

How to Stop Prediabetes from Becoming Diabetes

Francisco Javier Barajas, MD, FACP
Internal Medicine

Erie Primary Care, 303-586-7258



Boulder Community Health

❖ PREDIABETES

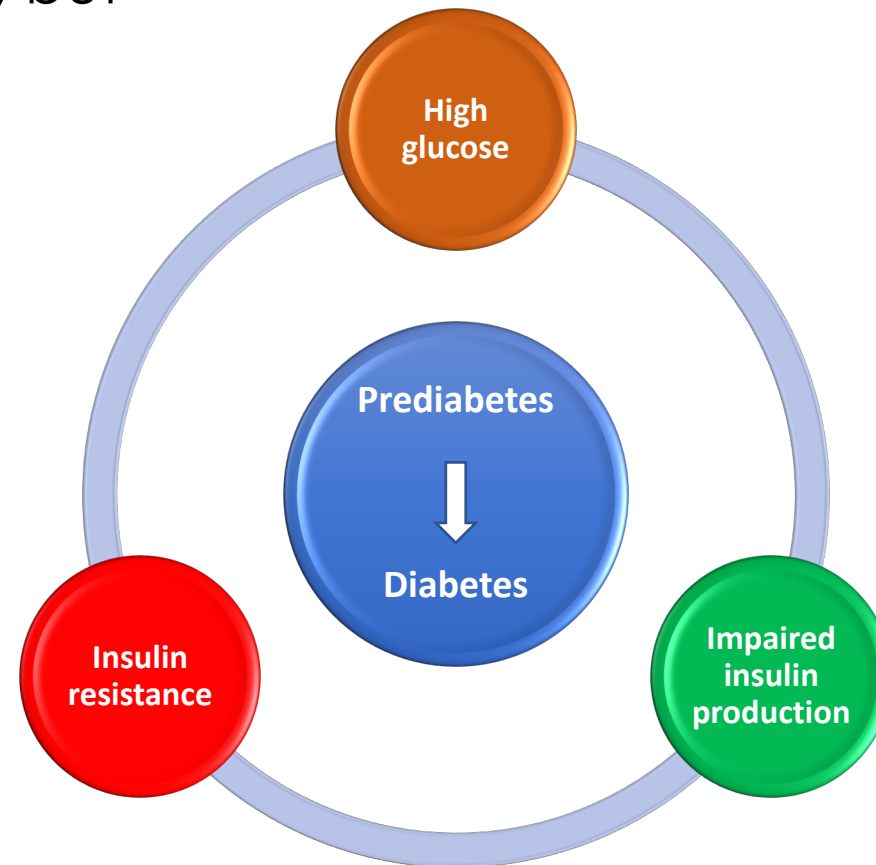
- ❖ Road to possibly getting diabetes
- ❖ Reversible

❖ DIABETES

- ❖ Chronic condition
- ❖ Increased risk complications

❖ PREDIABETES

- ❖ Blood sugar levels higher than normal, but not high enough yet for a diabetes diagnosis.

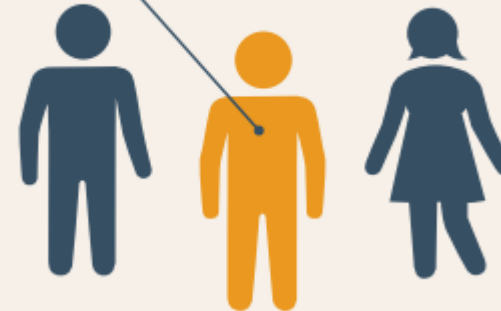


PREDIABETES

96
MILLION

96 million American adults — more than 1 in 3 — have prediabetes

1 IN 3



MORE THAN 8 IN 10 adults with prediabetes don't know they have it

Every year 5%–10% will progress to Diabetes

A SNAPSHOT

DIABETES

IN THE UNITED STATES

DIABETES

37.3
MILLION

37.3 million
people have
diabetes



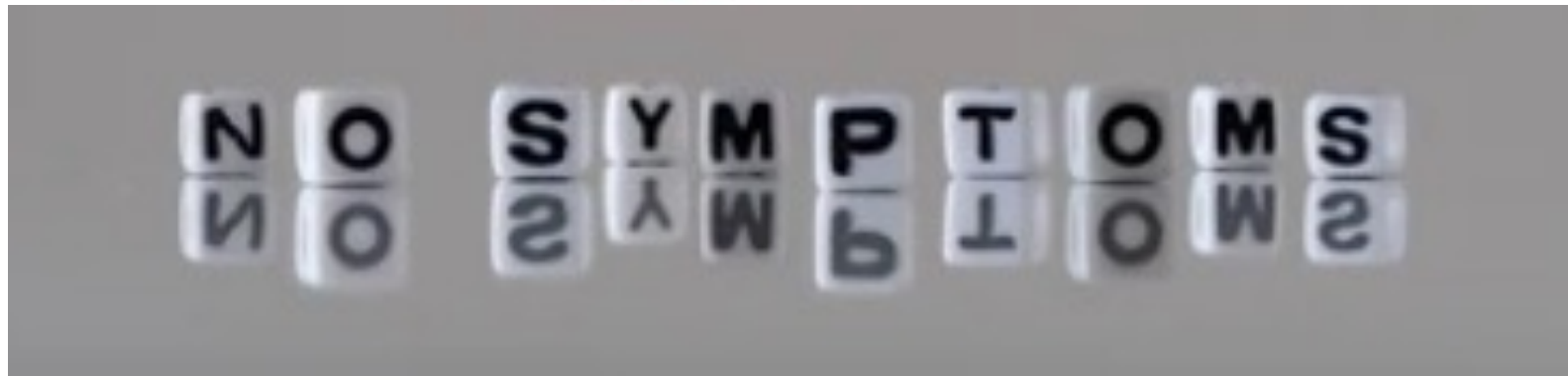
That's about 1 in every 10 people



1 IN 5

don't know
they have
diabetes

WHY DO WE HAVE TO SCREEN?



USPSTF RECOMMENDATIONS

Population	Recommendation
Asymptomatic adults aged 35 to 70 years who have overweight or obesity	The USPSTF recommends screening for prediabetes and type 2 diabetes in adults aged 35 to 70 years who have overweight or obesity. Clinicians should offer or refer patients with prediabetes to effective preventive interventions.

WHO IS AT HIGH RISK?

- ❖ Overweight
- ❖ Obesity
- ❖ First degree relative with DM2
- ❖ High risk race/ethnicity
- ❖ Sedentary
- ❖ HTN, dyslipidemia, PCOS, CVS disease
- ❖ Gestational diabetes

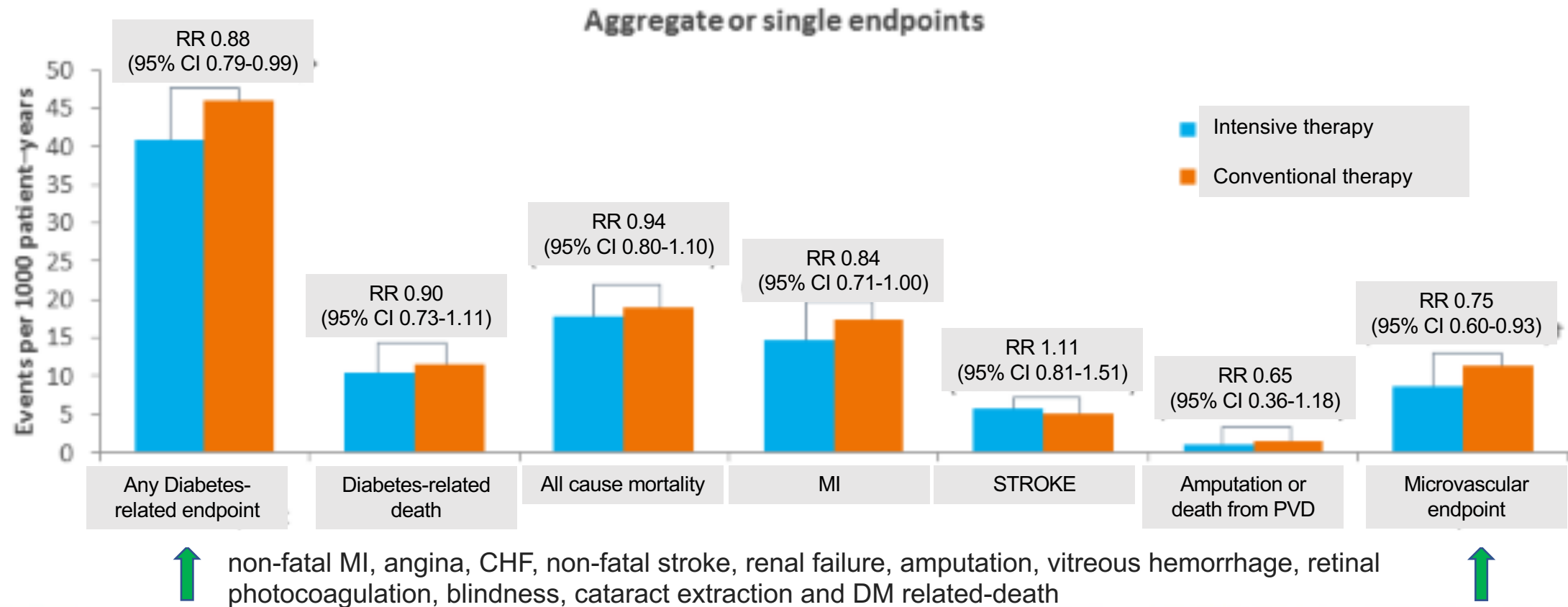
- ❖ Fasting plasma glucose ★
- ❖ Hemoglobin A1C ★
- ❖ Oral glucose tolerance test
- ❖ If the FPG or A1C value is abnormal, the initial test should be repeated

FPG 100 to 125 mg/dL (5.6 to 6.9 mmol/L) – IFG

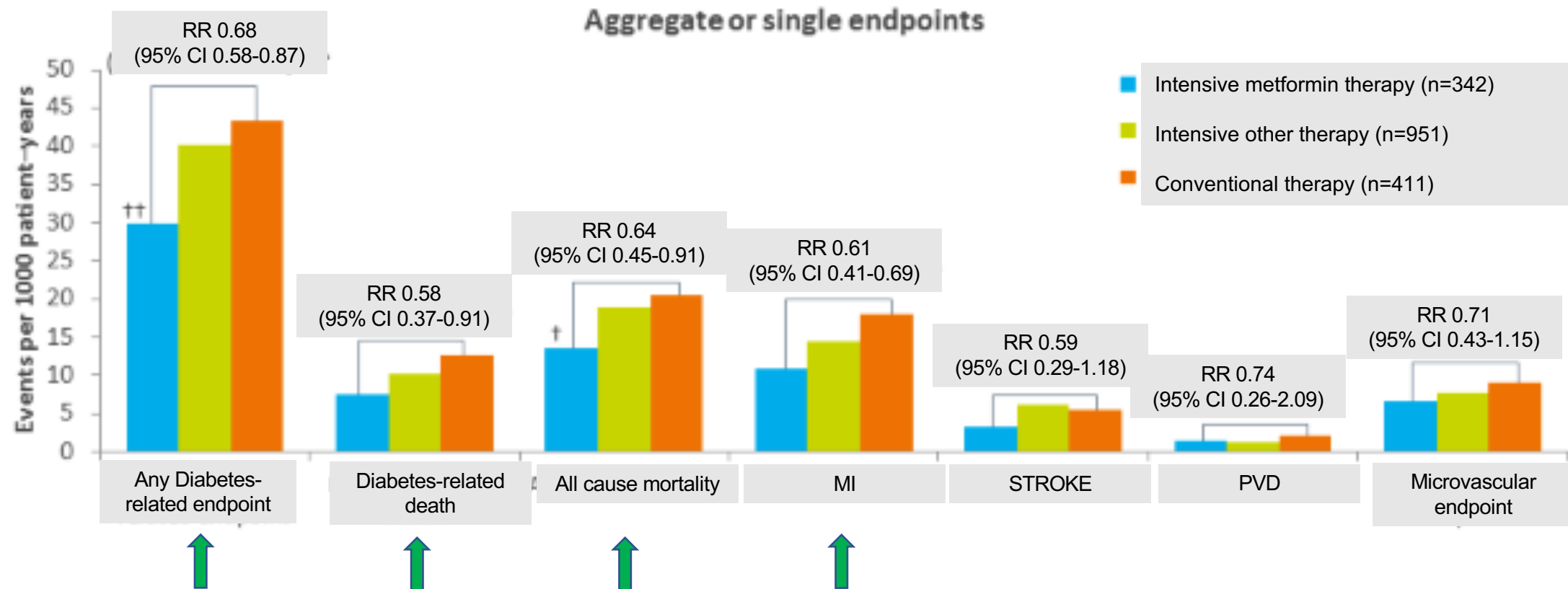
A1C 5.7 to 6.4% (39 to 46 mmol/mol)

2-hour post-load glucose on the 75 g OGTT 140 to 199 mg/dL (7.8 to 11.0 mmol/L) – IGT

❖ Early diagnosis and appropriate interventions (UKPDS 33):



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PREVENTING DIABETES

- ❖ Prevent or delay the onset of diabetes
- ❖ Preserve pancreas function
- ❖ Prevent DM complications
- ❖ Reduce cost of diabetes care



\$327 BILLION^{‡(c)}
total annual cost of diabetes¹⁵

The High Cost of Diabetes

Diabetes is the most expensive chronic condition in our nation.

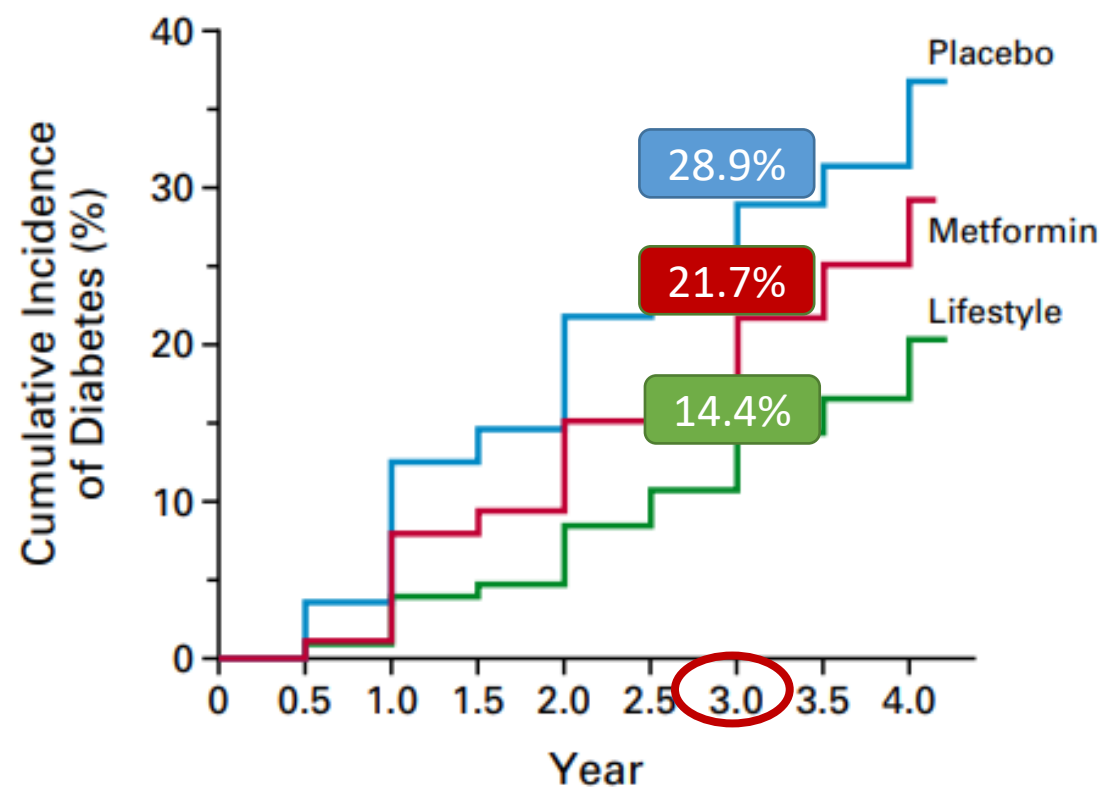
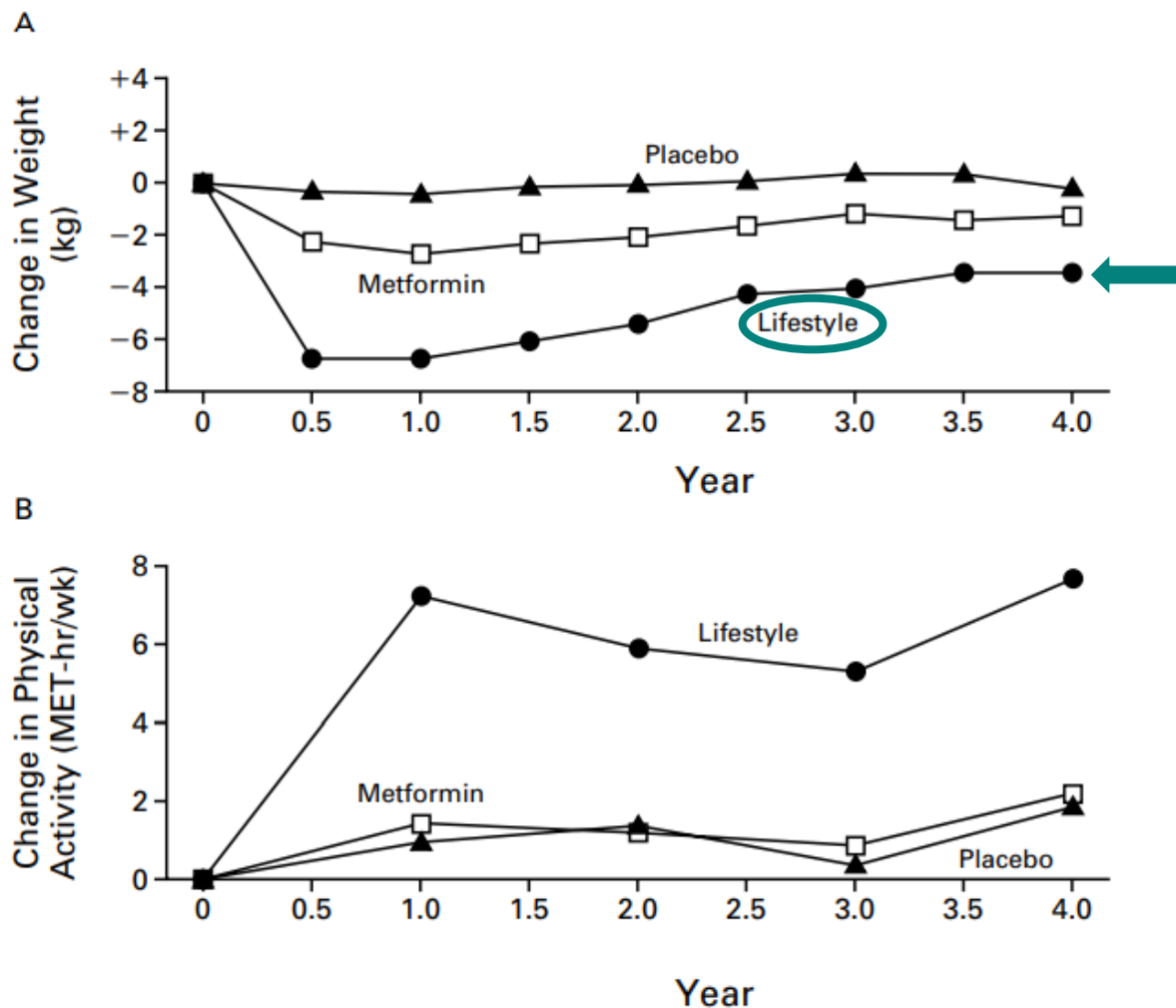
- \$1 out of every \$4 in US health care costs is spent on caring for people with diabetes.
- \$237 billion^{‡(c)} is spent each year on direct medical costs and another \$90 billion^{‡(c)} on reduced productivity.
- The total economic cost of diabetes rose 60% from 2007 to 2017.
- 61% of diabetes costs are for people 65 years or older, which is mainly paid by Medicare.
- 48% to 64% of lifetime medical costs for a person with diabetes are for complications related to diabetes, such as heart disease and stroke.

INTERVENTION PLAN



- ❖ What evidence do we have that diet and exercise work?
- ❖ 2002 Diabetes Prevention Program published
 - ❖ RCT 3,200 patients
 - ❖ Measure outcome: Diabetes diagnosis
 - ❖ Interventions
 - ❖ Standard lifestyle modifications + placebo
 - ❖ Standard lifestyle modifications + metformin
 - ❖ Intensive lifestyle modifications
 - ❖ 7% weight loss goal
 - ❖ Exercise 150 min/week

LIFESTYLE MODIFICATIONS



❖ Summary:

❖ Diabetes incidence reduction:

❖ Lifestyle vs. placebo 58%

❖ Metformin vs. placebo 31%

❖ Lifestyle vs. Metformin 39%

Moderate-intensity aerobic activity

Anything that gets your heart beating faster counts.



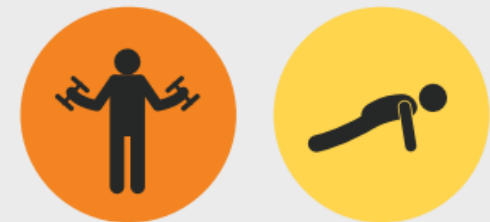
AND

Muscle-strengthening activity

Do activities that make your muscles work harder than usual.



OR



75 minutes a week of vigorous-intensity aerobic activity

❖ Moderate vs Vigorous-intensity activity

Talk Test

As a rule of thumb, a person doing moderate-intensity aerobic activity can talk, but not sing, during the activity. A person doing vigorous-intensity activity cannot say more than a few words without pausing for a breath.

Moderate-intensity aerobic activity

Anything that gets your heart beating faster counts.



- ❖ Walking at 2.5 miles per hour
- ❖ Recreational swimming
- ❖ Bicycling slower than 10 miles per hour on level terrain
- ❖ Active forms of yoga (Vinyasa or power yoga)
- ❖ Ballroom or line dancing
- ❖ Water aerobics

Vigorous-intensity aerobic activity



- ❖ Jogging or running
- ❖ Swimming laps
- ❖ Vigorous dancing
- ❖ Bicycling faster than 10 miles per hour
- ❖ Jumping rope
- ❖ Hiking uphill
- ❖ Kickboxing or step aerobics



- ❖ 7% weight loss goal
- ❖ There is no “one-size-fits-all” plan
- ❖ Medical Nutrition Therapy = treatment of a disease
 - ❖ A1c reduction 2.0 % at 3-6 months
- ❖ Goals:
 - ❖ Glycemic control
 - ❖ Weight
 - ❖ CVS risk

❖ REMINDER:

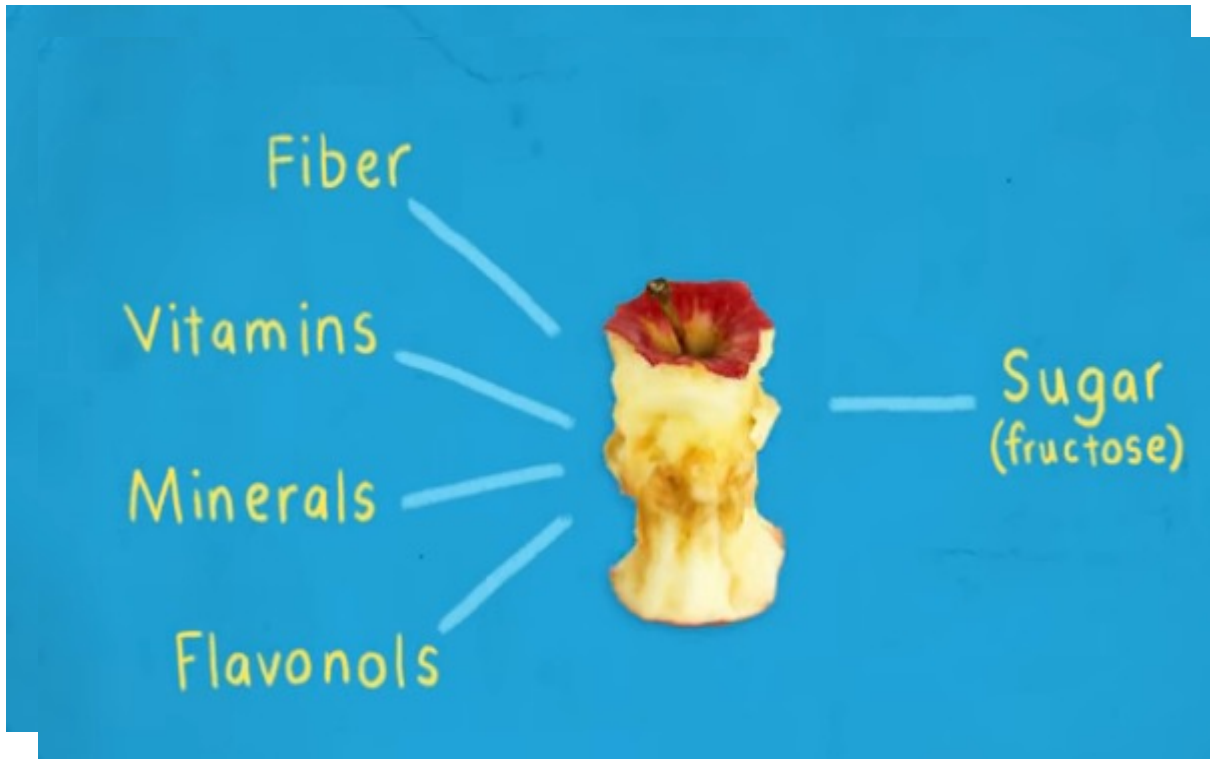
- ❖ Lifestyle could reduce progression to DM by 58% at 3 years, and by 43% at 7 and 20 years.

❖ MACRONUTRIENTS:

- ❖ No magic formula (physical activity, co-morbidities, food preference)
 - ❖ Carbs
 - ❖ Fat
 - ❖ Protein
 - ❖ Don't forget calorie amount!!!
- ❖ % distribution depends on INDIVIDUALIZED assessment
- ❖ INCREASE fiber intake

- ❖ Quality and quantity
 - ❖ Sugar +/- added sugars
 - ❖ Starches
 - ❖ Vitamin/minerals

CARBOHYDRATES



CARBOHYDRATES

- ❖ Carbohydrates:
- ❖ Simple vs Complex
- ❖ Glycemic Index
- ❖ Glycemic load

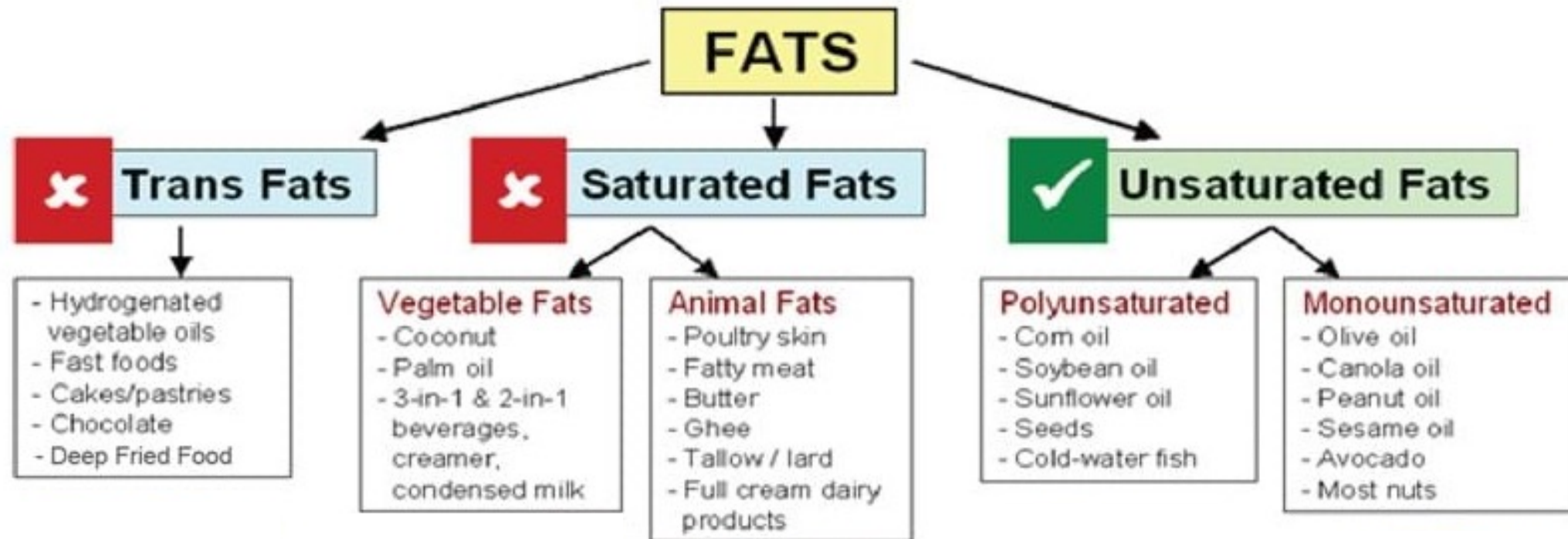
SIMPLE CARBS		COMPLEX CARBS	
	White bread		Whole wheat bread
	White pasta		Brown rice
	White rice		Starchy vegetables
	Cakes		Fruit
	Cookies		Beans
	Candy		Lentils
	Ice cream		Quinoa
	Non-diet sodas		Oats
	Sugary cereals		Sweet potatoes
	Sweetened drinks		Chia seeds

- ❖ Sugar sweetened beverages (SSB)
 - ❖ In prediabetics, consumption of 1 SSB drink per day increases the risk of DM by 28%
- ❖ Sugar substitutes
 - ❖ Decrease daily intake of carbohydrates and calories, with possible weight loss, glycemic and CVS improvement, but long-term results are QUESTIONABLE
- ❖ Make it easy, choose WATER!!!

- ❖ Higher calorie intake (30 vs 15 %) from protein might favor more weight loss and A1C improvement

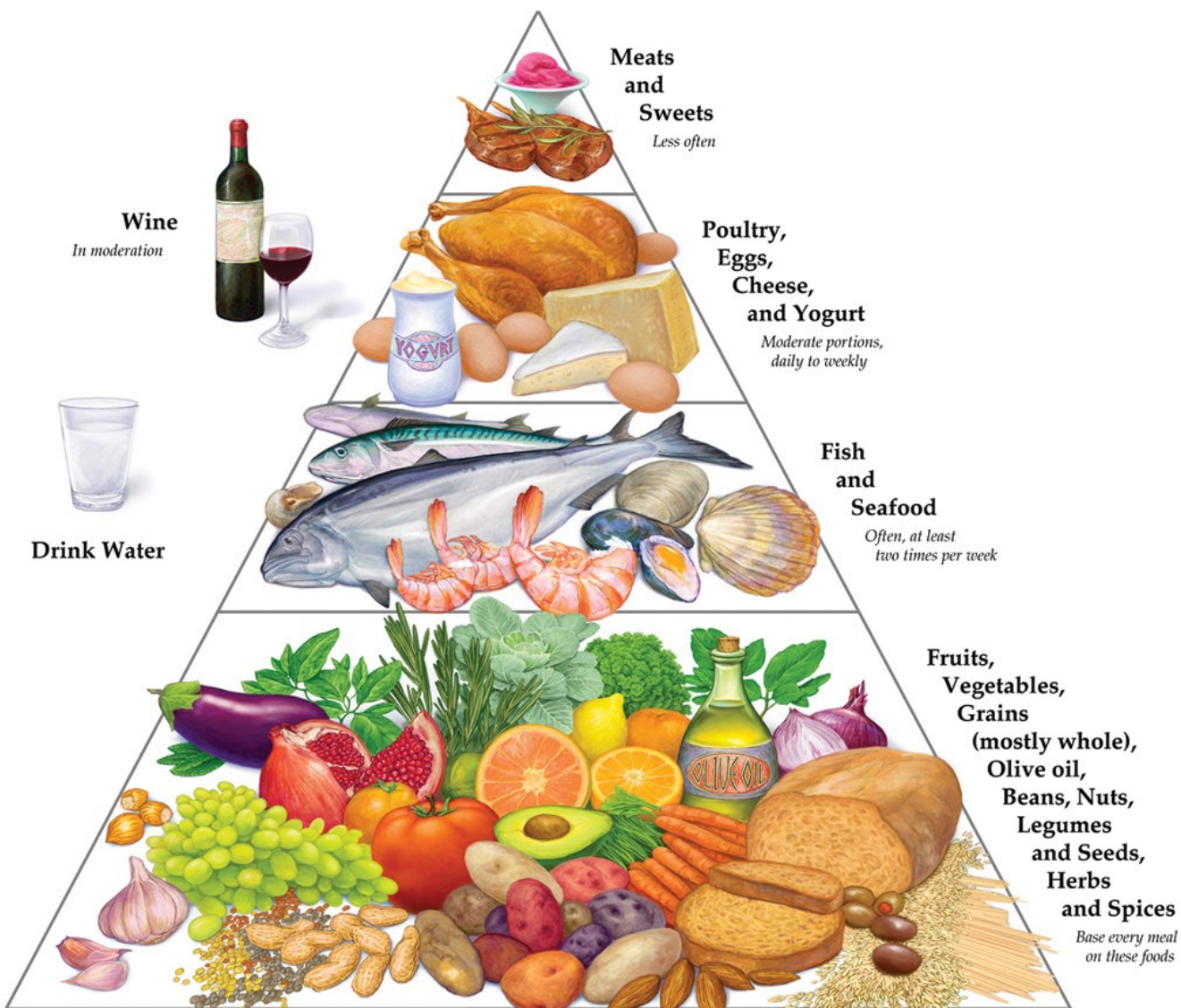
FAT

- ❖ Aim to 20-35% of calorie intake
- ❖ QUALITY!!!



- ❖ Totality of all foods and beverages consumed
 - ❖ Follow an eating plan
 - ❖ When?
 - ❖ What?
 - ❖ How much?
- ❖ 3 main patterns have been studied
 - ❖ Mediterranean
 - ❖ Low-carb
 - ❖ Low-fat

MEDITERRANEAN



- Reduced risk of diabetes
- A1C reduction
- Lowered triglycerides
- Reduced risk of major cardiovascular events

- Reduced risk of diabetes
- A1C reduction
- Weight loss
- Lowered LDL-C and non-HDL-C

❖ No benefit on BP, HDL and tgl

Emphasizes vegetables, fruits, starches (e.g., breads/crackers, pasta, whole intact grains, starchy vegetables), lean protein sources (including beans), and low-fat dairy products. In this review, defined as total fat intake $\leq 30\%$ of total calories and saturated fat intake $\leq 10\%$.

- Reduced risk of diabetes
- Weight loss

❖ 26-45% of calories

❖ VLC <26%

Calories	10%	20%	30%	40%	50%	60%	70%
1,200	30 g	60 g	90 g	120 g	150 g	180 g	210 g
1,500	38 g	75 g	113 g	150 g	188 g	225 g	263 g
2,000	50 g	100 g	150 g	200 g	250 g	300 g	350 g
2,500	63 g	125 g	188 g	250 g	313 g	375 g	438 g

❖ Low-carb vegetables

❖ Salad greens, broccoli, cauliflower, cucumber, cabbage

❖ Fat sources: animal fat, butter, oil, avocado

❖ Protein: meat, fish, poultry, eggs, cheese, nuts

❖ Avoid: pasta, rice, bread, potatoes, sweets

❖ Caution: CKD, and pregnancy

- A1C reduction
- Weight loss
- Lowered blood pressure
- Increased HDL-C and lowered triglycerides

- ❖ When vs what you eat?
- ❖ Multiple patterns studied 16/8, 20/4, alternate days vs non-fasting
- ❖ Promotes:
 - ❖ Weight loss
 - ❖ A1C changes are similar to a nonfasting plan low calorie

WHICH PATTERN SHOULD I PICK?

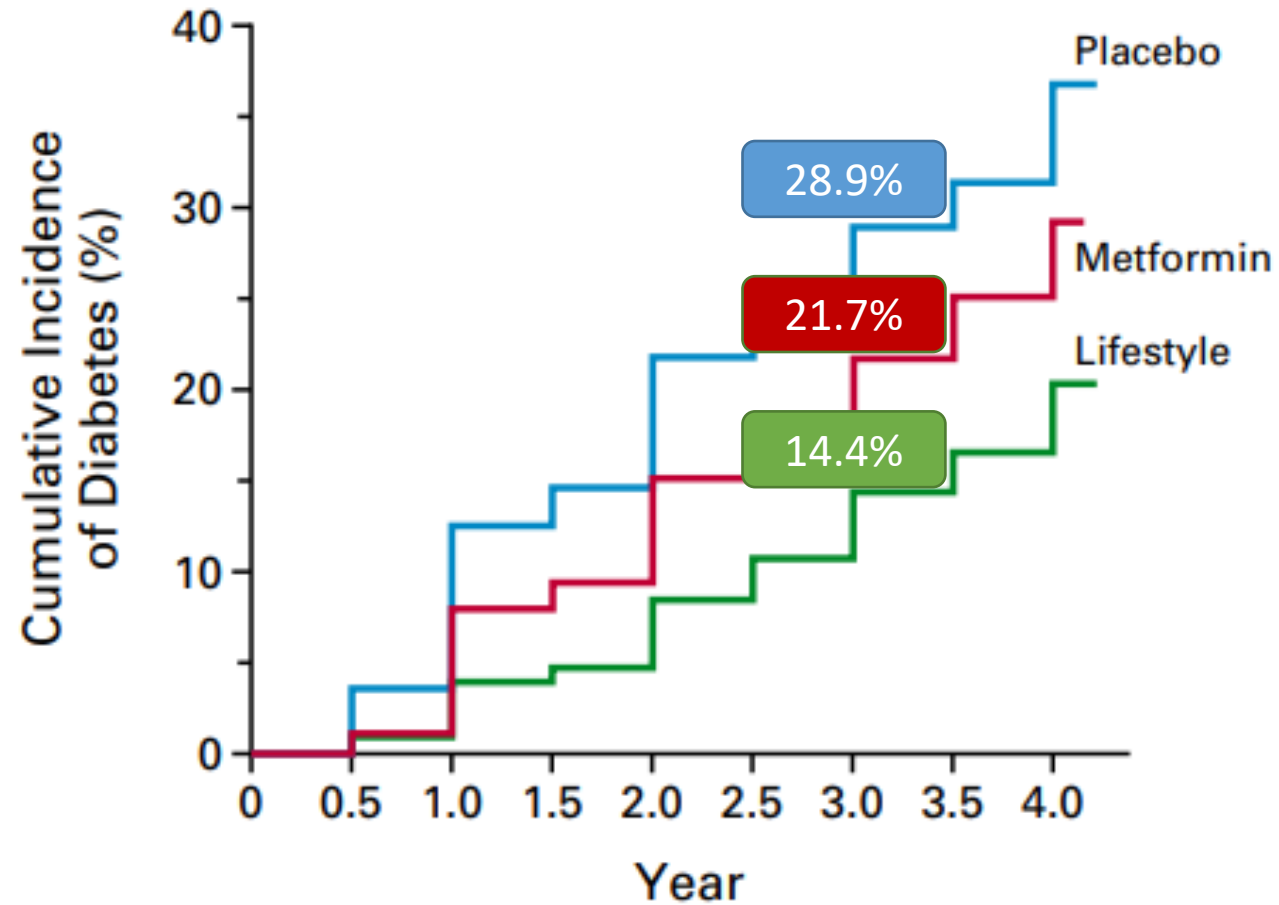
- ❖ Evidence not robust to recommend a specific pattern
- ❖ Sustainable
- ❖ Emphasize non-starchy vegetables
- ❖ Minimize added sugars and refined grains
- ❖ Choose whole foods over highly processed foods

WHICH PATTERN SHOULD I PICK?

All eating patterns include a range of more-healthy versus less-healthy options: lentils and sugar-sweetened beverages are both considered part of a vegan eating pattern; fish and processed red meats are both considered part of a low-carbohydrate eating pattern; and removing the bun from a fast-food burger might make it part of a paleo eating pattern but does not necessarily make it healthier.

- ❖ Obesity
- ❖ History of gestational diabetes
- ❖ <60 years
- ❖ Other risk factors (HbA1C >6%, hypertension, low HDL cholesterol, elevated triglycerides, or a family history)
- ❖ With no intervention diabetes incidence decreased by 31% (vs. 58% with lifestyle changes)

ALWAYS REMEMBER



❖ <https://www.cdc.gov/diabetes/prevention/find-a-program.html>

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