

Stop Prediabetes from Becoming Diabetes

Richard Barnett, DO
Frontier Internal Medicine
303-963-9419



Welcome!



Key Points of Tonight's Talk

- Diabetes is a devastating, chronic condition.
- Prediabetes and diabetes are on different ends of the same continuum.
- Diabetes can be prevented/delayed with proper interventions.
- Even small changes can be of great benefit.

What is Diabetes?

- Diabetes is shortened form of “Diabetes Mellitus” and you’ll often see it abbreviated as DM.
- Diabetes = Greek “siphon” and Mellitus = Latin for “honey” or sweet.
- Doctors of old noticed patients would urinate frequently and the urine tasted sweet.
- ... because the patients were dumping glucose in the urine, creating increased urination and a sweet taste to the urine (fortunately, we have more accurate tests for urine glucose now)

Type 1 vs. Type 2 Diabetes

Type 1 Diabetes

- Usually onset in childhood or early 20s
- Pancreas does not produce ANY insulin
- Patients must take insulin shots several times a day

Type 2 Diabetes

- Insulin doesn't work properly (insulin resistance)
- Pancreas increases insulin production
- Eventually the pancreas cannot produce enough insulin to overcome the insulin resistance and the blood sugars rise

Complications of Diabetes

- Elevated glucose in the blood is **INFLAMMATORY** and damages blood vessels
 - Coronary artery disease
 - Strokes
 - Blindness
 - Kidney failure
 - Peripheral nerve damage
 - Foot ulcers/amputation

What is Prediabetes?

- Blood glucose higher than normal, but does not meet criteria for diagnosis of diabetes
 - Elevated fasting blood glucose less than 126 mg/dL
 - Hemoglobin A1c between 5.7-6.4%
- More than 100 million Americans have prediabetes or diabetes.
- Estimated 34% of adults have prediabetes
 - 35% of US adults older than 20yrs
 - 50% of US adults older than 65yrs

Diagnosis of Diabetes/Prediabetes

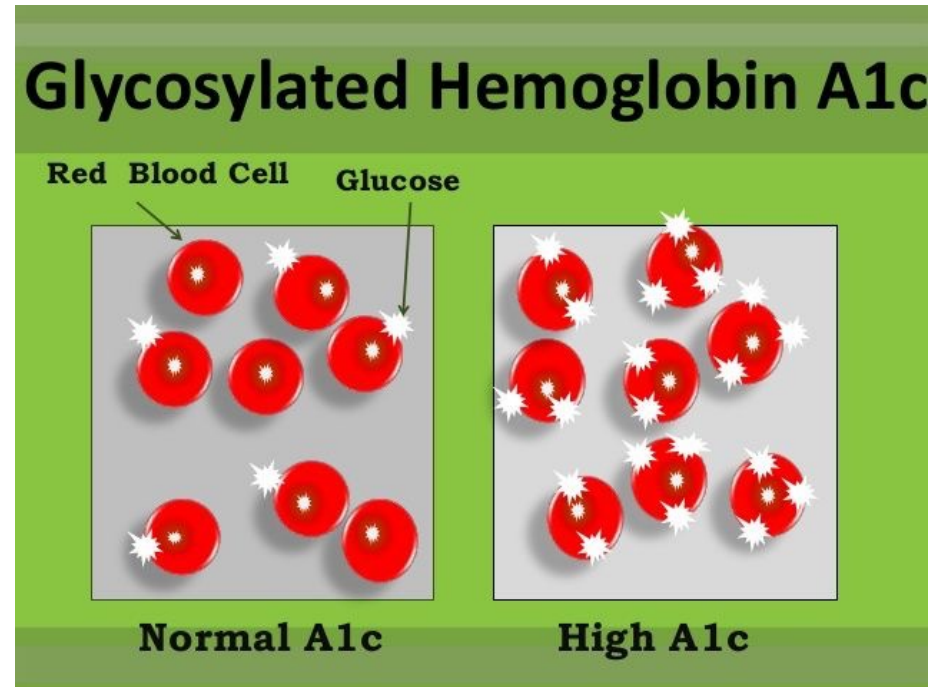
	Non-diabetic	Prediabetes	Diabetes
Before meals (fasting)	Less than 100 mg/dL (normal)	100-125 mg/dL	126 mg/dL or higher
Random	Less than 140 mg/dL	140-199 mg/dL	200 mg/dL or higher
A1C	Less than 5.7 %	5.7 – 6.4 %	6.5 % or higher

Diagnosis of Prediabetes: Hemoglobin A1c

- A blood test that measures the amount of glycosylated hemoglobin in the blood.
- Gives you a picture of your average blood glucose control for the past 2 to 3 months.

Diagnosis of Diabetes/Prediabetes: Hemoglobin A1c

- Glucose molecules normally become stuck to hemoglobin molecules in red blood cells. Hemoglobin becomes glycosylated.
- As a person's blood sugar becomes higher, more of hemoglobin becomes glycosylated.
- A1c range of 5.7–6.3% = prediabetes.



Risk Factors for Type 2 Diabetes

(Who should be tested for prediabetes?)

- You have high blood pressure (over 140/90).
- You have existing cardiovascular disease.
- You have low HDL (good) cholesterol (40 or lower).
- You have high triglycerides (150 or higher).
- You are overweight.
- You smoke cigarettes.

Risk Factors for Type 2 Diabetes (Who should be tested for prediabetes?)

- You have a first degree relative with Type 2 diabetes.
- You are African American, Hispanic/Latino, Native American, Asian American or Pacific Islander.
- You had a baby weighing more than 9 pounds or had gestational diabetes.
- You have a history of polycystic ovary syndrome.

Who should be tested for prediabetes?

If you are...

- Age 45 or older and overweight, with a BMI above 25
- Age 45 or older and not overweight – ask your doctor if you need to be tested
- Under age 45, but overweight and at increased risk for diabetes
- Inactive

Not All Prediabetics are Obese or Overweight

- In a sample area, 81% are overweight/obese while 19% had normal weight.

If you have prediabetes, why do we care?

- Increased risk of getting type 2 diabetes soon or sometime in the future:
 - 70% of individuals with prediabetes will eventually develop diabetes.
 - If prediabetes not treated, 37% of individuals will have diabetes in 4yrs.

If you have prediabetes, why do we care?

- Raises risk for heart disease and stroke
- Increased risk of:
 - Blood vessel changes in the eyes (retinopathy)
 - Changes in the nerves (neuropathy)
 - Kidney disease (nephropathy)

Every cloud has a silver lining



Prediabetes is reversible!

Clinic Example

- 48-year-old female presents to clinic to establish care. She has no significant past medical history. Today, she has no complaints and wants to get her annual labs performed, as she has not had labwork in over two years, as COVID-19 pandemic prevented regular follow-up.

Case Study continued

- Past medical history: No childhood illnesses; denies chronic conditions
- Past surgical history: Cholecystectomy at age 45
- Past family history: Significant for father who developed T2DM in his 70s. Mother without significant medical history.
- Social History: Lives in Colorado with her husband and 1 dog. Works full time job. No tobacco use. She drinks 3-5 glasses of wine/week on avg.
- Allergies: No known drug allergies
- Medications: None; OTC Vitamin C and Zinc

Case Study continued

- Vital signs: Temperature: 98.6 F; Blood pressure 132/84; HR 68 and Respiratory rate: 14
- Physical exam: Alert, oriented and in no acute distress. Cardiac exam NSR with +S1, S2 and no murmurs. Lungs clear to auscultation. No leg swelling. BMI is 26.5.
- Laboratory findings: Fasting blood sugar: 115; Hemoglobin A1c: 6.2%; Complete blood count, kidney, liver and electrolytes are unremarkable.

Clinic example

- Assessment: Prediabetes
- Plan:
 - Exercise – At least 30 minutes, 5 days a week
 - Diet
 - Weight loss
- Follow up:
 - 1 year for annual examination and labs.

Goals of Treatment for Prediabetes

- Avoid progression to type 2 diabetes mellitus
- Lower blood sugars
- Decrease risk of complications of diabetes and prediabetes

Treatment of Prediabetes

- Weight loss
- Exercise
- Medications

Treatment of Prediabetes

The Diabetes Prevention Program study showed:

- ***30 minutes** a day of moderate physical activity along with a **5 to 10%** body weight loss produced a **58% reduction** in progression to diabetes!*

Body Mass Index (BMI)

- Convenient measure of body weight relative to height
- $BMI = \text{Weight} / (\text{height} \times \text{height})$

BMI

- Underweight <18.5
- Normal weight 18.5-24.9
- Overweight 25-29.9
- Obesity 30-40
- Morbid obesity 40+

Weight Loss

- The goal is a weight loss of 5-10% total body weight.
- Focus on healthy eating and calorie reduction (avg 500 kcal/day).
- Optimal goal: a sustained weight loss of 7%.

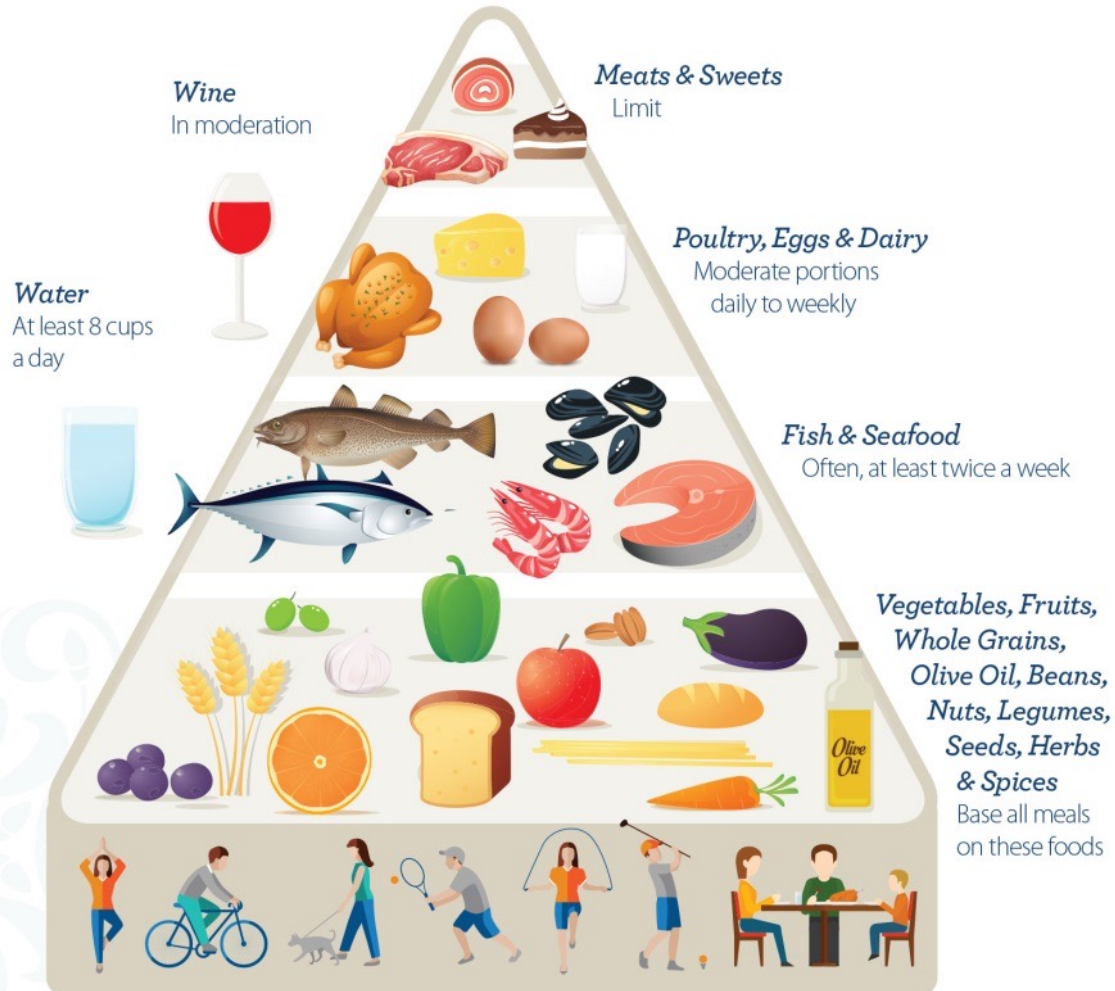
If You Weigh:	Losing 5 to 10% is
150 pounds	8 to 15 pounds
175 pounds	9 to 18 pounds
200 pounds	10 to 20 pounds
225 pounds	11 to 23 pounds
250 pounds	13 to 25 pounds
300 pounds	15 to 30 pounds

How to Achieve Weight Loss?

- Weekly self-weighing
- Eat breakfast
- Drink water
- Get sleep
- Eat healthy foods

Healthy Eating Patterns

THE MEDITERRANEAN DIET



Savor meals with loved ones and be active every day.

Mediterranean Diet on a Plate

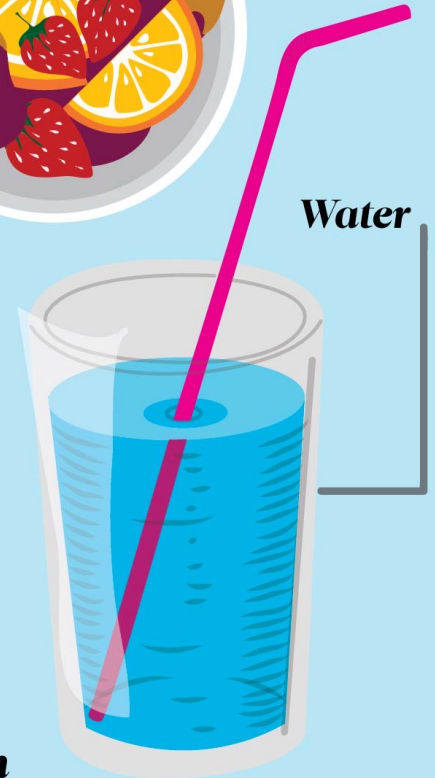
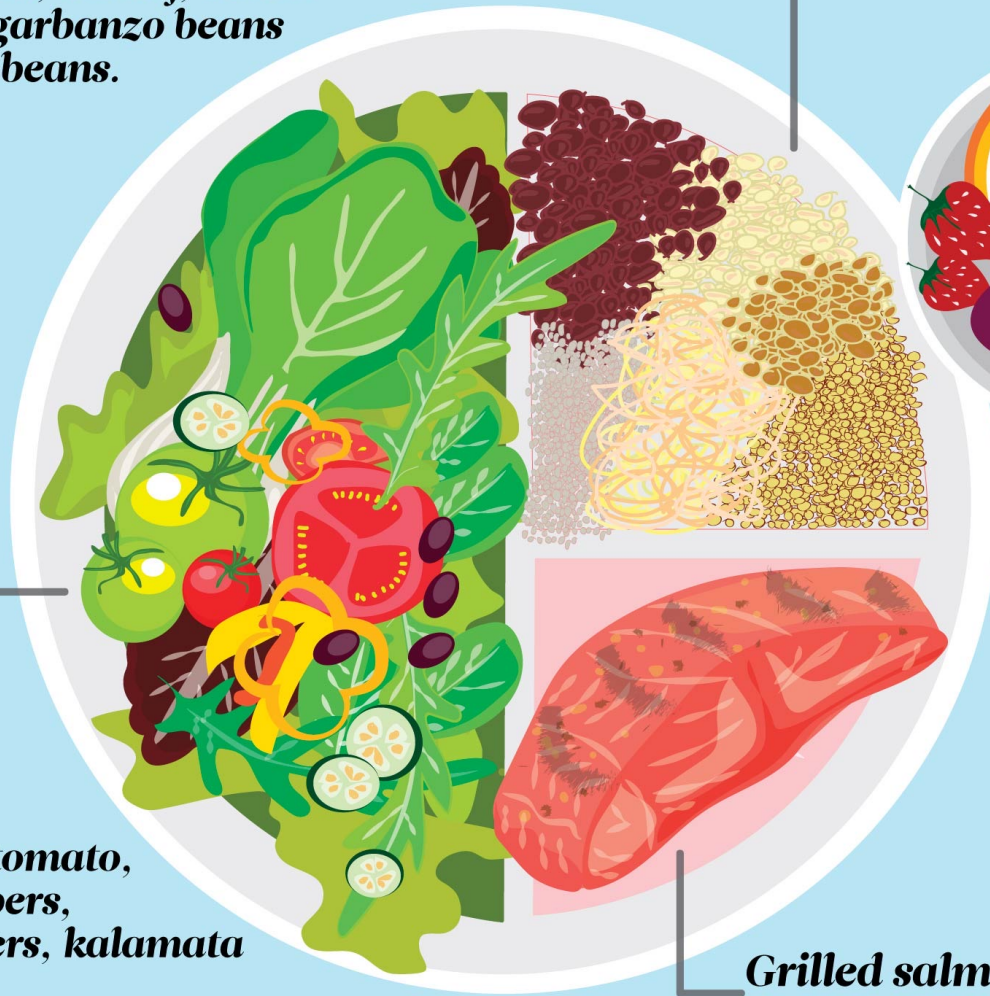
**Couscous, barley, wheat
pasta, garbanzo beans
kidney beans.**

**Orange, fig,
strawberries.**

**Greens, tomato,
bell peppers,
cucumbers, kalamata
olives .**

Grilled salmon

Water



Healthy Eating Patterns

The DASH Diet for Healthy Blood Pressure

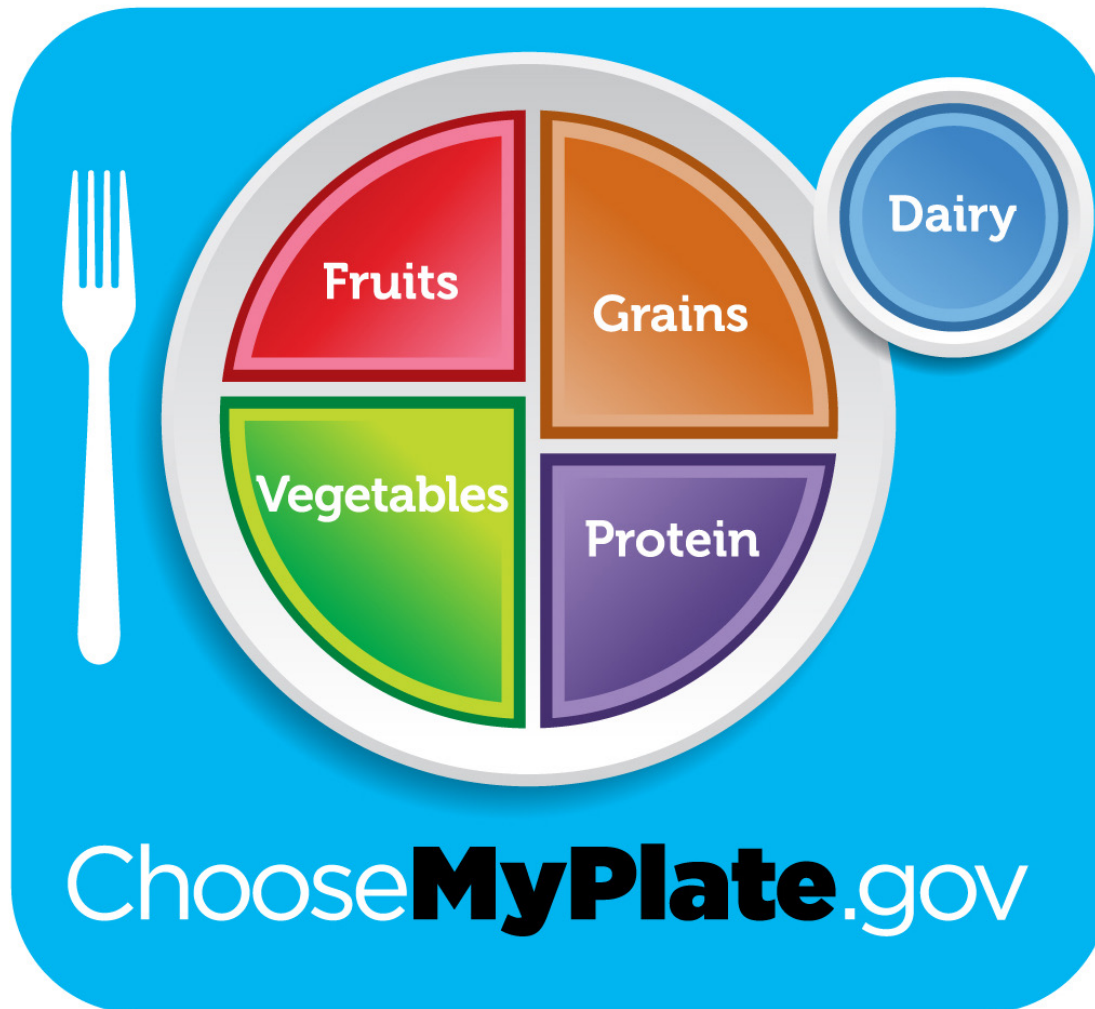
Follow these DASH (Dietary Approaches to Stop Hypertension) guidelines for a healthier, more balanced diet



Discover how the DASH Diet can help you manage your blood pressure at blog.ohiohealth.com

Plate Method

www.myplate.gov



Other Methods

- Carb counting
- Fiber
- Food order
- Cinnamon
- Resistant starch
- Vinegar

How to Achieve Weight Loss?

- Exercise

- 30 minutes, 5-7 times/week (or a total of 150 min./week however you can get it)
- + 2 days of resistance training (weights/arm bands, etc.).

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www.glasbergen.com



**“To prevent a heart attack, take one aspirin every day.
Take it out for a jog, then take it to the gym,
then take it for a bike ride...”**

Benefits of Exercise

- Reduced risk of diabetes
- Reduced risk of cardiovascular disease
- Reduced risk of some cancers
- Improved bone density with decreased risk of hip fractures
- Improved pain and quality of life in patients with arthritis
- Improved sleep
- Decreased risk of falls
- Increased longevity
- Improved depression and anxiety
- Improved memory/decreased risk of dementia

Starting an Exercise Program

- Talk with your doctor before starting an exercise program.
- Start slowly and increase the duration and intensity of your exercise gradually.
- Goal is 30 minutes of moderate activity, 5-7 days each week.

Pharmacologic Intervention

- Lowers risk of developing diabetes by 45%.
- Greatest benefit = those prediabetics with higher Body Mass Index (BMI).
- Metformin has good safety profile, with beneficial effects on BMI and lipids.
 - Metformin works by improving insulin sensitivity and decreasing glucose manufacture in the liver.

Treatment recommendation for individuals with IFG, IGT, or elevated A1C

Population	Treatment
IFG, IGT, or A1C (5.7 to 6.4%)	Lifestyle modifications (i.e., 5 to 10% weight loss and moderate-intensity physical activity, approximately 30 min/day)
Individuals with IFG, IGT, or A1C 5.7 to 6.4%, especially for those: <60 years of age BMI ≥ 35 kg/m ² Women with prior gestational diabetes	Lifestyle modification (as above) and/or metformin*

IFG: Impaired fasting glucose; IGT: impaired glucose tolerance; A1C: glycated hemoglobin; BMI: body mass index. * **Metformin 850 mg twice per day.**

Reproduced with permission from: Nathan DM, Davidson MB, DeFronzo RA, et al. Impaired fasting glucose and impaired glucose tolerance. Diabetes Care 2007; 30:753. Copyright © 2007 American Diabetes Association. Updated information from American Diabetes Association. Standards of medical care in diabetes – 2013. Diabetes Care 2013; 36 Suppl 1:S11. The content within this table is still current as of the 2017 version of the Standard of Medical Care in Diabetes. Graphic 67073 Version 9.0

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Surgical Intervention

- For morbidly obese: bariatric surgery associated with sustained weight loss

Does sleep matter?

- Evidence from both longitudinal and prospective studies suggests that sleep loss is associated with an increase in the risk of obesity.
- Sleep restriction leads to hormonal alterations, which may favor an increase in calories intake and a decreased energy expenditure – and ultimately lead to weight gain.

[Curr Opin Clin Nutr Metab Care. 2011 Jul; 14\(4\): 402–412.](#)

Sleep and obesity

[Guglielmo Beccuti](#)^{a,b} and [Silvana Pannain](#)^a

Studies

Diabetes Prevention Program (DPP)

- 3,234 patients average age 51, average BMI 34
- Followed for 3 years
- Low-fat diet and 150 minutes exercise each week with a goal of 7% weight loss vs control
- Results:
 - 14% developed diabetes vs 29% in control group
 - average weight loss 15#
 - 16% reduction for every 2.2# lost

2012 Perreault, et al., study

- Showed reversion to normal glucose levels—even transiently—was associated with 56% reduced risk of future diabetes.

Effect of regression from prediabetes to normal glucose regulation on long-term reduction in diabetes risk: results from the Diabetes Prevention Program Outcomes Study.

Lancet. 2012 Jun 16;379(9833):2243-51

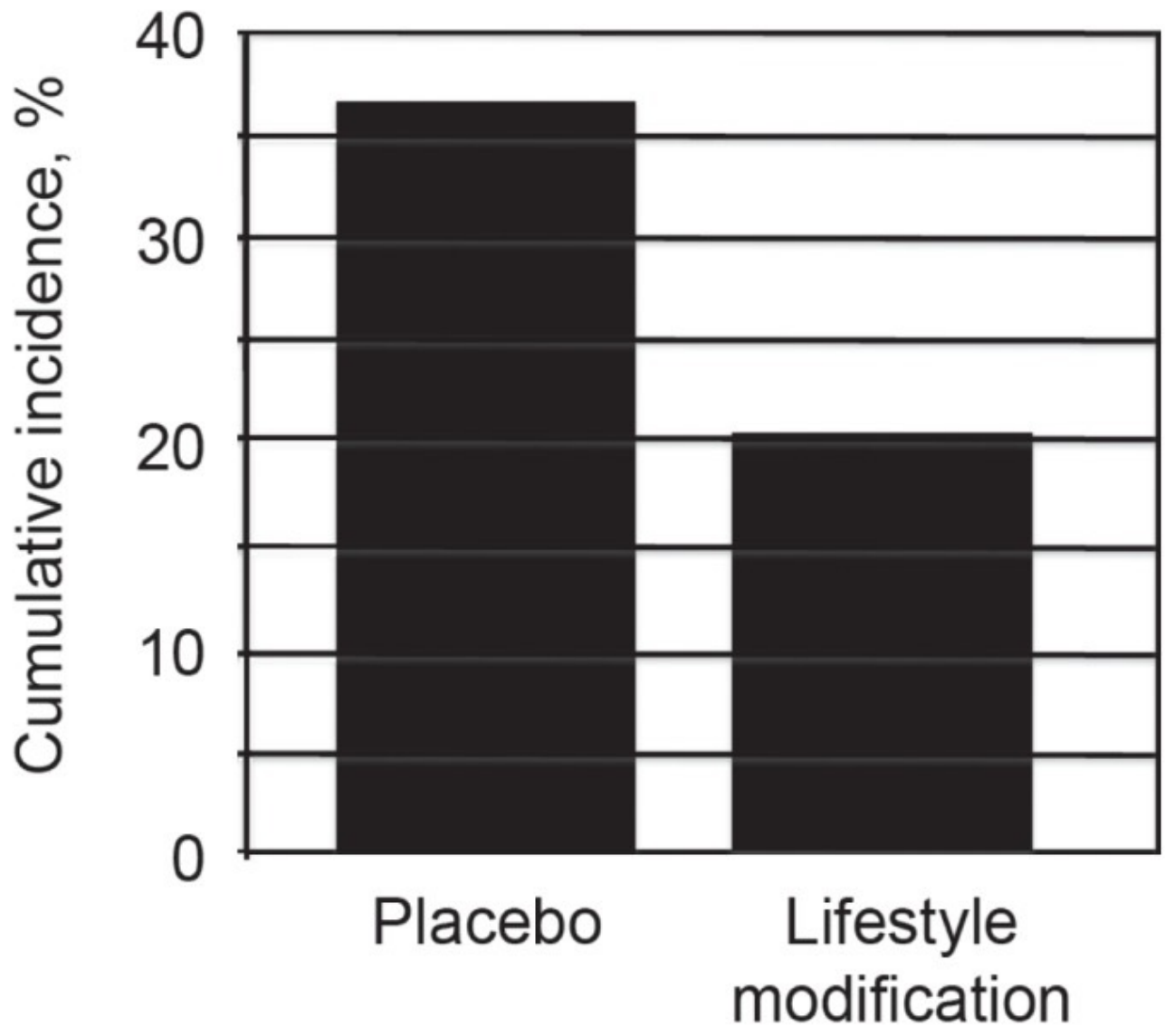
Knowler, et al, study

- In 2002, Knowler, et al 16, hypothesized that lifestyle intervention would prevent or delay the development of diabetes.
 - Randomly assigned patients with prediabetes to receive a placebo or a lifestyle modification program.
 - Goals of at least a 7% weight loss and at least 150 minutes of physical activity per week.

Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin.

N Engl J Med. 2002 Feb 7;346(6):393-403.

William C. Knowler, M.D., et al16



Knowler, et al, study

- Showed metformin lowered incidence of diabetes but not as much as lifestyle intervention.

Take Home Message:

All it takes is exercise and weight loss to reverse prediabetes!

The Diabetes Prevention Program:

Offered by Boulder County Area Agency on Aging:

- A proven behavior change program developed by the CDC
- A trained lifestyle coach provides support and guidance to the group
- Skill building to lose weight, become more physically active and manage stress
- A year-long program with weekly meetings for six-months, followed by one to two a month for the second six months.

Diabetes Prevention Program

Please join us for an informational session

September 27th

5-6 PM

3482 Broadway St. Boulder, CO

September 30th

11am – 12pm

Via ZOOM

Limited space – sign up early! Classes are offered without charge to qualified participants. Pre-registration is required

To find out if you are eligible:

Call 303-441-4710 or email infohealthyaging@bouldercounty.org

Flatirons Family Pharmacy in Longmont

603 Ken Pratt Blvd Longmont, CO 80501

One year of Pre-diabetes Education classes at NO cost

Flatirons Family Pharmacy is working in partnership with Colorado Department of Public Health & Environment to provide free classes to the first 20 patients who qualify and pass the pre-assessment test. We are certified health coaches managing CDC Preventive Type 2 Diabetes curriculum.

How to Sign up?


Call Rodney (clinical pharmacist) at 303 827 3480

Email rodneyd@flatironsrx.com



Thank You!





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Boulder Community Health