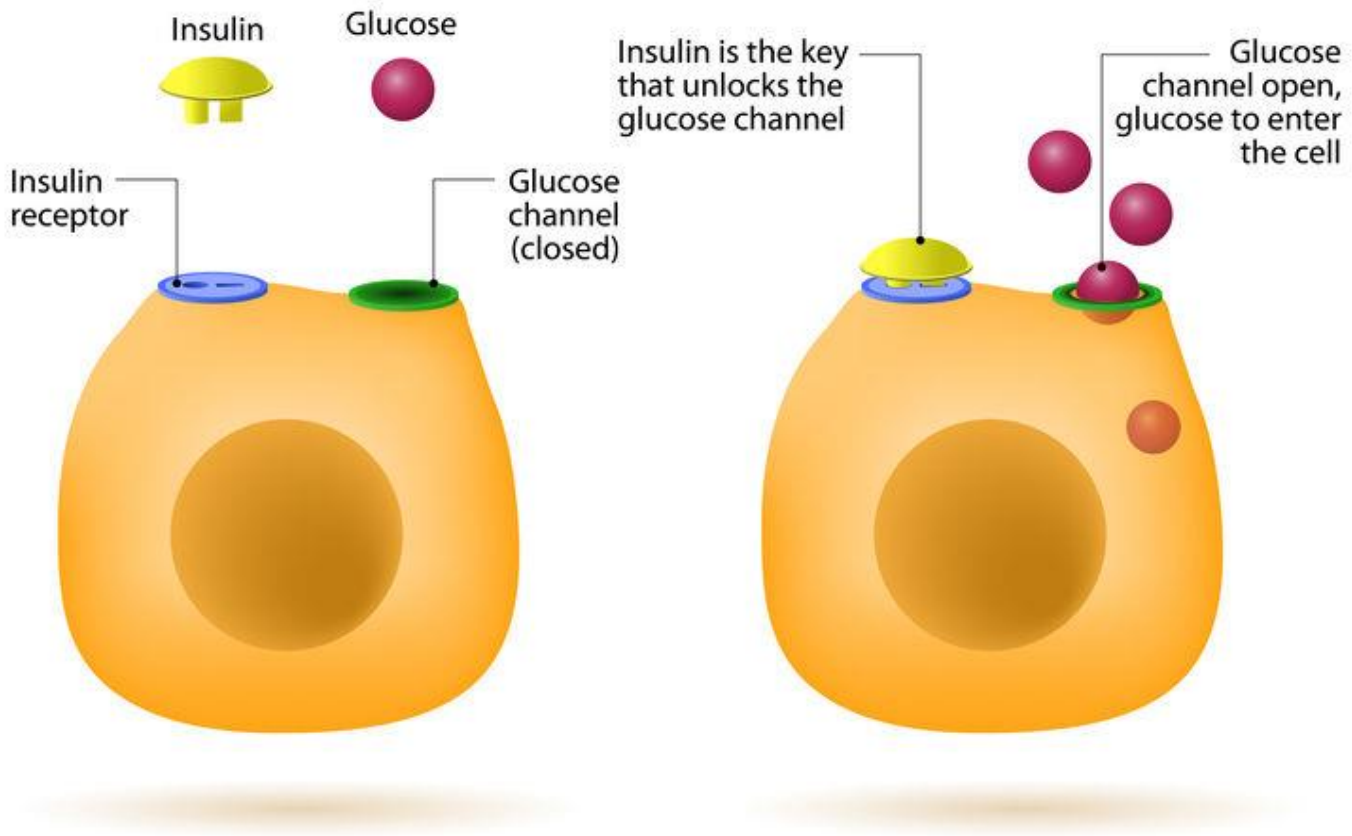
WHAT IS TYPE 2 DIABETES MELLITUS (T2DM)

- Chronic condition
- "Adult-onset diabetes"
- Characterized by high levels of blood sugar
- Mechanism is different from T1DM

HOW DOES T2DM EVOLVE



HOW DOES INSULIN WORK?



WHO DEVELOPS T2DM/ RISK FACTORS

Modifiable vs. Nonmodifiable risk factors

- Family history, race/ethnicity, age, gestational diabetes
- Weight, physical activity, tobacco use, diet, alcohol, stress, sleep

PREVALENCE OF T2DM

- In 2019 8% (64,000) Montana adults report a history of diabetes
  - 35% of adults in MT are at risk of developing T2DM
- 1 in 10 Montana residents have diabetes
- 1 in 3 adults in the US have prediabetes

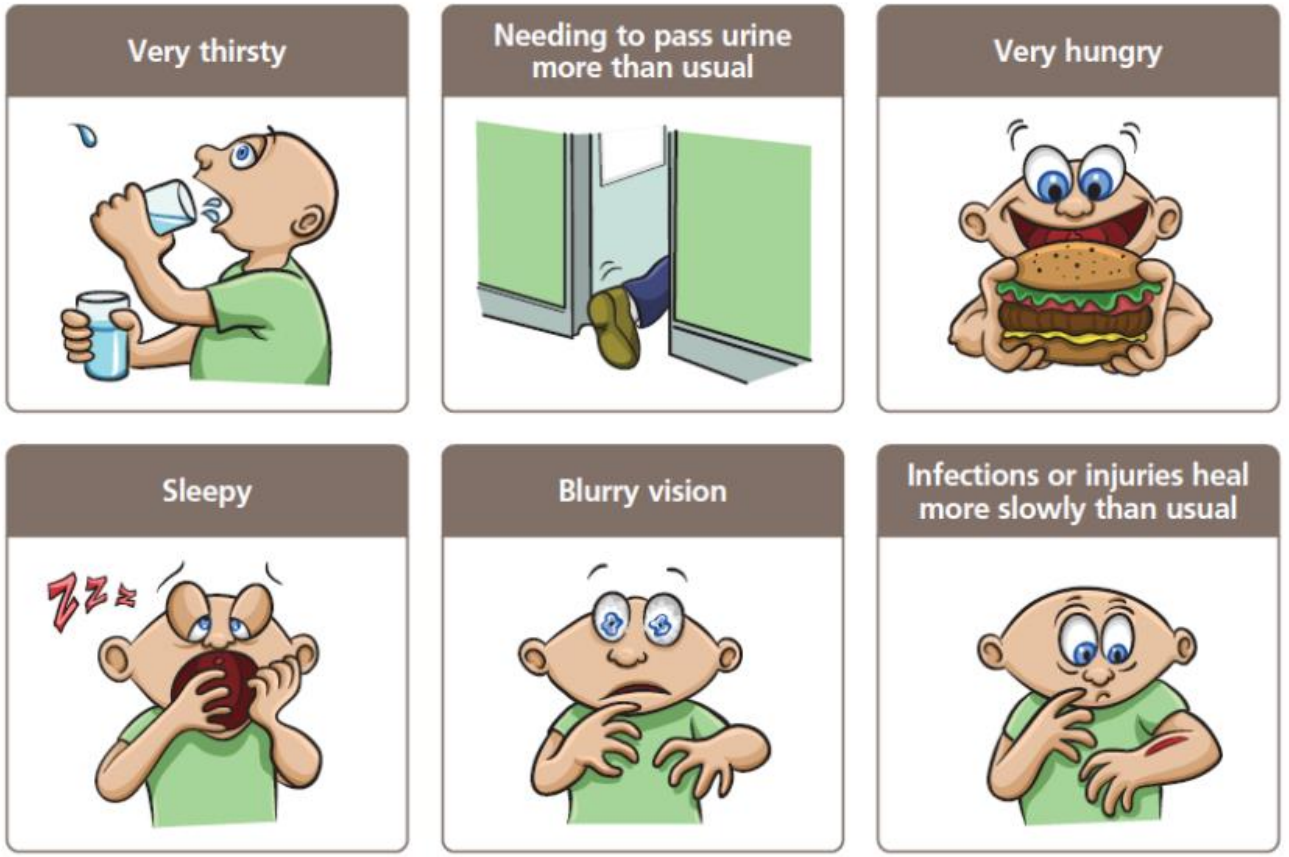
WHEN TO SCREEN FOR T2DM / PREDIABETES

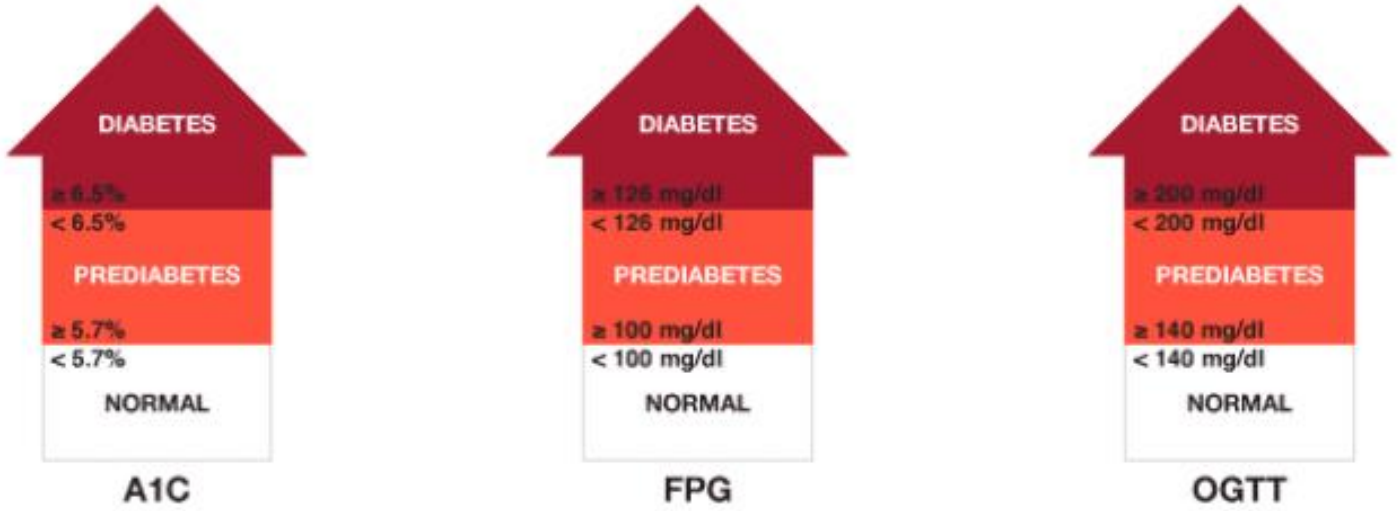
Are you at risk?

- ***You could have prediabetes if you:***
- Are you 45 years of age or older?
- Are overweight.
- Have a family history of type 2 diabetes.
- Have a history of gestational diabetes.
- Are physically active less than 3 times a week.
- Have certain medical conditions like high blood pressure.

SIGNS AND SYMPTOMS OF T2DM

- Image Credit: Cornerstones4Care, Novo Nordisk





DIAGNOSING CRITERIA FOR DIABETES

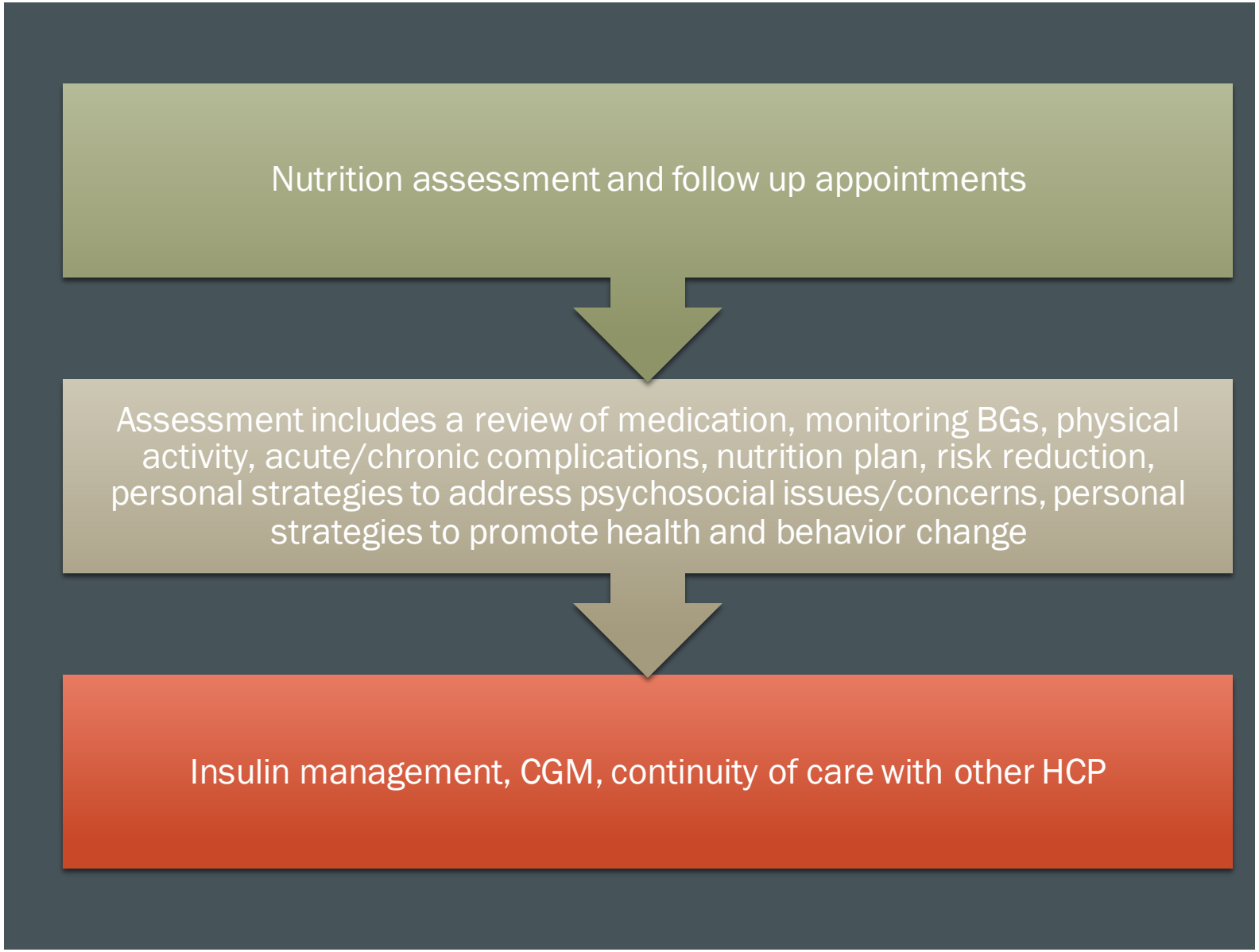
DIABETES MANAGEMENT

- Patient-centered, team-based approach
- “Ongoing process of facilitating knowledge, skill, and ability necessary for diabetes self-care”
- Guided by evidence-based standards

HCP SUPPORTING DM PATIENTS

PCP	Endocrinologist	Certified Diabetes Care and Education Specialist	Registered Nurse	Pharmacist
Opthalmolgist	Podiatrist	Wound care	Mental Health Professional	Fitness Profession

ROLE OF RD


Nutrition assessment and follow up appointments
Assessment includes a review of medication, monitoring BGs, physical activity, acute/chronic complications, nutrition plan, risk reduction, personal strategies to address psychosocial issues/concerns, personal strategies to promote health and behavior change
Insulin management, CGM, continuity of care with other HCP

TREATMENT OF T2DM

TREATMENT OPTIONS: FIRST LINE THERAPY

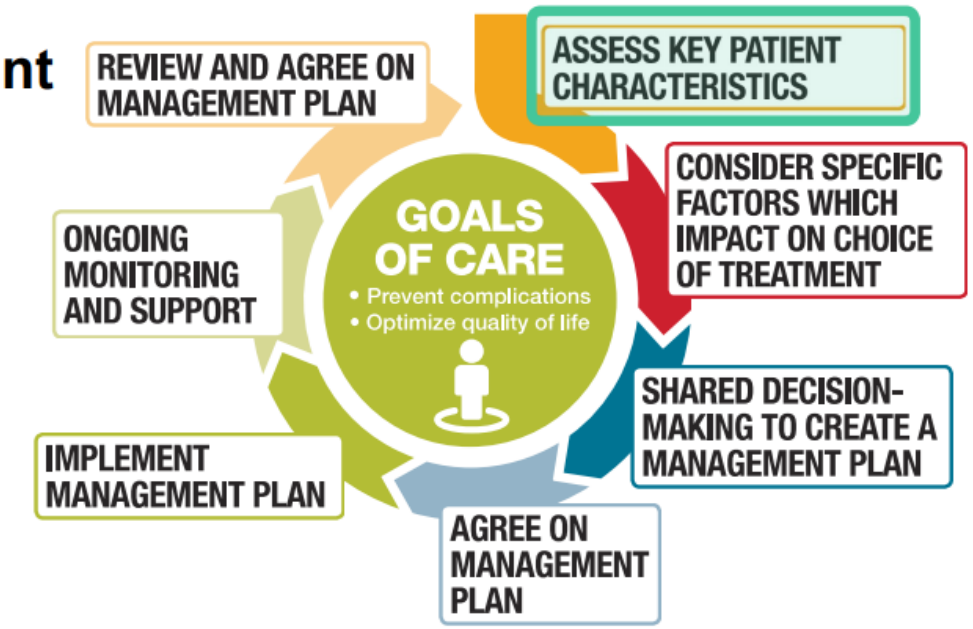
- Always individualized
- Considering Standards of Care
- Generally, a combination of metformin and/or diet and lifestyle modification

GOALS OF CARE

Decision Cycle for Patient-Centered Glycemic Management

ASSESS KEY PATIENT CHARACTERISTICS

- Current lifestyle
- Comorbidities i.e. ASCVD, CKD, HF
- Clinical characteristics i.e. age, HbA_{1c}, weight
- Issues such as motivation and depression
- Cultural and socio-economic context



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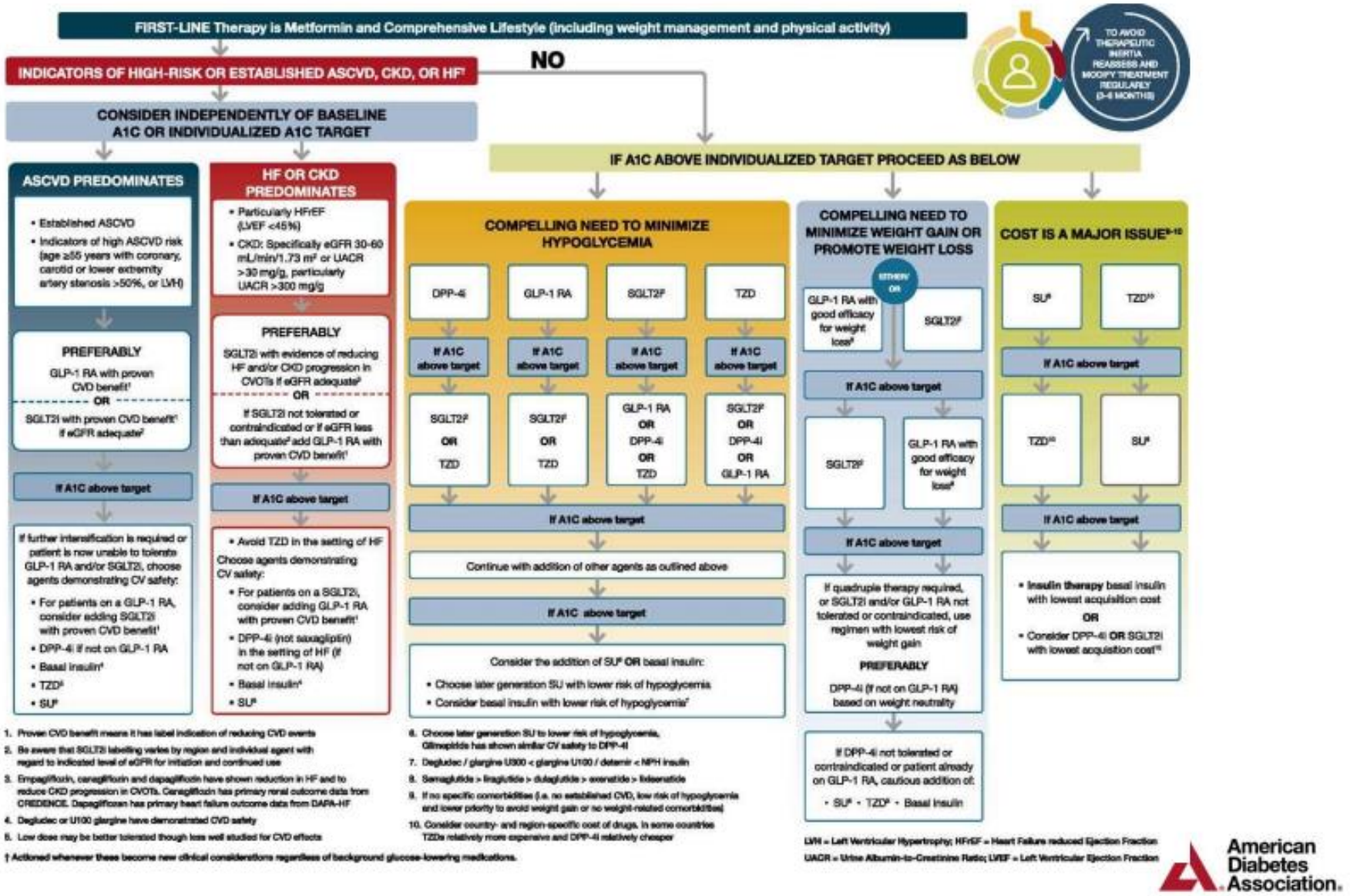
American Diabetes Association.



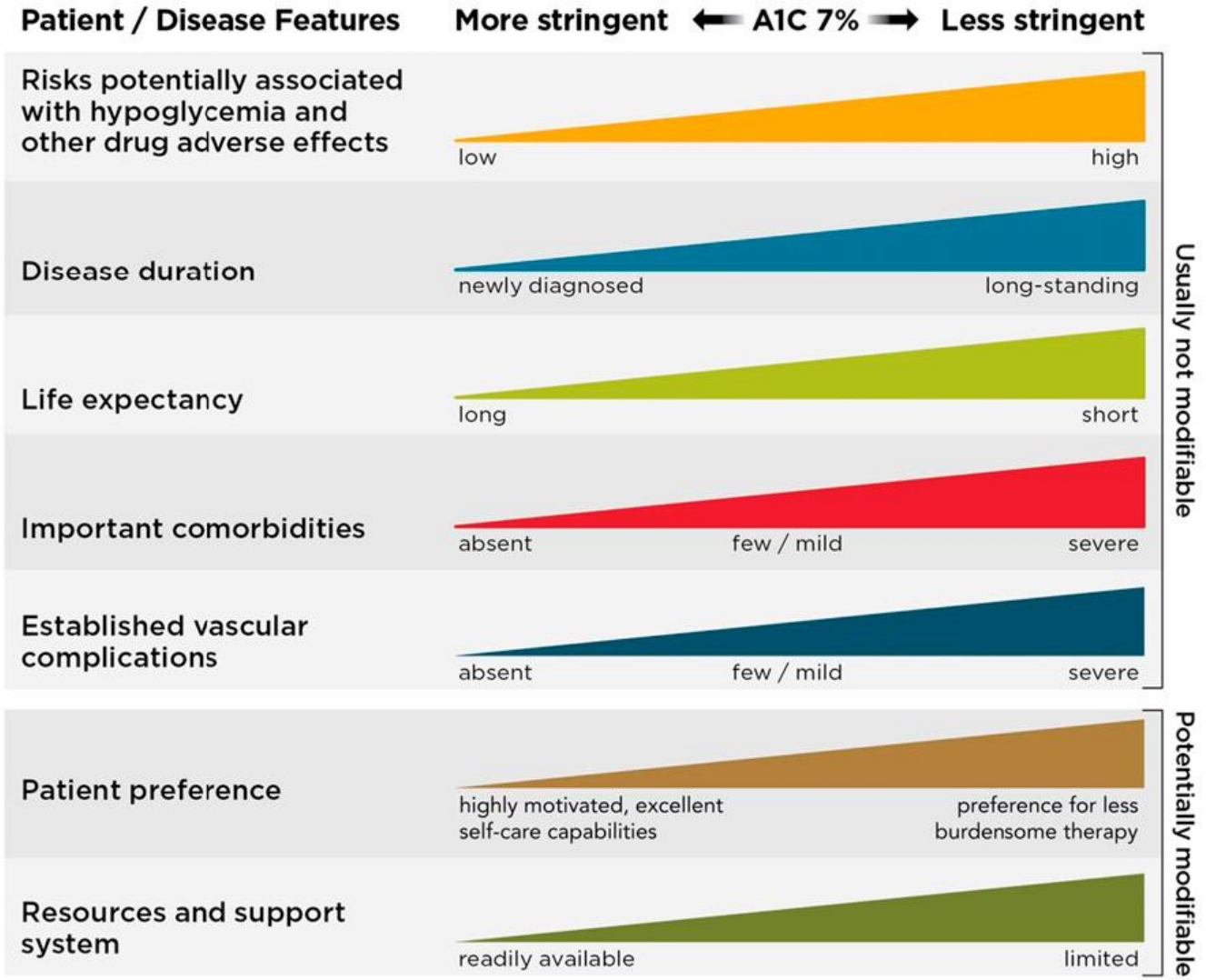
1. Proven CVD benefit means it has label indication of reducing CVD events
2. Be aware that SGLT2i labelling varies by region and individual agent with regard to indicated level of eGFR for initiation and continued use
3. Empagliflozin, canagliflozin and dapagliflozin have shown reduction in HF and to reduce CKD progression in CVOTs. Canagliflozin has primary renal outcome data from CREDENCE. Dapagliflozan has primary heart failure outcome data from DAPA-HF
4. Degludec or U100 glargine have demonstrated CVD safety
5. Low dose may be better tolerated though less well studied for CVD effects
6. Choose later generation SU to lower risk of hypoglycemia. Glimepiride has shown similar CV safety to DPP-4i
7. Degludec / glargine U300 < glargine U100 / detemir < NPH insulin
8. Semaglutide > liraglutide > dulaglutide > exenatide > lixisenatide
9. If no specific comorbidities (i.e. no established CVD, low risk of hypoglycemia and lower priority to avoid weight gain or no weight-related comorbidities)
10. Consider country- and region-specific cost of drugs. In some countries TZDs relatively more expensive and DPP-4i relatively cheaper

† Actioned whenever these become new clinical considerations regardless of background glucose-lowering medications.

LVH = Left Ventricular Hypertrophy; HFrEF = Heart Failure reduced Ejection Fraction
UACR = Urine Albumin-to-Creatinine Ratio; LVEF = Left Ventricular Ejection Fraction

American Diabetes Association.

Approach to Individualization of Glycemic Targets



BENEFITS OF DSME

- Benefits of DSME
  - Have improved A1c levels
  - Higher levels of medication adherence
  - Improved Blood pressure/cholesterol levels
  - Fewer or less severe diabetes-related complications
  - Healthier lifestyles
  - Decreased health care costs, including fewer hospitalizations and readmissions

DSME IN MT

An estimated 5,300 Montana adults with diagnosed diabetes did not seek needed medical care due to costs in 2019

4 in 10 (42%) MT adults with DM reported NEVER taking a course or class to better self-manage diabetes

DPP

Diabetes Prevention Program

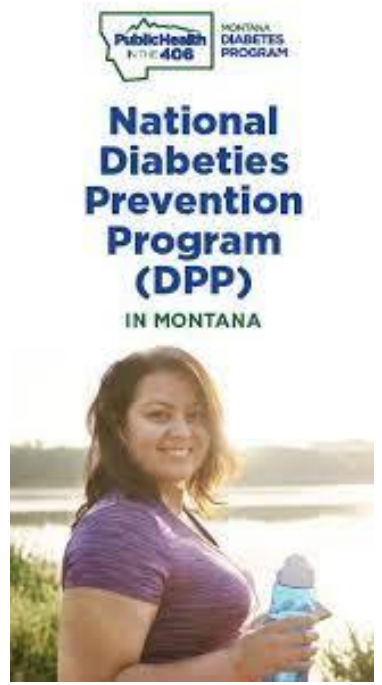
CDC evidence-based program to prevent or delay the progression of T2DM and cardiovascular disease

Prediabetes is REVERSIBLE

Estimated 35% of adults are at “high risk” of developing T2DM

Program that works!

Shown to reduce the risk of T2DM by 58%



COMPLICATIONS OF DIABETES

COMPLICATIONS OF DM

Acute

- Complications that generally require immediate attention

Chronic

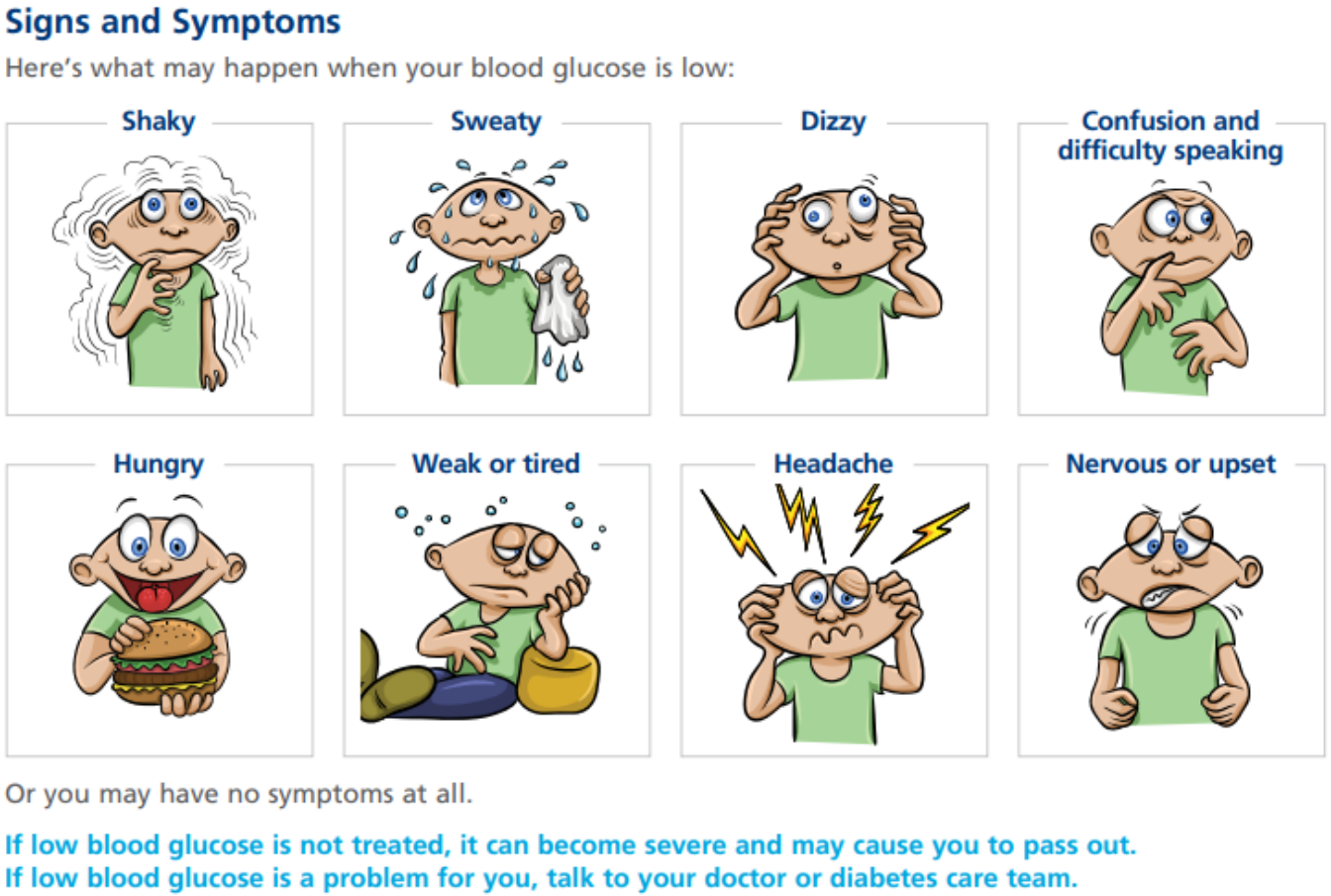
- Serious complications that progress over time

ACUTE COMPLICATIONS

- Hypoglycemia
- Hyperglycemia
- Hyperosmolar Hyperglycemic State (HHS)
- Diabetic ketoacidosis (DKA)

HYPOGLYCEMIA

- Clinically <70 mg/dL



15-15 RULE

What to do if you think you have low blood glucose

CHECK

- Check your blood glucose right away if you have any symptoms of low blood glucose
- If you think your blood glucose is low but cannot check it at that time, treat anyway

TREAT

Treat by eating or drinking **15 grams** of something high in sugar, such as:

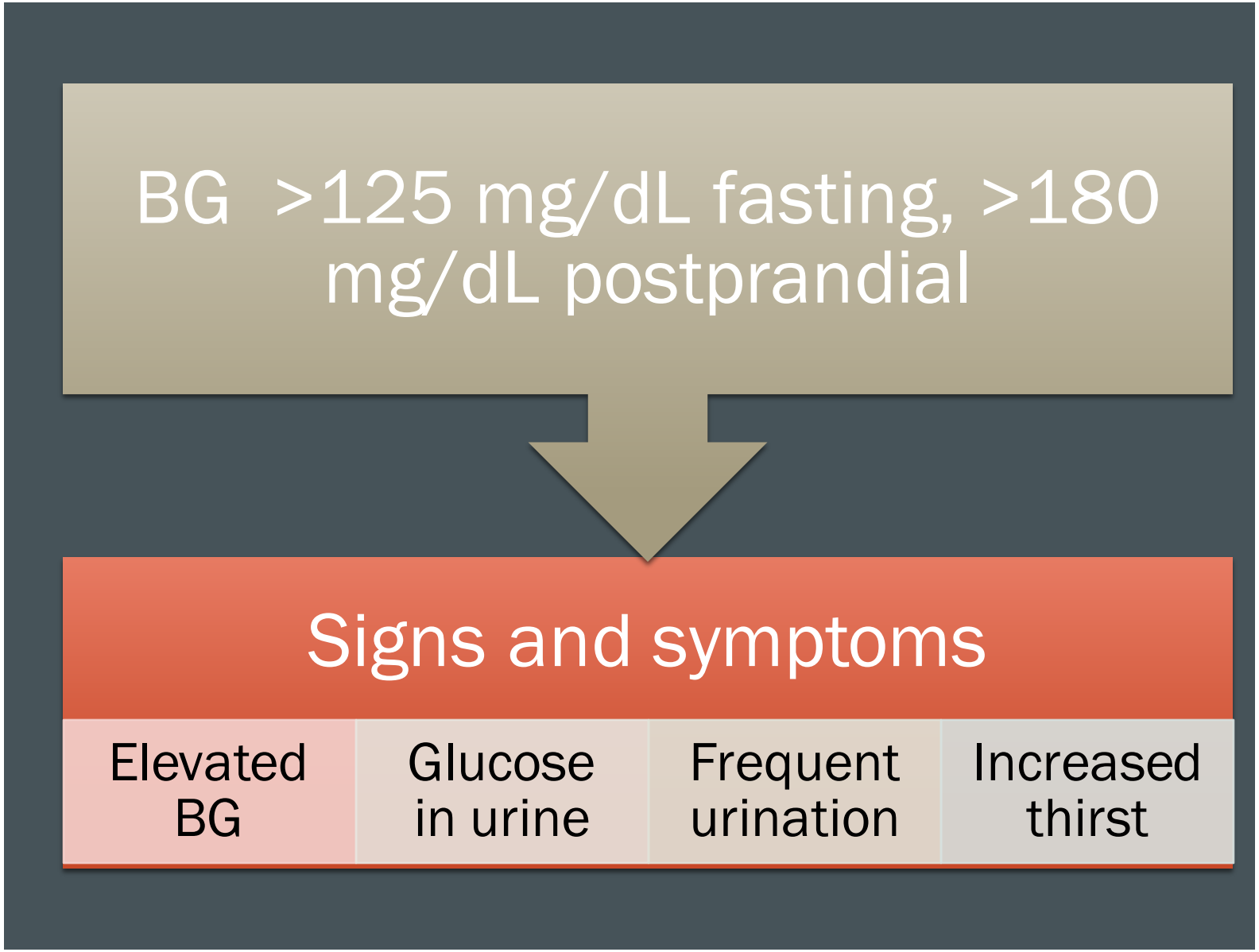
- 4 ounces (½ cup) of regular fruit juice (like orange, apple, or grape juice)
- 4 glucose tablets or 1 tube of glucose gel
- 1 tablespoon of sugar, honey, or corn syrup
- 4 ounces (½ cup) of regular soda pop (not diet)
- 2 tablespoons of raisins

WAIT

Wait **15 minutes** and then check your blood glucose again

- If it is still low, eat or drink something high in sugar again
- If your next meal is more than an hour away, eat a snack to keep your low blood glucose from coming back

HYPERGLYCEMIA



HHS

- Occurs in T2DM with very high BGS (>600mg/dL)
- Symptoms include urination, thirst, nausea, dry skin, disorientation/gradual loss of consciousness
- Treatment requires hospitalization for fluids/insulin management

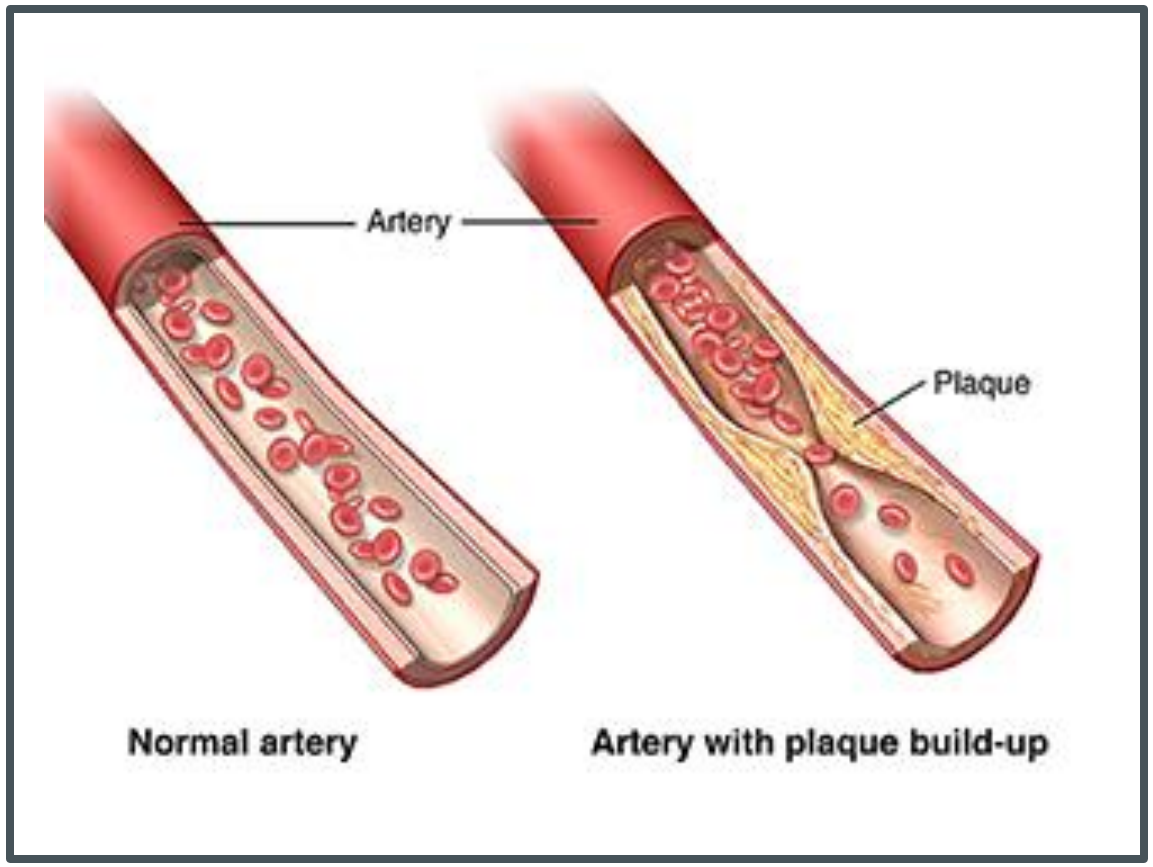
DKA

- Occurs most commonly in T1DM due to lack of insulin
- Without insulin, body cannot utilize glucose for energy
- Fat becomes primary source of energy, which causes ketones to be released
- Ketones make the blood acidic, and this causes a cascade of symptoms
- Symptoms include fatigue, confusion, stomach pain, frequent urination, blurred vision, thirst, having sweet-smelling breath, high bgs, and ketones in the urine
- DKA is serious and requires hospitalization for fluid/insulin management

CHRONIC COMPLICATIONS OF T2DM

- Cardiovascular disease
- Neuropathy
- CKD
- Retinopathy
- Skin conditions

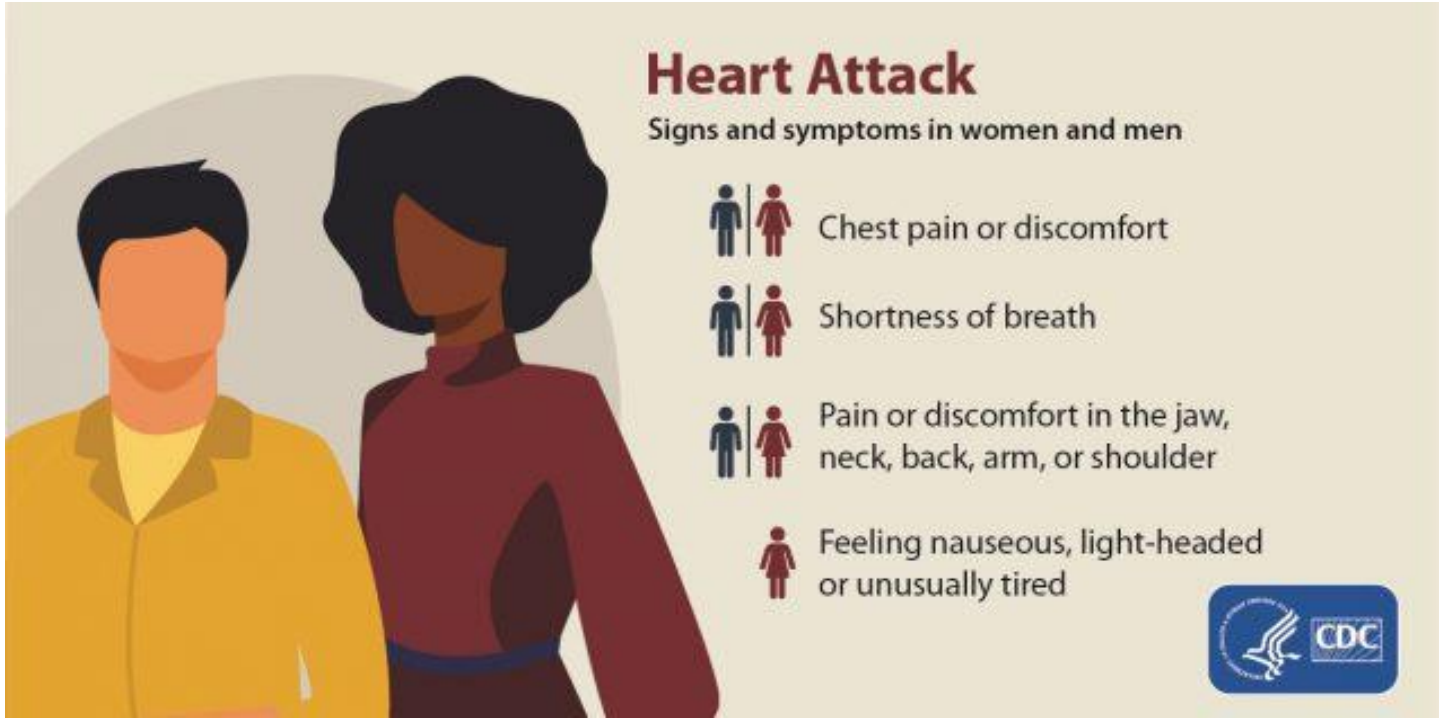
CARDIOVASCULAR DISEASE (CVD) IN T2DM



- #1 cause of death in patients with diabetes
- Patients with DM are twice as likely to have HD or stroke
- Atherosclerosis
- Heart Failure
- Arrhythmias

SYMPTOMS FOR CVD

- Emergency action –
  - Chest pressure, SOB, sweating, indigestion, light-headedness
  - SOB, irregular heartbeat, fatigue, swelling of LE



NEUROPATHY

- Nerve damage
- 50% of PWD have some form of neuropathy
- Increased risk of infection/amputation
- Peripheral vs Autonomic
- Peripheral – tingling, pain, increased sensitivity, numbness, or weakness
- Autonomic – autonomic nerves that control the bladder, intestinal tract, and other organs
  - Gastroparesis

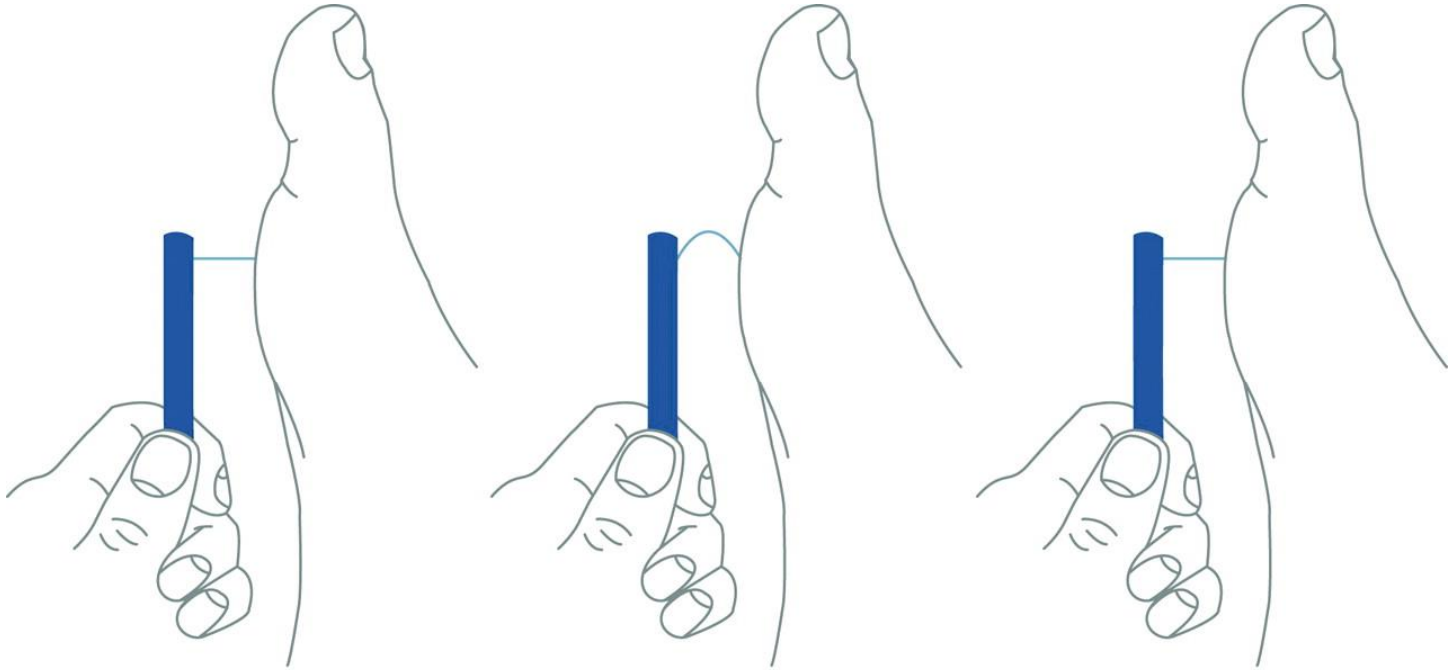
DM FOOT EXAM

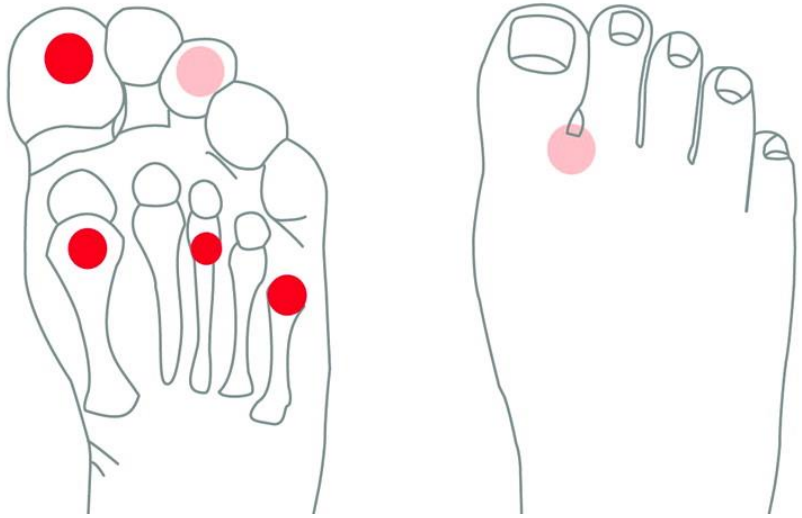
- The importance DM foot exams
  - 50% of DM neuropathy can be asymptomatic
  - Early recognition and treatment can delay or prevent adverse outcomes.

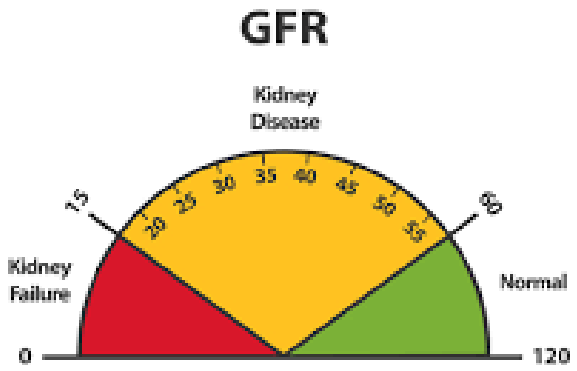
NEUROLOGIC EXAM (MONOFILAMENT)

- Monofilament is placed perpendicular to the skin, with pressure applied until the monofilament buckles. It should be held in place for ~1 s and then released.

- The monofilament test should be performed at the highlighted sites while the patient's eyes are closed.







CHRONIC KIDNEY DISEASE

- Prevalence depends on genetics, glucose control, and blood pressure
- Symptoms not specific
- Adequate blood glucose control cuts risk by 1/3

NORMAL VISION
Vision remains intact

DIABETIC RETINOPATHY
Vision is obstructed by macular edema

RETINOPATHY

- Nonproliferative retinopathy (most common) – capillaries balloon
  - Lowers perfusion and increases the risk of blockages
- Proliferative (progression of retinopathy) –
  - BV closed off, causing BG regrowth (bleeding/scarred tissue)

SKIN CONDITIONS

- Commonly the first sign that a patient has DM
- PWD more common to get bacterial/fungal infections, and itching
- Chronic nonhealing wounds
- Annual foot exam or more frequently if indicated

Academy of Nutrition and Dietetics

WHERE TO GET MORE INFO

- American Diabetes Association
- Academy of Nutrition and Dietetics
- CDC

QUESTIONS