Nutrition and Heart Disease

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www.mylifecheck.heart.org

Life Check: Healthy Diet is a key component

Cardiovascular (CV) Health

- **Ideal CV health: presence of optimal levels of the 7 metrics**
- *4 health behaviors:*
    - *Not smoking*
    - *Sufficient physical activity*
    - *Healthy diet pattern*
    - *Energy balance=normal body weight*
- *3 health factors:*
    - *Blood pressure*
    - *Total cholesterol*
    - *Fasting blood glucose*

the 4 health behaviors

LIFE'S SIMPLE 7

	WHERE YOU ARE NOW	CHOOSE YOUR NEXT STEPS	WHERE YOU WANT TO BE
Smoking Status	**Never smoked** Excellent	[x] **Keep up the good work** [ ] Stay physically active [ ] Plan activities that don't involve smoking [ ] Eat a healthy diet [ ] Maintain a healthy weight	**No smoking** Excellent
Healthy Weight	**185 pounds** (BMI of 30.8) Warning	[ ] Plan to lose 10% of my current weight, as a first step [ ] Eat smaller portions and less food per day [x] **See a dietitian for guidance on healthier eating decisions** [ ] Increase physical activity to burn more calories than I eat [ ] Join a support group or comprehensive weight-loss program	**110 to 149 pounds** (BMI of 18.5 to 24.9) Excellent
Physical Activity	**30 min. moderate and 0 min. vigorous** (weekly) Needs improvement	[ ] Look for ways to move more - take the stairs more often [x] **Be active longer each time - add 10 minutes to what I do now** [ ] Choose activities that work all the different parts of my body [ ] Write down what may be holding me back from moving more [ ] Be active with friends and family; a support network helps	**150 min. moderate or 75 min. vigorous** (or equivalent combination) Excellent
Healthy Diet	**1 component** Warning [ ] 4 cups fruits/vegetables/day [ ] 3 oz. or more whole grain/day [✓] **2-3 servings fish/wk** [ ] Under 450 cal. added sugar/wk [ ] Under 1,500 mg sodium/day	[x] **Eat at least one fruit and vegetable with every meal** [ ] Eat more whole grain foods [ ] Eat fish twice per week [ ] Limit foods and beverages with added sugars [x] **Choose processed foods less often to reduce sodium intake**	**4-5 components** Excellent It is important to follow the guidelines for other dietary components like fats, etc.

the 3 health factors

LIFE'S SIMPLE 7

	WHERE YOU ARE NOW	CHOOSE YOUR NEXT STEPS	WHERE YOU WANT TO BE
Blood Pressure	SYSTOLIC 140 mm Hg DIASTOLIC 95 mm Hg Warning You should discuss this factor with your healthcare provider.	☐ See my healthcare provider to recheck my blood pressure ☒ **Learn to read food labels and choose foods with less sodium** ☒ **If I'm overweight, lose weight – even 10 lbs makes a difference** ☐ Be more physically active; aim for at least 150 minutes per week ☐ Speak to my healthcare provider about medication options	SYSTOLIC Less than 120 mm Hg DIASTOLIC Less than 80 mm Hg Excellent
Blood Cholesterol *(total cholesterol)*	224 mg/dL Needs improvement You should discuss this factor with your healthcare provider.	☐ Speak to my healthcare provider about medication options ☒ **Speak to a dietitian to improve my eating habits** ☐ Eat fewer saturated and trans fats ☐ Be more physically active ☒ **If overweight, work on losing weight**	Less than 200 mg/dL Excellent
Blood Sugar *(fasting)*	98 mg/dL Excellent (no medication)	☐ Make good food choices and eat modest food portions ☐ Work with a dietitian for guidance on how to eat a healthy diet ☒ **If I'm overweight, lose weight – even 10 lbs makes a difference** ☐ Be more physically active; aim for at least 150 minutes per week ☐ Learn to read food labels to avoid added sugars	Less than 100 mg/dL Excellent

Meeting more of the metrics means lower total and CV mortality

Very few actually meet all Life Simple 7 metrics:

in 1988-1994: only 2%

in 2005-2010: 1.2%

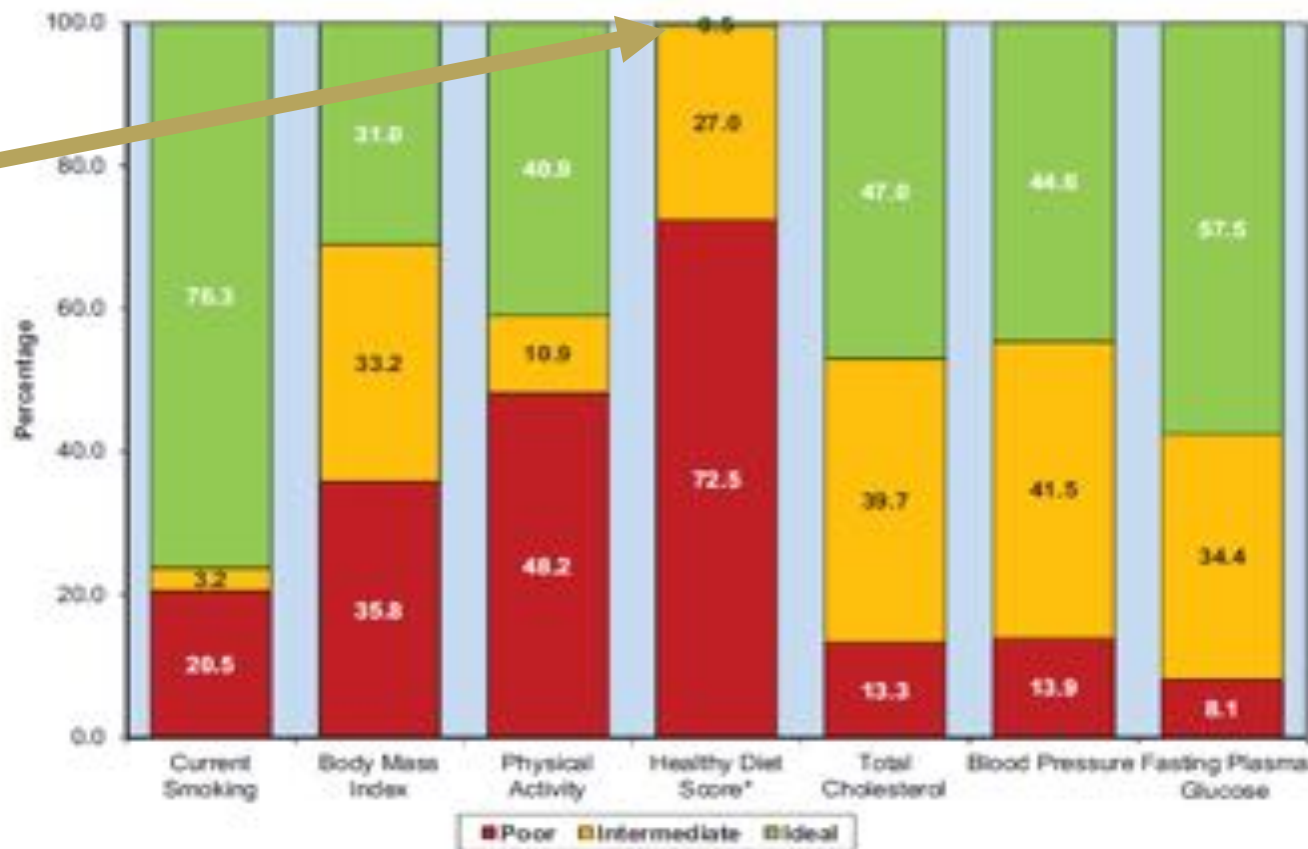# Metrics of CV Health: Healthy Diet Score in Adults

Chart 2-2. Age-standardized prevalence estimates for poor, intermediate, and ideal cardiovascular health for each of the 7 metrics of cardiovascular health in the American Heart Association 2020 goals among US adults aged ≥20 years, National Health and Nutrition Examination Survey 2009 to 2010.

Heart Disease and Stroke Statistics 2014 Update

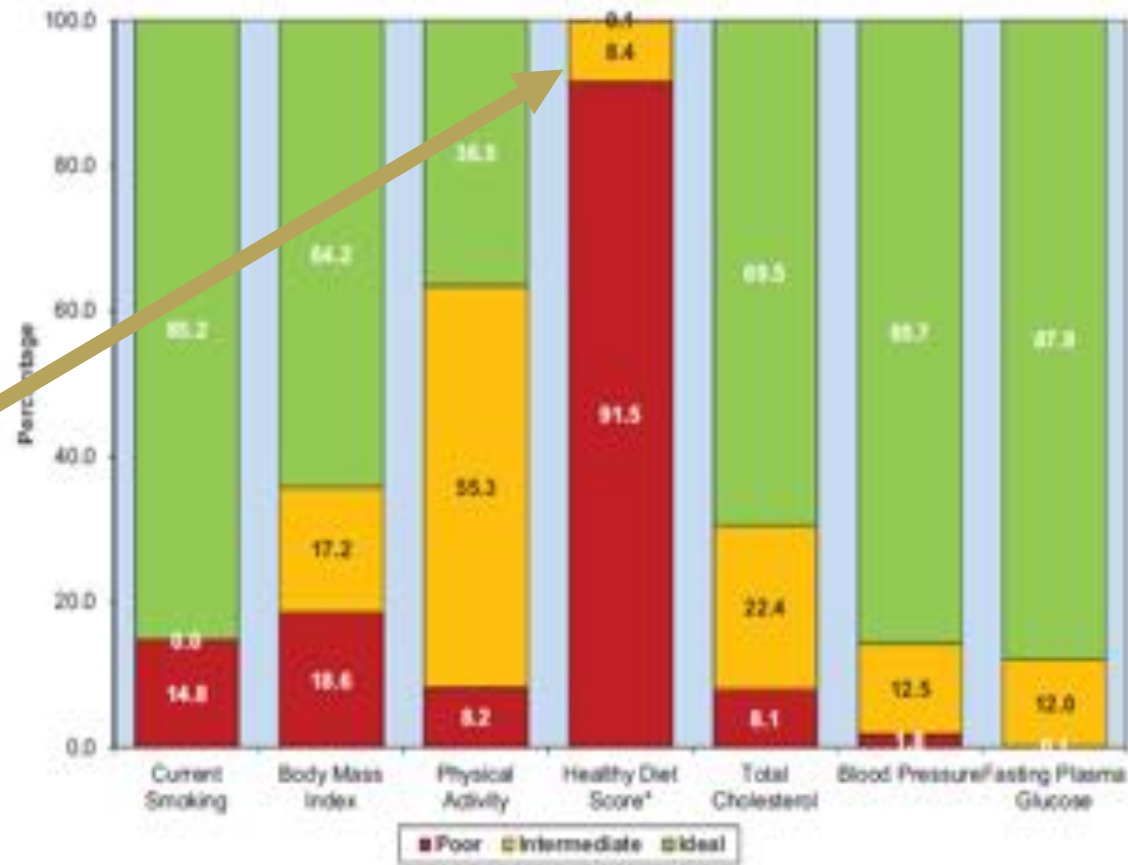# Metrics of CV Health: Healthy Diet Score in Children

Chart 2-1. Prevalence (unadjusted) estimates for poor, intermediate, and ideal cardiovascular health for each of the 7 metrics of cardiovascular health in the American Heart Association 2020 goals among US children aged 12 to 19 years, National Health and Nutrition Examination Survey 2009 to 2010.

Heart Disease and Stroke Statistics 2014 Update

American Heart Association: Healthy Diet Score

| Life's Simple 7 healthy diet	Target servings
Fruits and Vegetables	4.5 c/d
Whole Grains (1.1g fiber/10 g CHO)	3 /d
Fish (3.5 oz)	2+/wk
Nuts/Legumes (50g, 1.75oz)	4/wk
Dairy Products (1 c, 1 oz)	2-3/d
Vegetable oils (1 tsp)	2- 6/d

American Heart Association: Healthy Diet Score

Life's Simple 7 healthy diet	Target servings
Consume less:	
Hydrogenated oils	**Avoid**
Meats/Processed	≤ 2/wk
Sugar-sweetened beverages	≤ 36oz /wk
Alcohol	1-2/d

Mozaffarian, Appel, Van Horn. Circulation 2011;123:2879

Vegetarian & Vegan Diet Pyramid
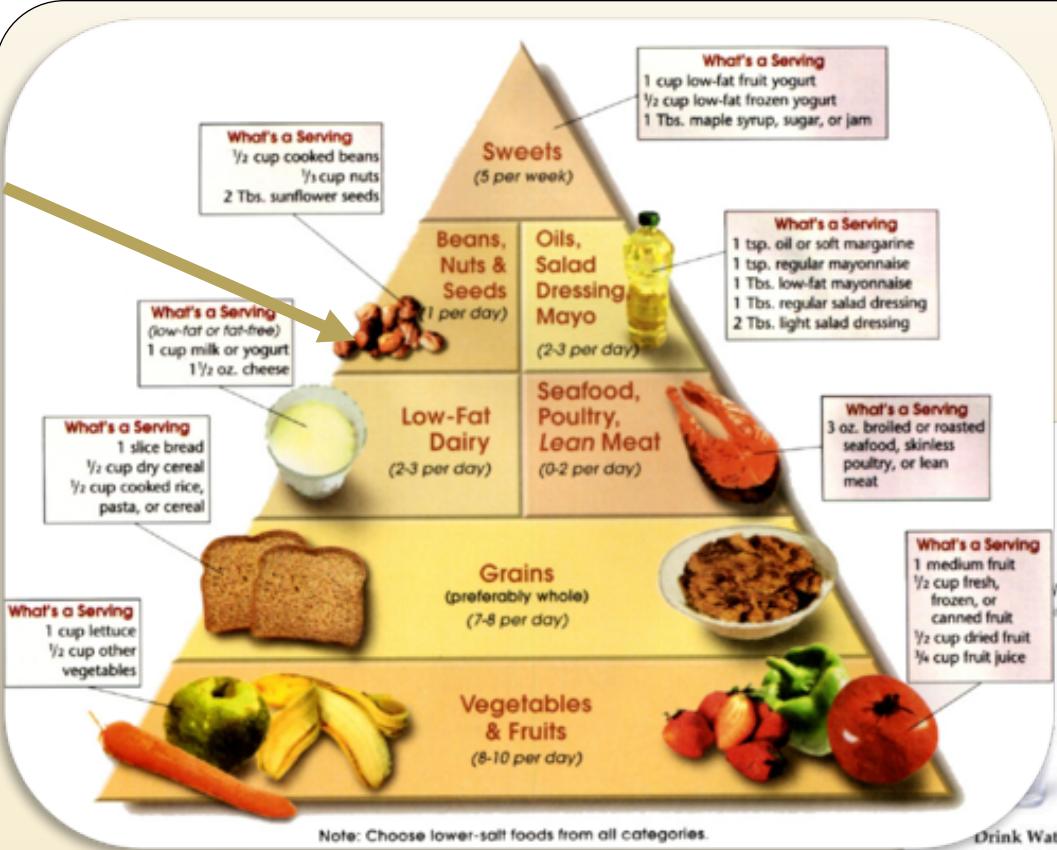
Dash Diet

Mediterranean Diet
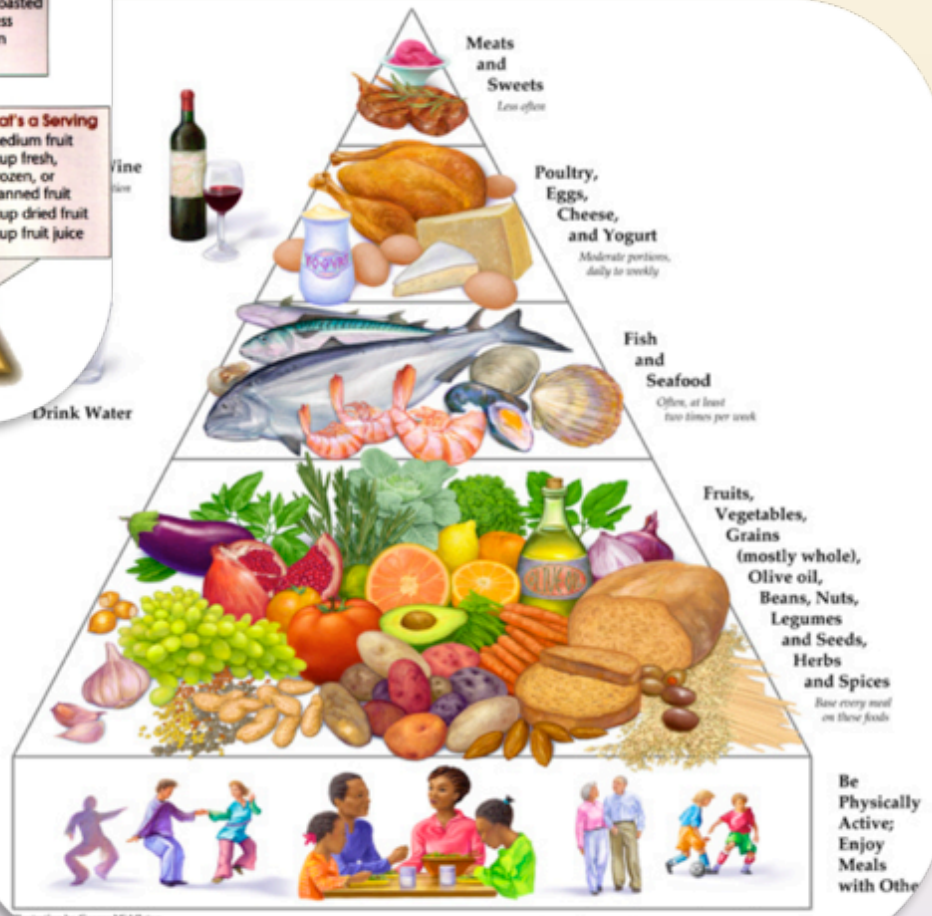
DASH vs Mediterranean

DASH

Low-saturated fat

Low-fat dairy

Fruit
Vegetables
Nuts, seeds, legumes
Lean meats
Whole grains

Mediterranean

Moderate fat (20-35%)

Full-fat dairy

Olive oil

Moderate wine

Fish

Emphasis on
 Sodium
Alcohol

"Dietary Approaches to Stop Hypertension" (DASH) Eating Plan

- 7–8 servings of grains, grain products daily

- 4–5 servings of vegetables daily

- 4–5 servings of fruits daily

- 2–3 servings of low-fat or nonfat dairy foods daily

- ≤ 2 servings of meats, poultry, fish daily

- 4–5 servings of nuts, seeds, legumes weekly

- Limited intake of fats, sweets

DASH Diet Plus Weight Loss: Change in Blood Pressure from Baseline (ENCORE Trial)

Blumenthal JA et al *Arch Intern Med* 2010;170:126-135.
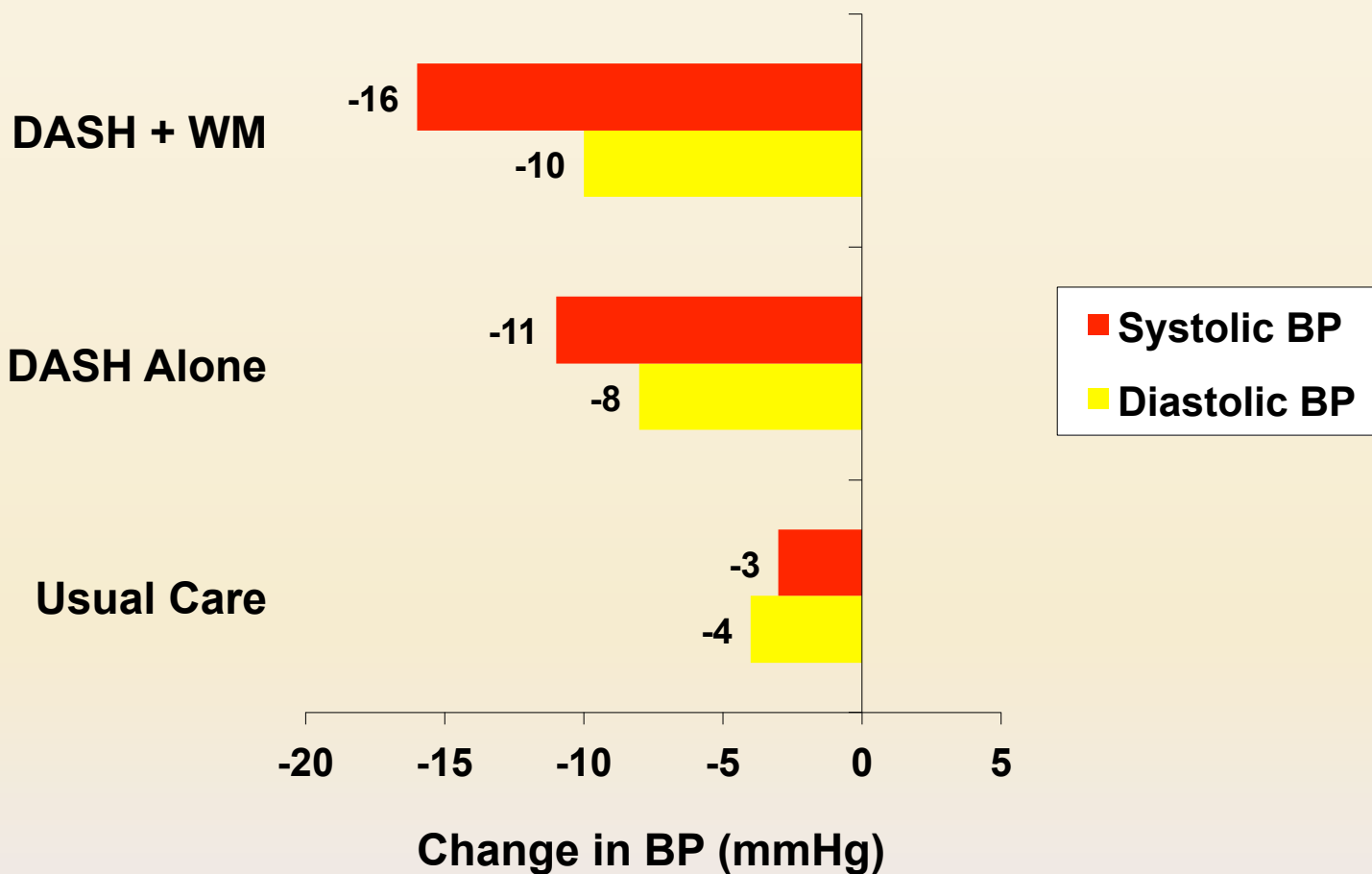
Lifestyle Modification & Impact on Blood Pressure

Modification	Recommendation	Expected systolic reduction
Weight reduction	Goal of BMI 18-25 Waist <35 inches	5-20 mm Hg per 10 kg wt loss
DASH	Fruits, veggies, low-fat dairy products, less fat	8-14 mm Hg
Sodium restriction	<2.3 g every day	2-8 mm Hg
Physical activity	30 min of aerobic 5x/wk	4-9 mm Hg
Reduced Alcohol (1/2 for women)	2-12 oz beer, 10 oz wine, 3 oz 80 proof whiskey in men	2-4 mm Hg
Mediterranean Diet	4 Tbs olive oil, 30 g nuts per day	3-5 mm Hg

DASH Accordance for 2013

- Overall DASH Accordance was poor, mean 2.8, minimum was 1 and maximum was 5

- Only 10 out of 65 or 15% of M1s got a score of 4 or better

- Components with the highest proportion of 0's (not accordant):
  - Fruits, 98%
  - Veggies, 86%
  - Reduced fat Dairy, 85%

What was the PREDIMED (PREvención con DIeta MEDiterranea) trial?

- How effective was a **Mediterranean diet** in preventing cardiovascular death OR myocardial infarction OR stroke

- In whom? 7500 high risk adults
  - *Type 2 diabetes OR*
  - *3 or more risk factors*
    - *smoking, hypertension, high LDL ($\geq$ 160mg/dL) low HDL ($\leq$ 40 for men 50 for women), overweight or more (BMI $\geq$ 25), family history of premature Heart disease*

Estruch R. et al. *N Engl J Med* 2013; 368:1279-1290

What was the PREDIMED (PREvención con DIeta MEDiterranea) trial?

- 3 Treatments

  1. Mediterranean diet instruction plus extra virgin olive oil (EVOO): 1 liter/week

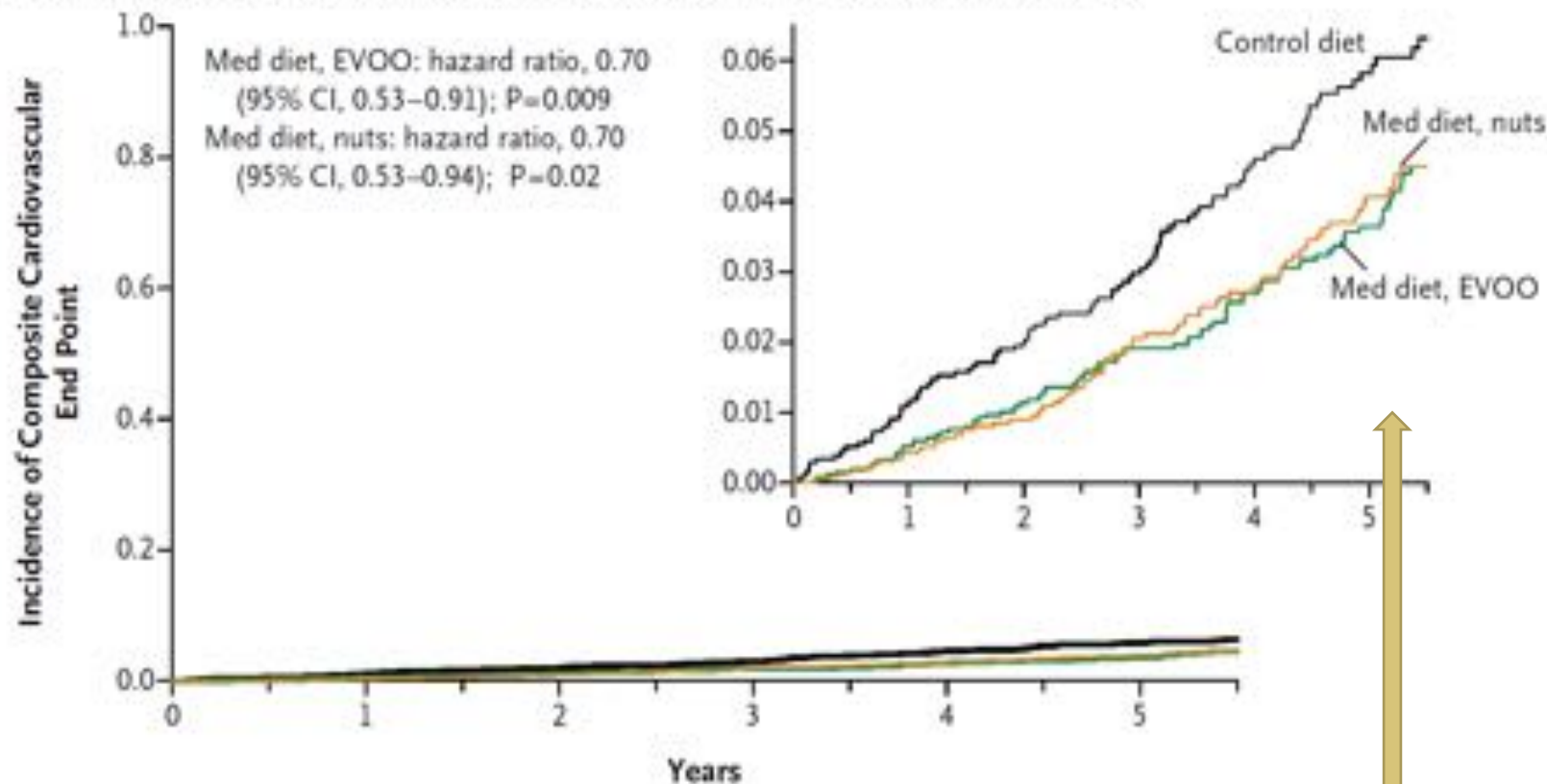 2. Mediterranean diet instruction plus mixed nuts (walnuts, almonds, hazelnuts): 15g walnuts + 7.5 g almonds + 7.5g hazelnuts=30 g/d

  3. Low fat control diet

Estruch R. et al. *N Engl J Med* 2013; 368:1279-1290

Reduction in CVD events and death with Mediterranean Diet

96, 83, 109 events

A. Primary End Point (acute myocardial infarction, stroke, or death from cardiovascular causes)

Med diet, EVOO: hazard ratio, 0.70 (95% CI, 0.53–0.91); P=0.009
Med diet, nuts: hazard ratio, 0.70 (95% CI, 0.53–0.94); P=0.02

BOTH Mediterranean Groups have few deaths, strokes or attacks after 4.7 y than the control group did…. Nearly 30% fewer events
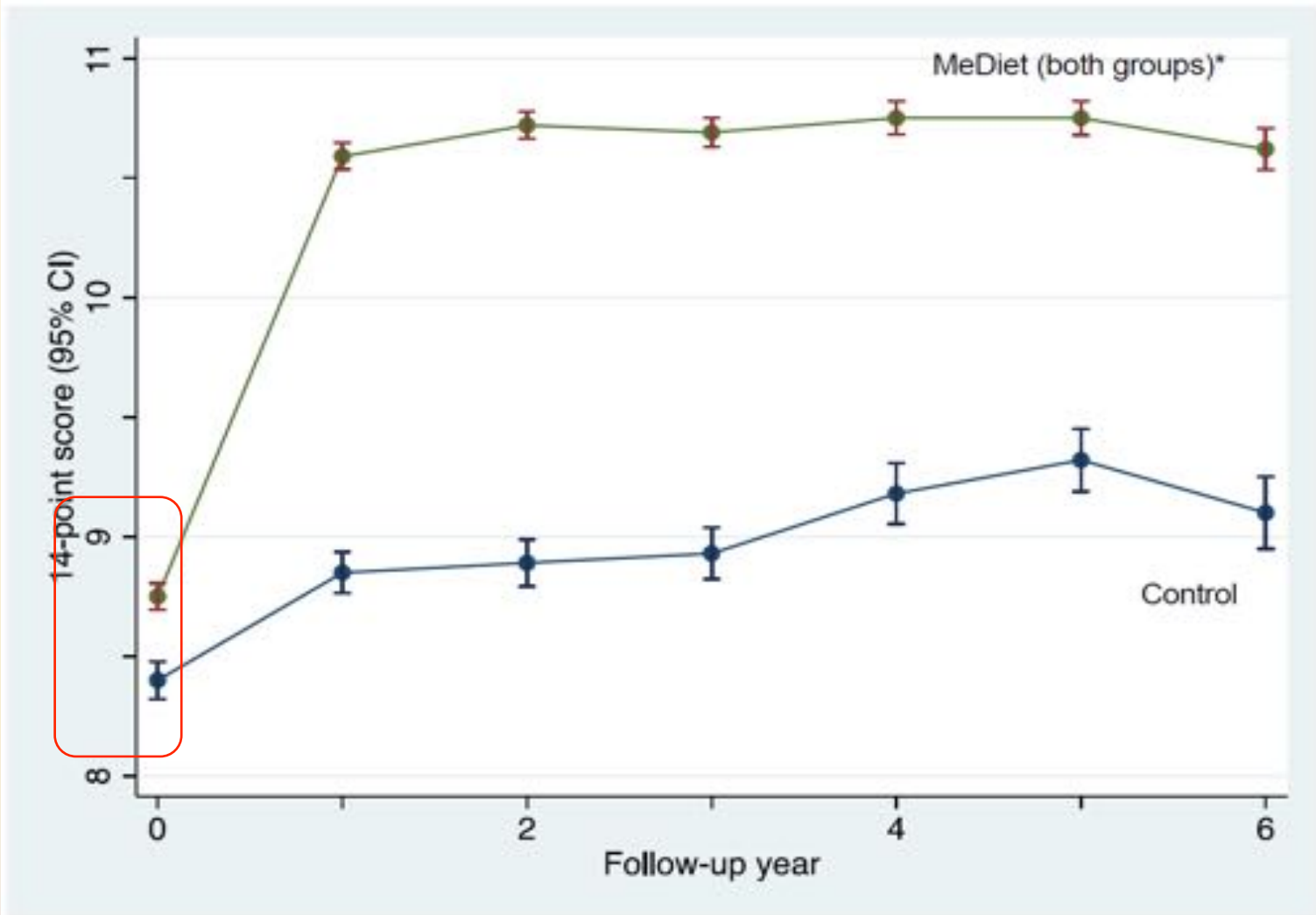
Mediterranean Diet Tool

Table S1. Quantitative Score of Compliance with the Mediterranean Diet.

	Foods and frequency of consumption	Criteria for 1 point*
1	Do you use olive oil as main culinary fat?	Yes
2	How much olive oil do you consume in a given day (including oil used for frying, salads, out of house meals, etc.)?	4 or more tablespoons
3	How many vegetable servings do you consume per day? (1 serving = 200g - consider side dishes as 1/2 serving)	2 or more (at least 1 portion raw or as salad)
4	How many fruit units (including natural fruit juices) do you consume per day?	3 or more
5	How many servings of red meat, hamburger, or meat products (ham, sausage, etc.) do you consume per day? (1 serving = 100-150 g)	Less than 1
6	How many servings of butter, margarine, or cream do you consume per day? (1 serving = 12 g)	Less than 1
7	How many sweet/carbonated beverages do you drink per day?	Less than 1
8	How much wine do you drink per week?	7 or more glasses
9	How many servings of legumes do you consume per week? (1 serving = 150 g)	3 or more
10	How many servings of fish or shellfish do you consume per week? (1 serving: 100-150 g fish, or 4-5 units or 200 g shellfish)	3 or more
11	How many times per week do you consume commercial sweets or pastries (not homemade), such as cakes, cookies, biscuits, or custard?	Less than 3
12	How many servings of nuts (including peanuts) do you consume per week? (1 serving = 30 g)	3 or more
13	Do you preferentially consume chicken, turkey or rabbit meat instead of veal, pork, hamburger or sausage?	Yes
14	How many times per week do you consume vegetables, pasta, rice, or other dishes seasoned with sofrito (sauce made with tomato and onion, leek, or garlic, simmered with olive oil)?	2 or more

* 0 points if these criteria are not met.

MAXimum =14

Mediterranean Diet Scores

*P<0.001 for all six comparisons in years 1 to 6 by analysis of variance.
MeDiet, Mediterranean diet; CI, confidence interval.

Participants with a Positive Answer (%) to each of the 14 Items of the Mediterranean Diet Score by Treatment Arm during Follow-up

	1-year follow-up			3-year follow-up			5-year follow-up		
	MeDiet+ EVOO	MeDiet+ Nuts	Control	MeDiet+ EVOO	MeDiet+ Nuts	Control	MeDiet+ EVOO	MeDiet+ Nuts	Control
1. Use olive oil as main culinary fat	99.2	96	91.6	99.2	97.2	92.1	99.9	97.5	96.3
2. Olive oil >4 tablespoons	92.8	78	58.4	93	76.3	51.1	93.6	79.5	58.9
3. Vegetables ≥ 2 servings/d	65.8	64.4	49.8	68.8	68.5	58.3	74.1	73.7	64.5
4. Fruits ≥ 3 servings/d	61.7	61.2	50.7	62.7	65.3	54.2	65.2	67.9	60.9
5. Red or processed meats < 1/d	93.7	94.9	93.9[b]	94.2	95.2	93.1[a]	97.3	96.6	97.1[b]
6. Butter. cream. margarine < 1/d	96.2	95.7	91.7	97.4	95.3	93.5	97.8	96.6	94.8
7. Soda drinks < 1/d	93.6	94	91.6	93.3	93.6	92.5[b]	94.6	93.9	94.7[b]
8. Wine glasses ≥ 7/ wk	31.4	33.7	26.4	28.1	31.0	26.1	29.9	32.3	25.1
9. Legumes ≥3 /wk	43.4	44	28.8	45.3	46.2	30.8	41.5	36.9	31.2
10. Fish or seafood ≥ 3/wk	75.5	73.5	63.3	77.6	75.7	62.1	74.7	75.9	66.1
11. Commercial bakery ≤ 2/wk	78.2	75.9	72.1	76.3	74.9	71.6	75.9	73.5	71.9[a]
12. Nuts ≥ 3/wk	44.5	93.6	24.7	42.2	94.4	22.0	42.2	90.7	16.7
13. Poultry more than red meats	82.4	84.7	78.2	84.3	85.1	80.4	84.0	84.0	83.2[b]
14. Use of sofrito sauce ≥ 2 /wk	84.1	81.7	62.5	87.6	82.0	63.5	86.9	84.3	65.1

MeDiet denotes Mediterranean diet; EVOO extra-virgin olive oil.
All comparisons between each of the two MeDiet groups and the control group for each year were statistically significant (Chi squared tests), with the exception of those with superscript letter [a] (0.05< p < 0.10) or superscript letter [b] (p>0.10).

Treatment: Mediterranean + EVOO

Extra Virgin Olive Oil (EVOO) in comparison to other oils

- Extra virgin olive oil: least processed, most polyphenols, vitamin E and vitamin K

EVOO	Coconut	Corn
♥ 14 % Saturated Fats	♥ 91 % Saturated Fats	♥ 13 % Saturated Fats
♥ 72% MUFAs	♥ 6 % MUFAs	♥ 28 % MUFAs
♥ 55-83% oleic	♥ 6% oleic	♥ 28% oleic
♥ 14 % Total PUFA (not hydrogenated)	♥ 3 % Total PUFA (not hydrogenated)	♥ 55 % Total PUFA (not hydrogenated)
♥ < 1.5% Omega 3	♥ 0% Omega 3	♥ 1% Omega 3

Treatment 2: Mediterranean + Nuts

Comparison: Nuts

- U.S. FDA approved a qualified health claim
  - Eating <u>1.5 ounces/day</u> of nuts may reduce the risk of CHD
  - 5 or more times a week can lower LDL by 2 -19%
  - These 3 nuts were part of PREDIMED (serving size 1 oz)

Almond	Hazelnuts	Walnut
♥ 164 Calories	♥ 178 Calories	♥ 185 Calories
♥ 14.4 g Fat	♥ 17.2 g Fat	♥ 18.5 g Fat
♥ 9.1 g MUFA	♥ 12.9 g MUFA	♥ 2.5 g MUFA
♥ 0.2 g omega-3	♥ 0.2 g omega-3	♥ **2.6 g omega-3**
♥ 3.3 g Fiber	♥ 2.7 g Fiber	♥ 1.9 g Fiber
♥ 6.0 g Protein	♥ 4.2 g Protein	♥ 4.3 g Protein

Omega-3s

- Heart Health
  - Lowers triglyceride (25-30%)
  - Reduces inflammation
  - Increases HDL cholesterol
- Sources of omega-3s
  - Fish
  - Plants (**walnuts**, flax seed, chia seed)
- Recommendations
  - At least 2 servings of fatty fish per week if no heart disease
    - Dietary Guidelines 250 mg EPA/DHA per day (2, 3.5 oz servings/week)
  - 1 g EPA/DHA (fish oil) if have heart disease (~1 serving of fish/day)
  - 2-4 g EPA/DHA (fish oil) if have high triglycerides (~2-4 servings of fish/day)

Carbohydrates

- Quantity
  - What fits in ¼ of your plate?
  - 3, ¼ plates a day

- Quality
  - Refined vs **whole grain/high fiber**
  - Alternative grains
    - Oatmeal, whole grain, high fiber breakfast cereal, whole wheat pasta, quinoa, popcorn

Fiber recommendations (per day)
25-35 g fiber
10-25 g soluble fiber

*Most (all) should be whole grains*

Whole Fiber-Rich Grains

- Seeds with 3 main parts:
  - Bran
    - **Fiber**, B-vitamins, trace minerals, phytochemicals
  - Endosperm
    - Starchy inner portion low in vitamins and minerals; most refined grains made up of only this portion
  - Germ
    - Vitamin E, trace minerals, B-vitamins, potassium, essential fatty acids
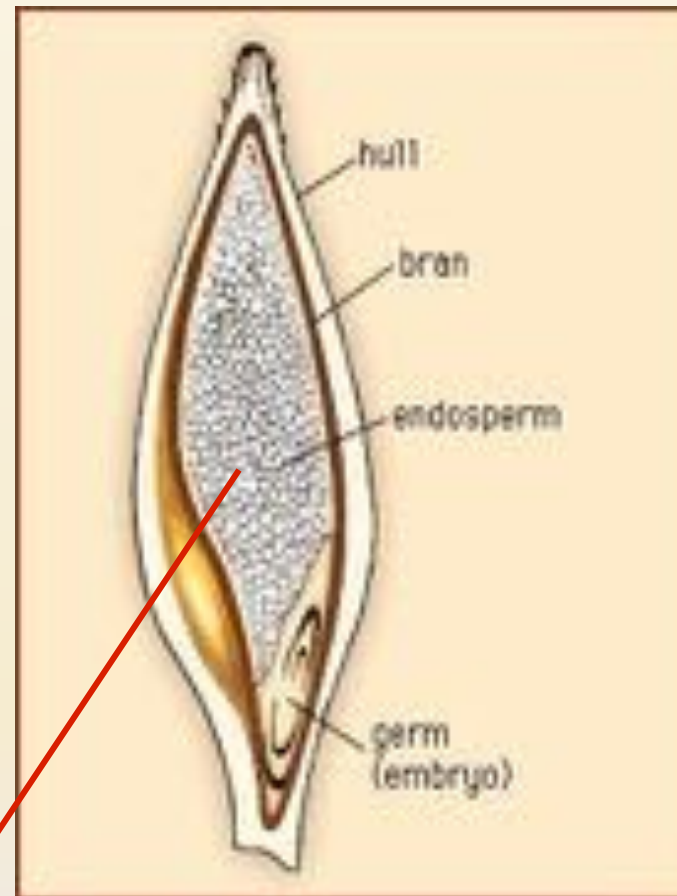
What's in **Refined Grains**

Sodium: Sources in the American Diet

% sodium

- restaurant, takeout
- breads, cereals
- red meats
- dairy
- condiments
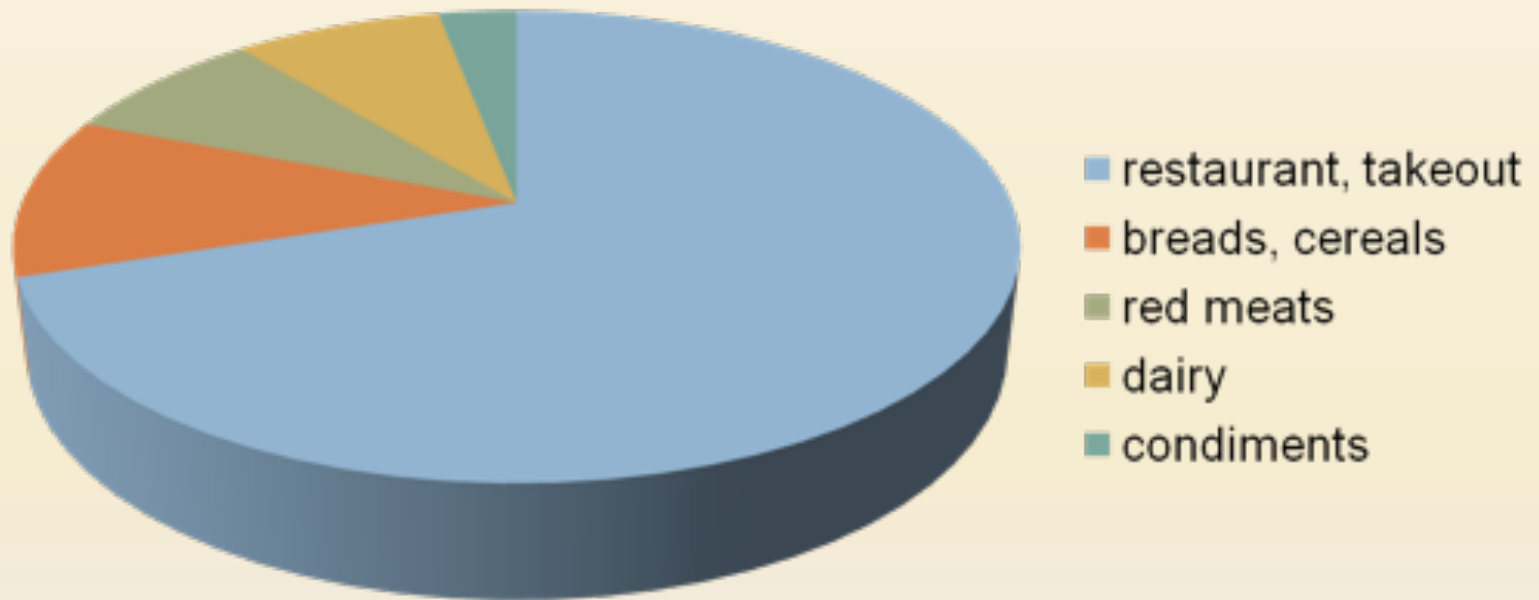
Sugar Intake

- All sugar is nutritionally equal
- Recommendation for sugar intake (each day)
  - 24 grams (6 teaspoons) for women
  - 36 grams (9 teaspoons) for men
- Coco-Cola, 20 oz
  - 240 kcal
  - 65 g sugar (16 teaspoons)
- Vitamin Water, 20 oz
  - 32 grams (8 teaspoons)
- Kool-Aid, 20 oz
  - 29 g sugar (7 teaspoons)
- Sweet Tea
  - 45 g sugar (11 teaspoons)
- Vanilla Latte
  - 35 g sugar (9 teaspoons)

Effects of DASH and Mediterranean dietary patterns on cardiovascular risk factors in randomized controlled trials
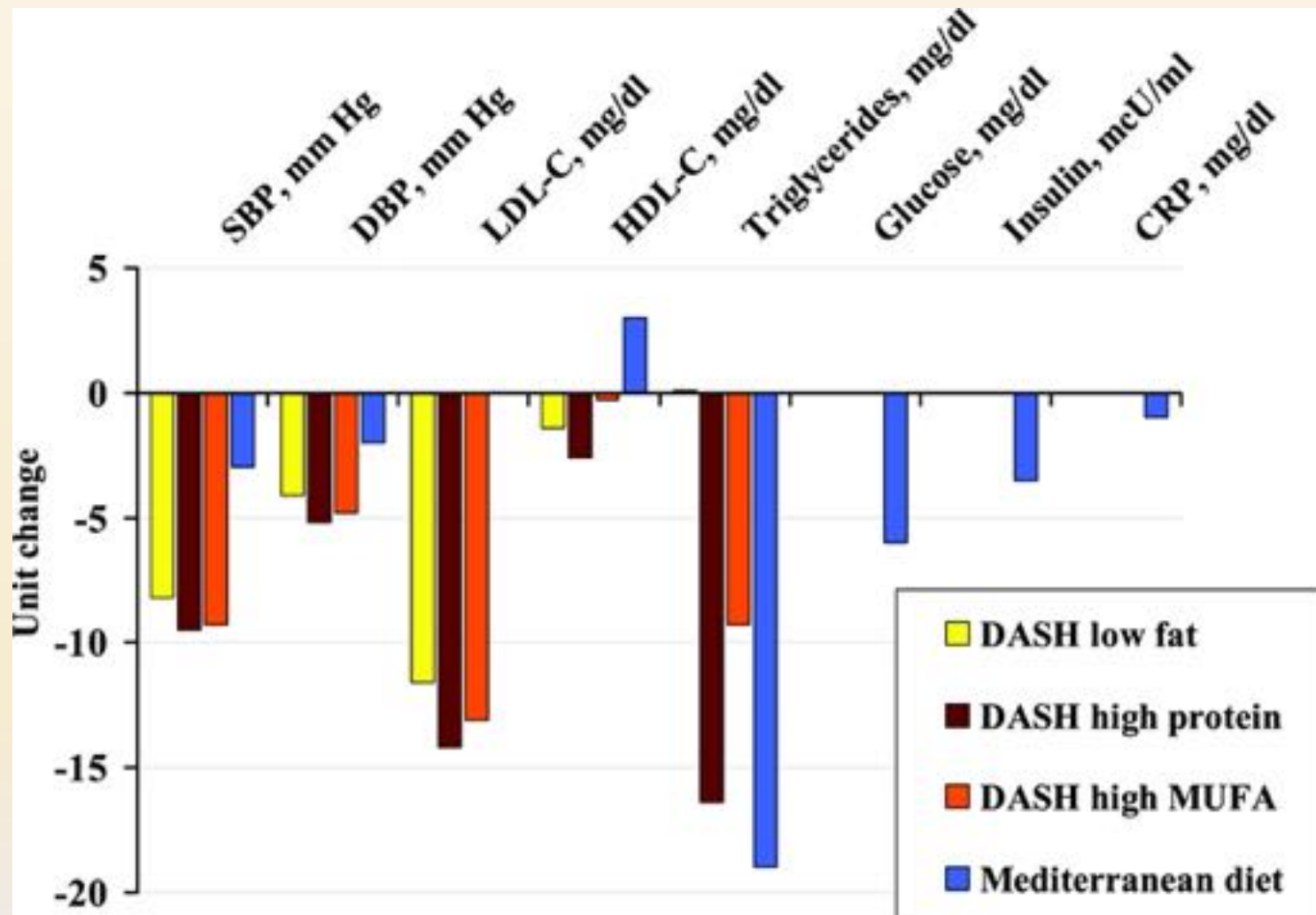
Mozaffarian D et al. Circulation 2011;123:2870-2891

American Heart Association

Learn and Live

How do you stack up?

- My LIFE CHECK
- For more complete diet analyses
  - 24 hour recall using…

QUESTIONS

Question for you...

Most of the sodium we eat comes from

A. *Salt used in cooking & added at the table*

B. *Poultry and beef consumption*

C. *Processed and restaurant foods*

True or False

For a company to claim a food is healthy, it must contain no more than

A. *500 mg sodium for meal and main products*

B. *1600 mg*

C. *800 mg*

500

520

780