

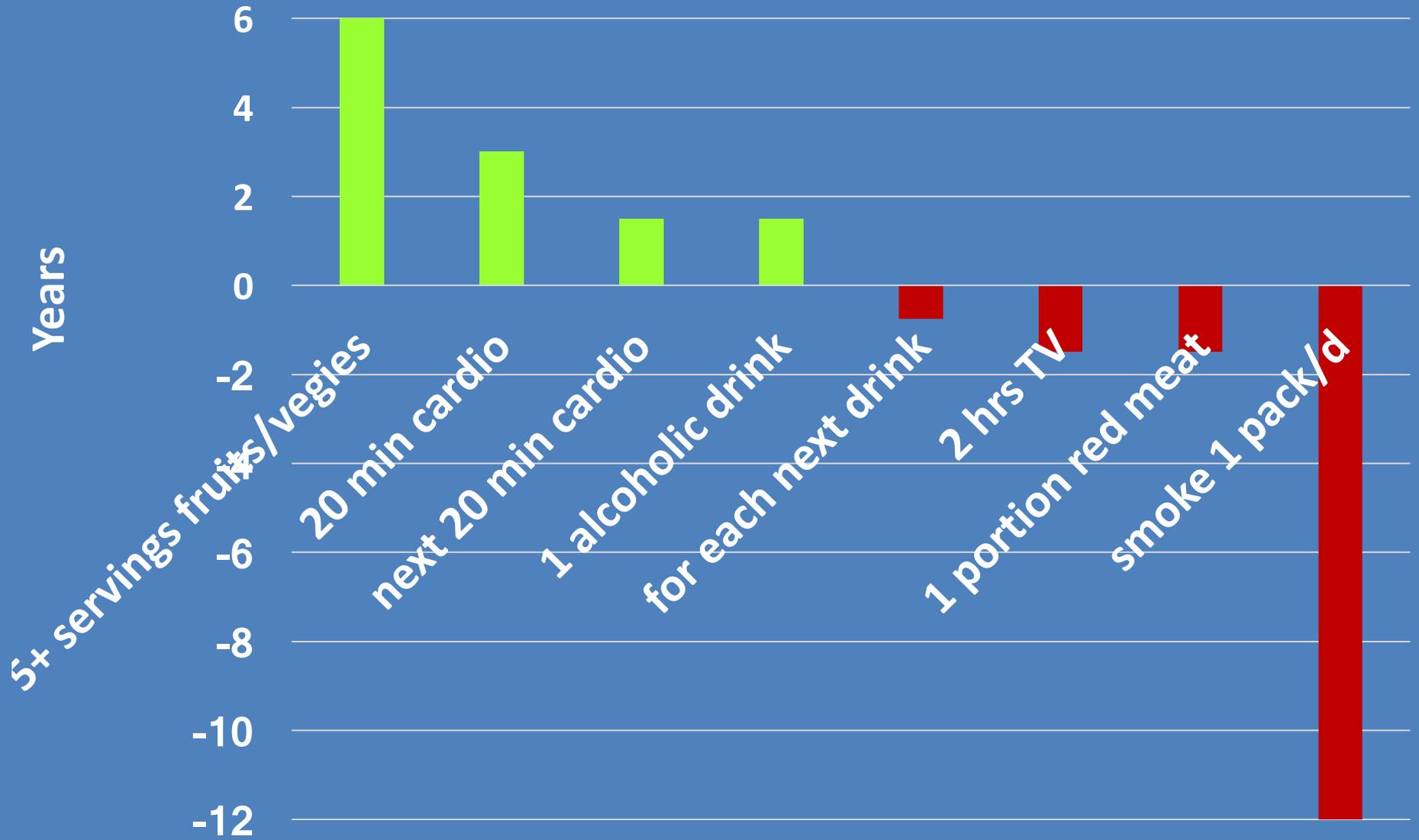
Lifestyle Prevention of Cardiovascular disease

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Sydney Australia

Lecturer in Medicine , Faculty of Medicine and Health
Sciences, Macquarie University

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Lifetime Daily Activities that Increase or Decrease Longevity



The Compression of Morbidity Paradigm

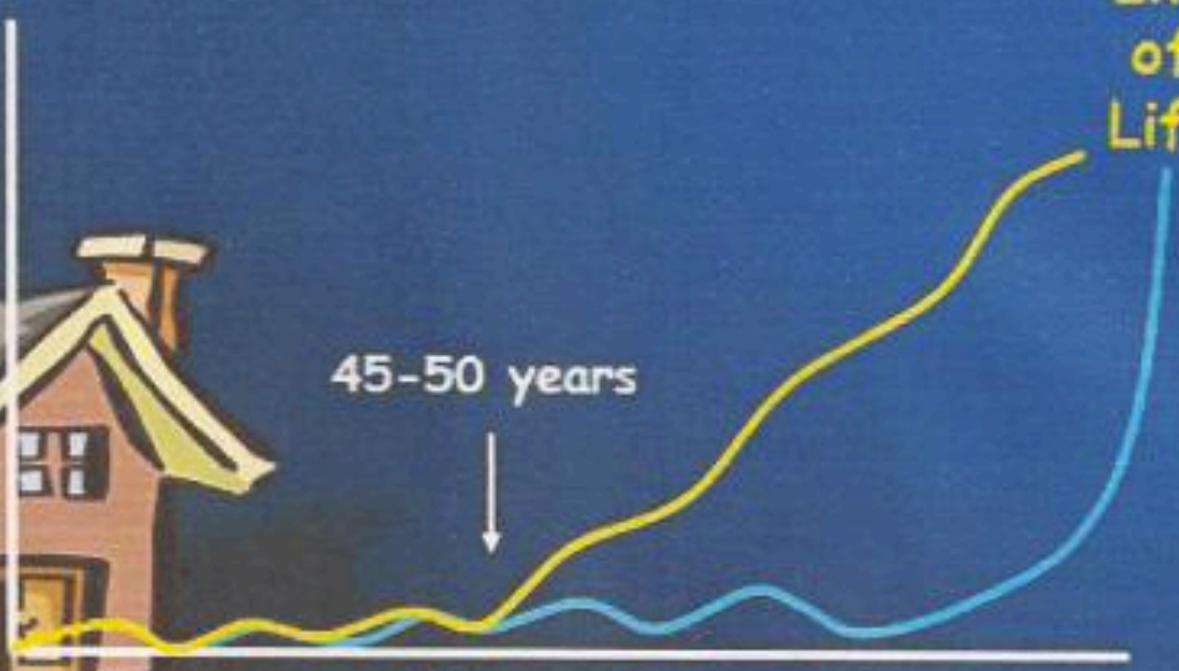
Quality of life

Disability & Health Care Costs

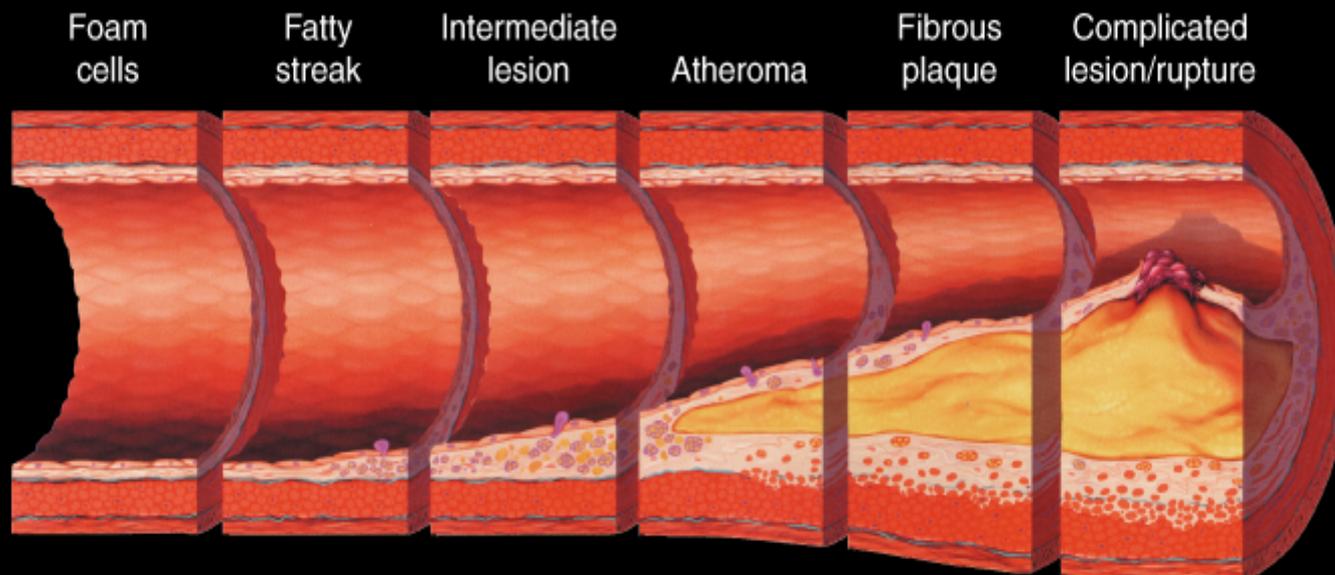
End of Life

45-50 years

Years



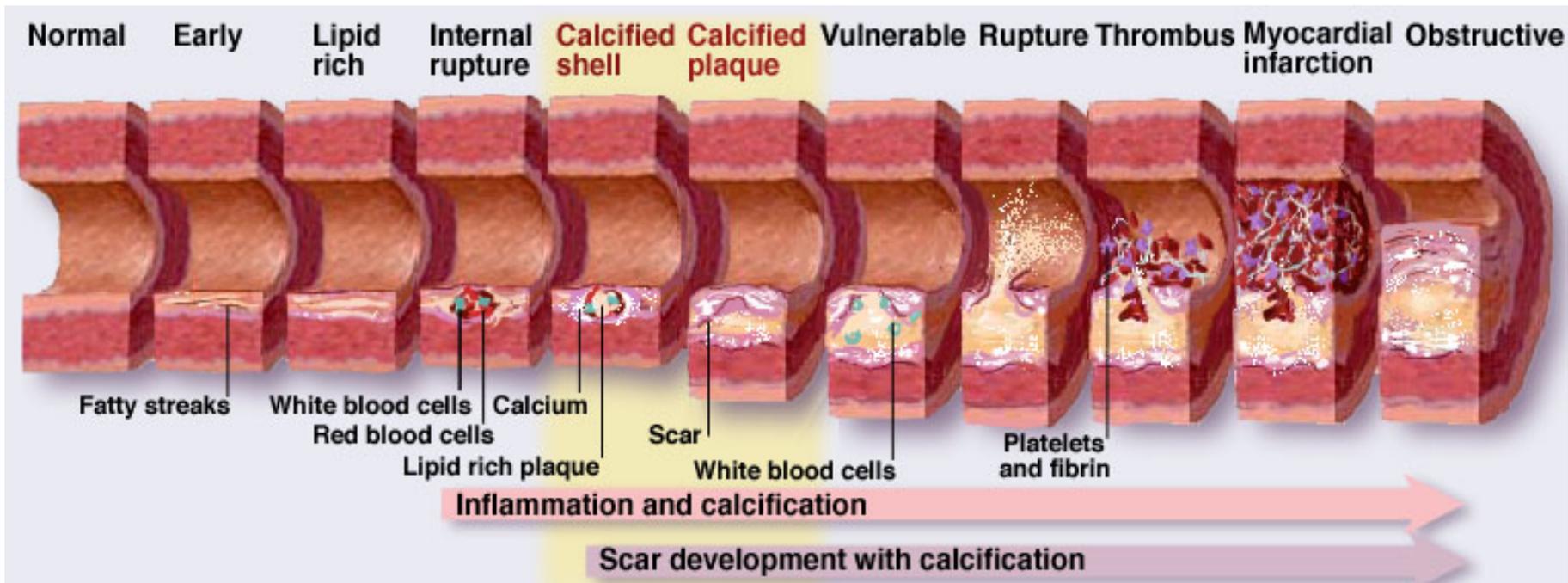
Atherosclerosis timeline

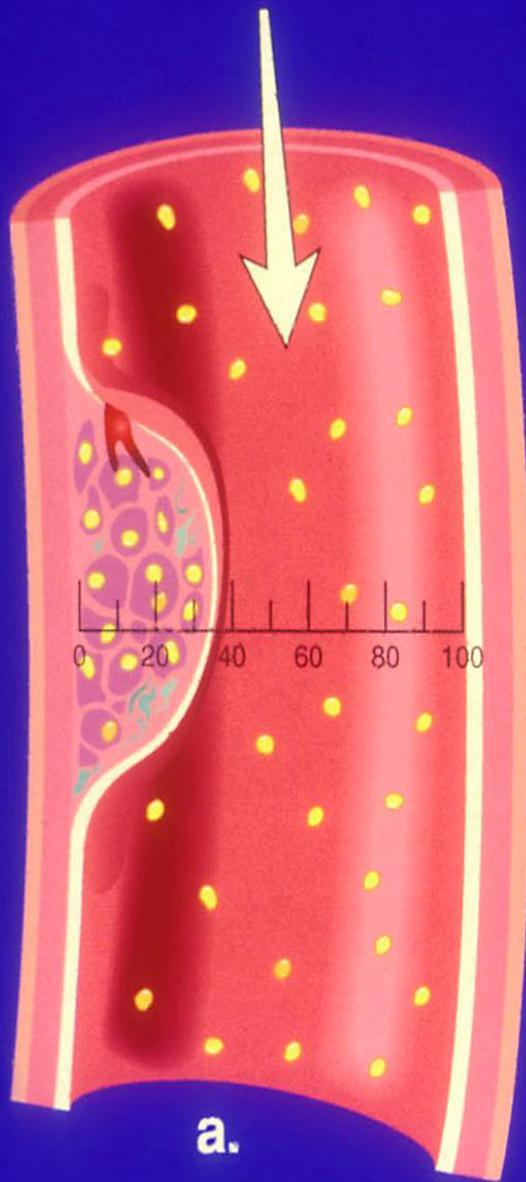


Endothelial dysfunction →

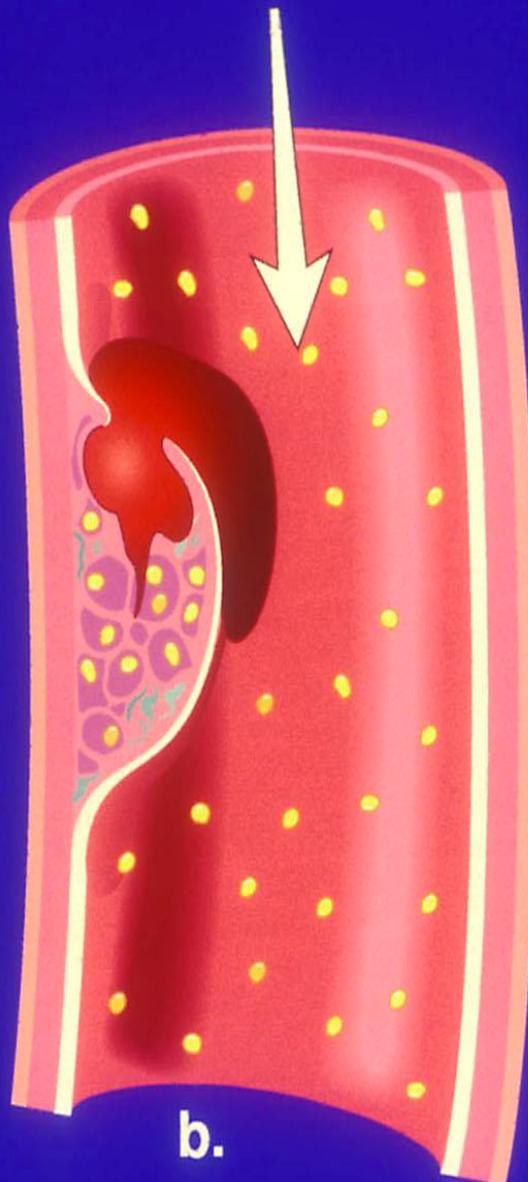
| | | |
|-------------------------------------|-------------------|----------------------------|
| From first decade | From third decade | From fourth decade |
| Growth mainly by lipid accumulation | | Smooth muscle and collagen |
| | | Thrombosis, hematoma |

Adapted from Pepine CJ. *Am J Cardiol.* 1998;82(suppl 104).





a.



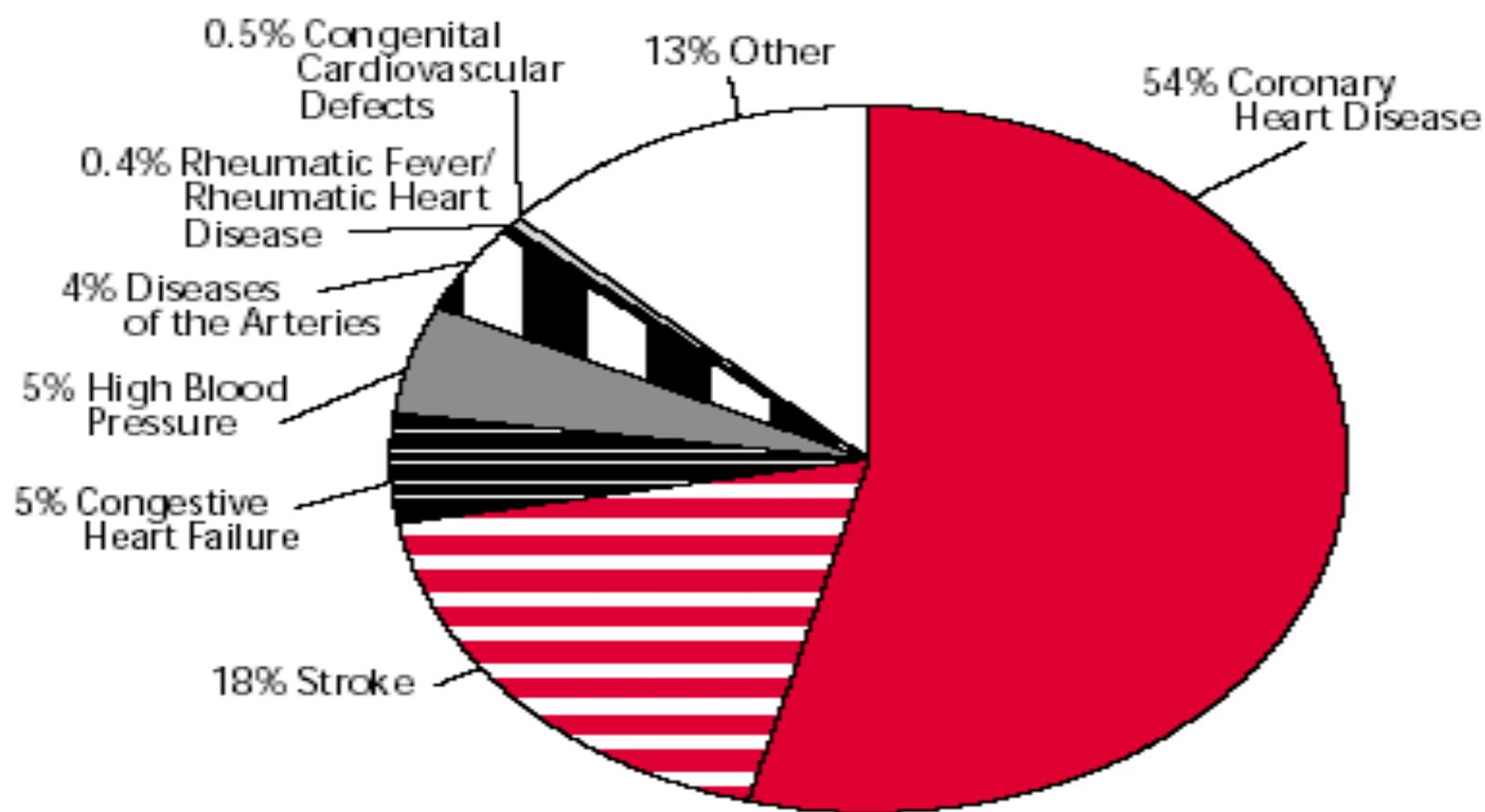
b.



c.

Percentage Breakdown of Deaths From Cardiovascular Diseases

United States: 2000



Source: CDC/NCHS.

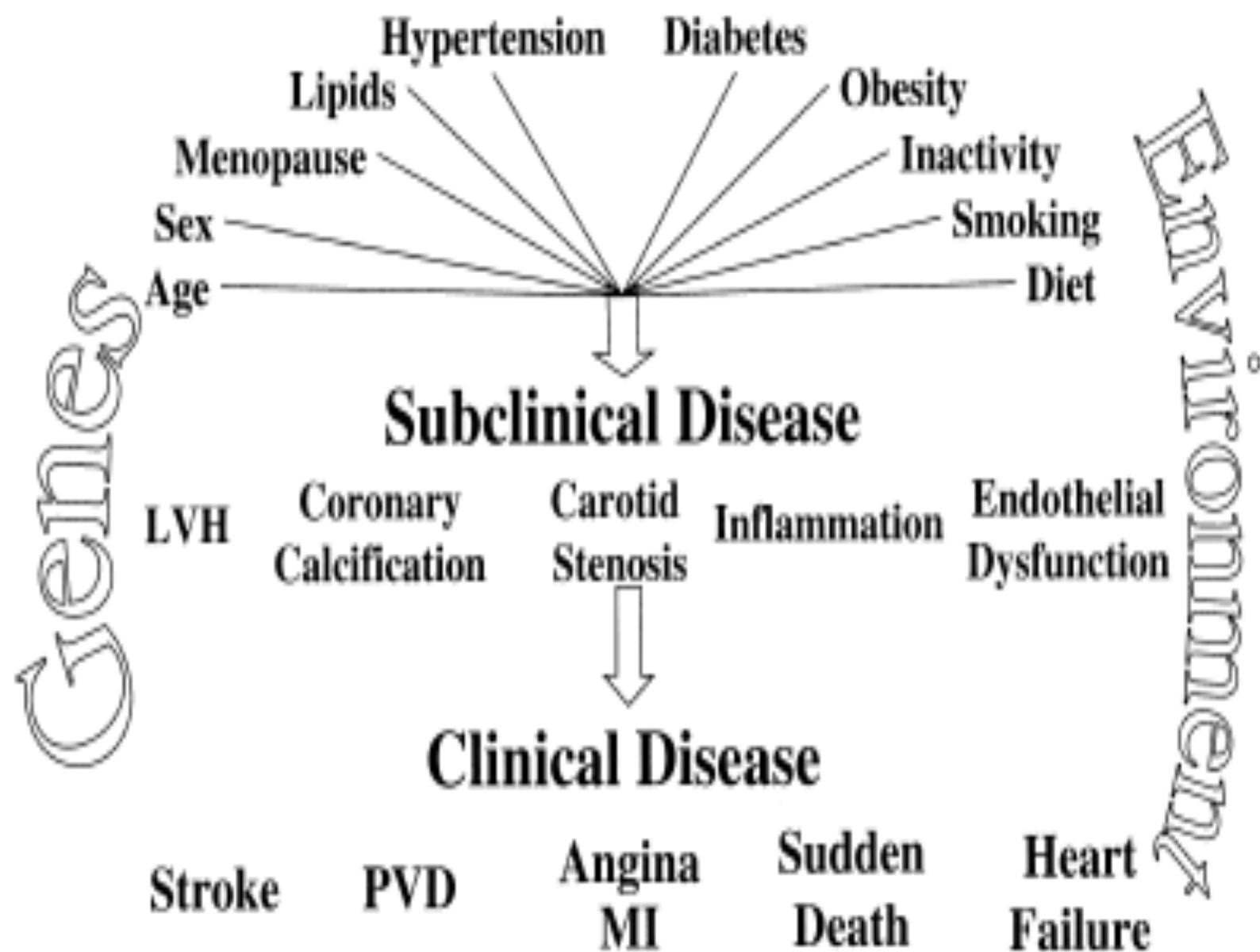


Figure 2. Risk factors. LVH = left ventricular hypertrophy; MI = myocardial infarction; PVD = peripheral vascular disease.

Established Risk Factors for Cardiovascular Disease

- Nonmodifiable

- Age

- >45 male
- >55 female (post Menopausal)

- Sex (M.F)

- Family History

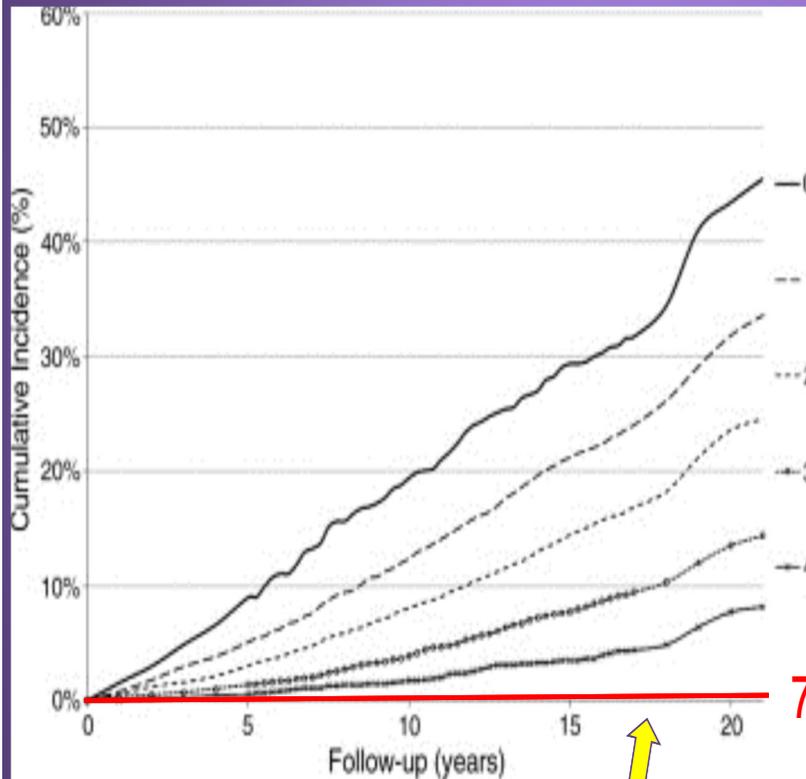
- age <55 father or other first degree male relative
- age <65 mother or first degree female relative

- Modifiable

- Hypertension (high BP)
- Cholesterol
- Elevated Low Density Lipoprotein (LDL)
- Reduced HDL
- Physical inactivity
- Obesity
- Diabetes (usually Type 2)
- Cigarette Smoking
- Chronic Stress
- Pessimism

IDEAL CARDIOVASCULAR HEALTH

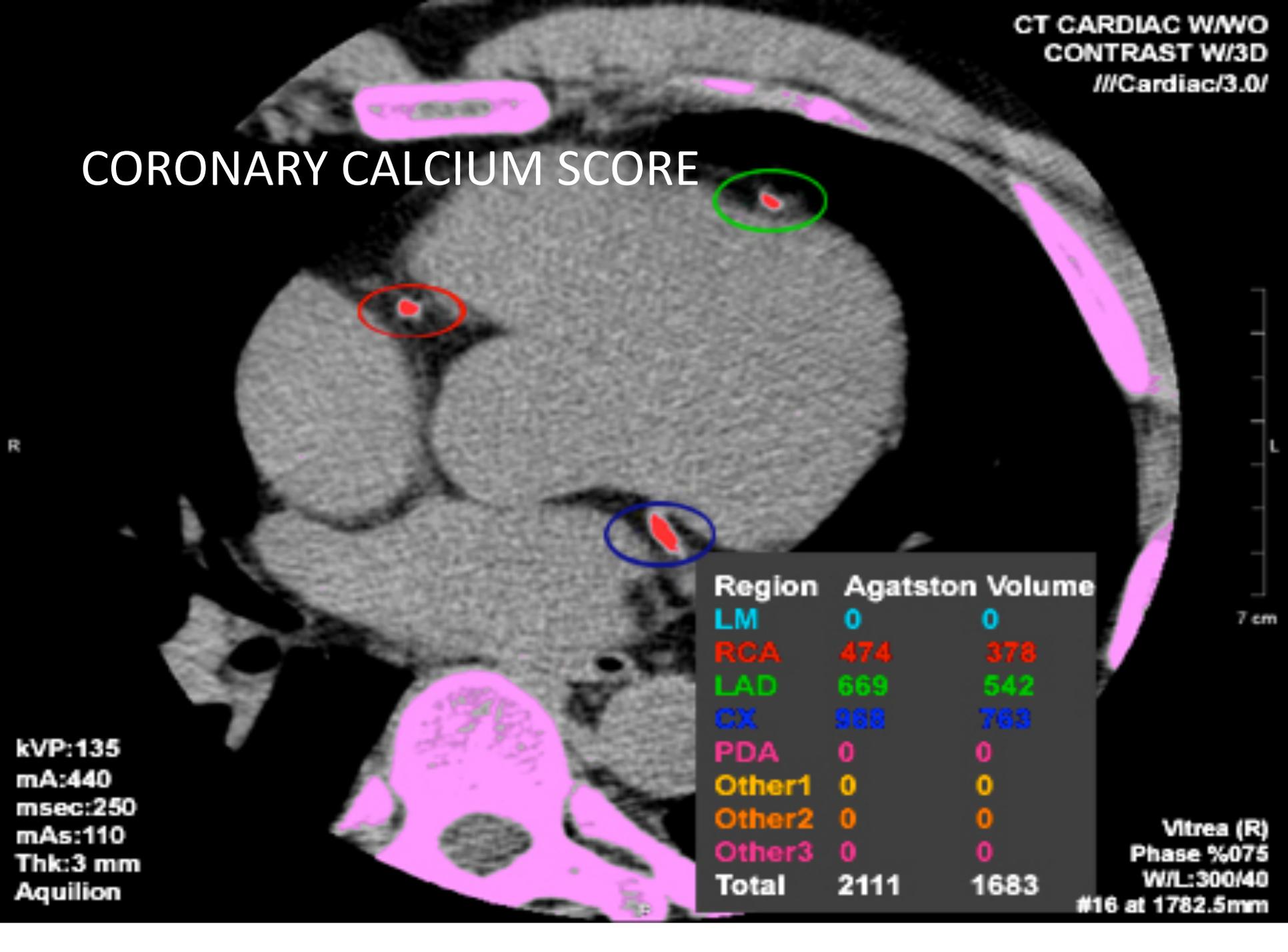
ARIC: 1987-2007
Mean age 54years



Cohort participants with all 7 Ideal CV Health Metrics had 0 CV events over 20 Years of follow-up

| IDEAL CV HEALTH | |
|--------------------|---------------------------------|
| SMOKE | NEVER |
| Blood pressure | <120/80 mm Hg |
| Healthy Diet Score | 4/5 Components |
| Total Cholesterol | less than 5.0 (usually HDL 1.5) |
| Fasting Sugar | < 7 (ie No diabetes) |
| BMI | < 25 |
| Physical activity | > 150 mins /week |

CORONARY CALCIUM SCORE



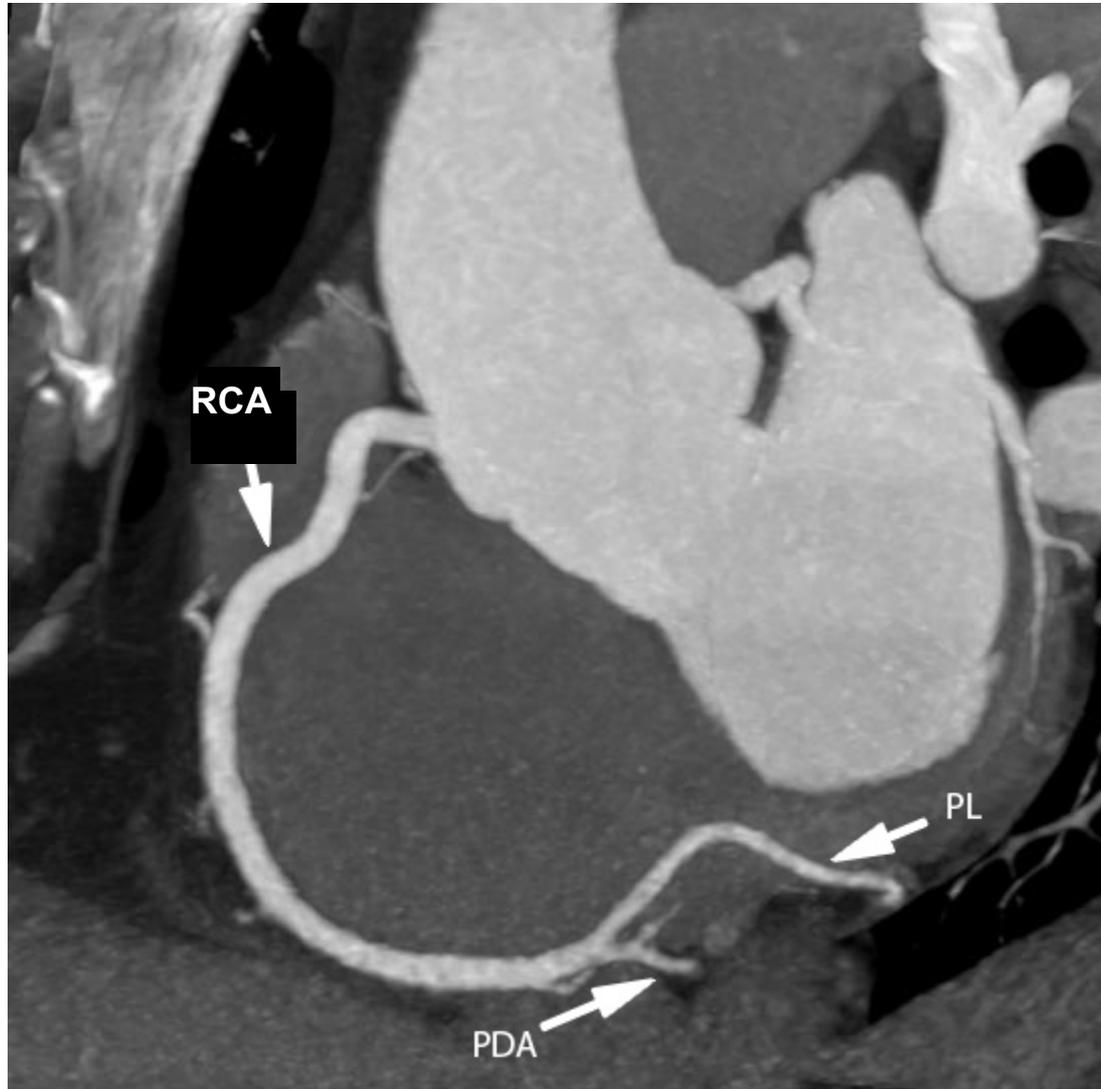
| Region | Agatston | Volume |
|--------------|-------------|-------------|
| LM | 0 | 0 |
| RCA | 474 | 378 |
| LAD | 669 | 542 |
| CX | 968 | 763 |
| PDA | 0 | 0 |
| Other1 | 0 | 0 |
| Other2 | 0 | 0 |
| Other3 | 0 | 0 |
| Total | 2111 | 1683 |

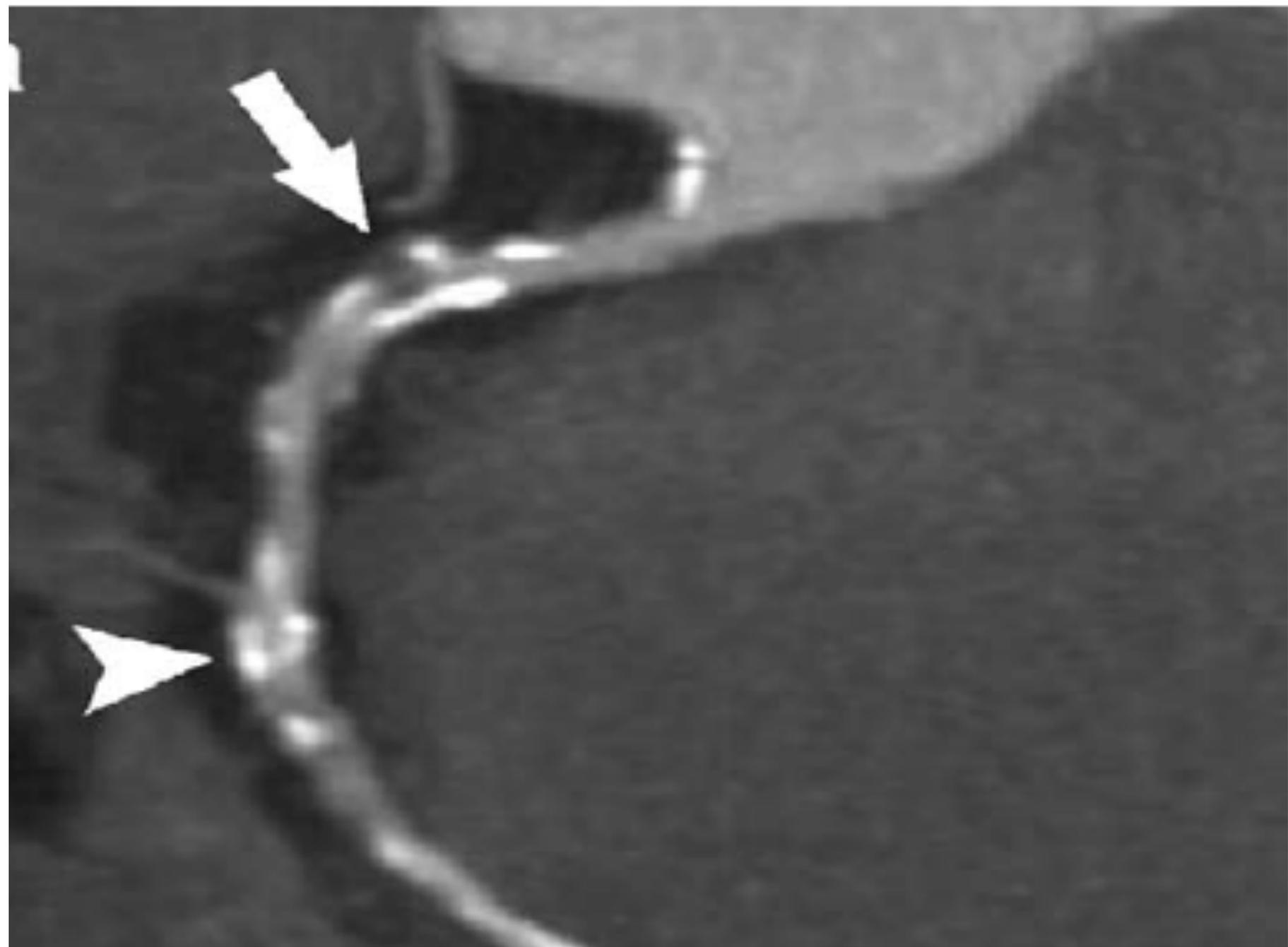
kVP:135
mA:440
msec:250
mAs:110
Thk:3 mm
Aquilion

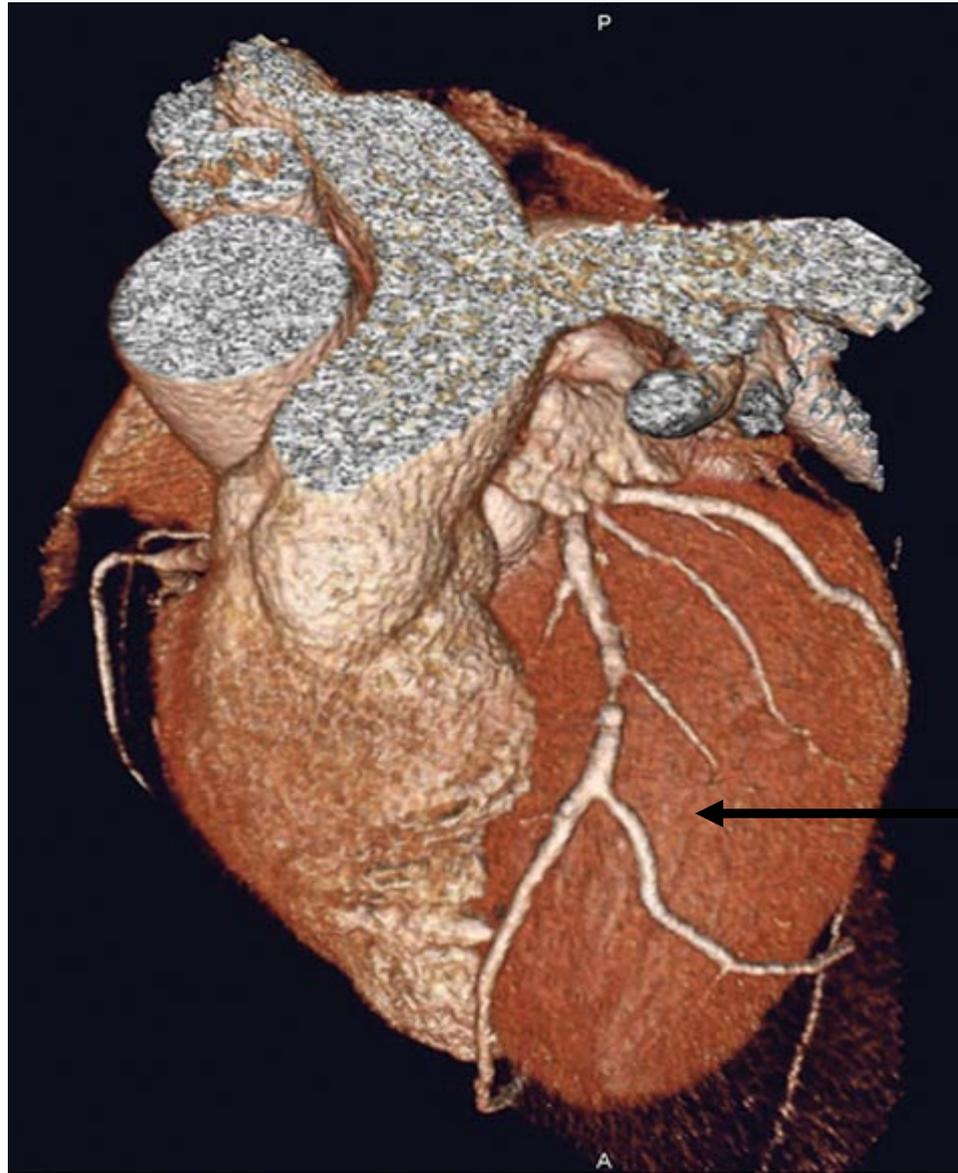
Vitrea (R)
Phase %075
W/L:300/40
#16 at 1782.5mm

7 cm

Right Coronary Artery with Normal Blood Flow







Original Article

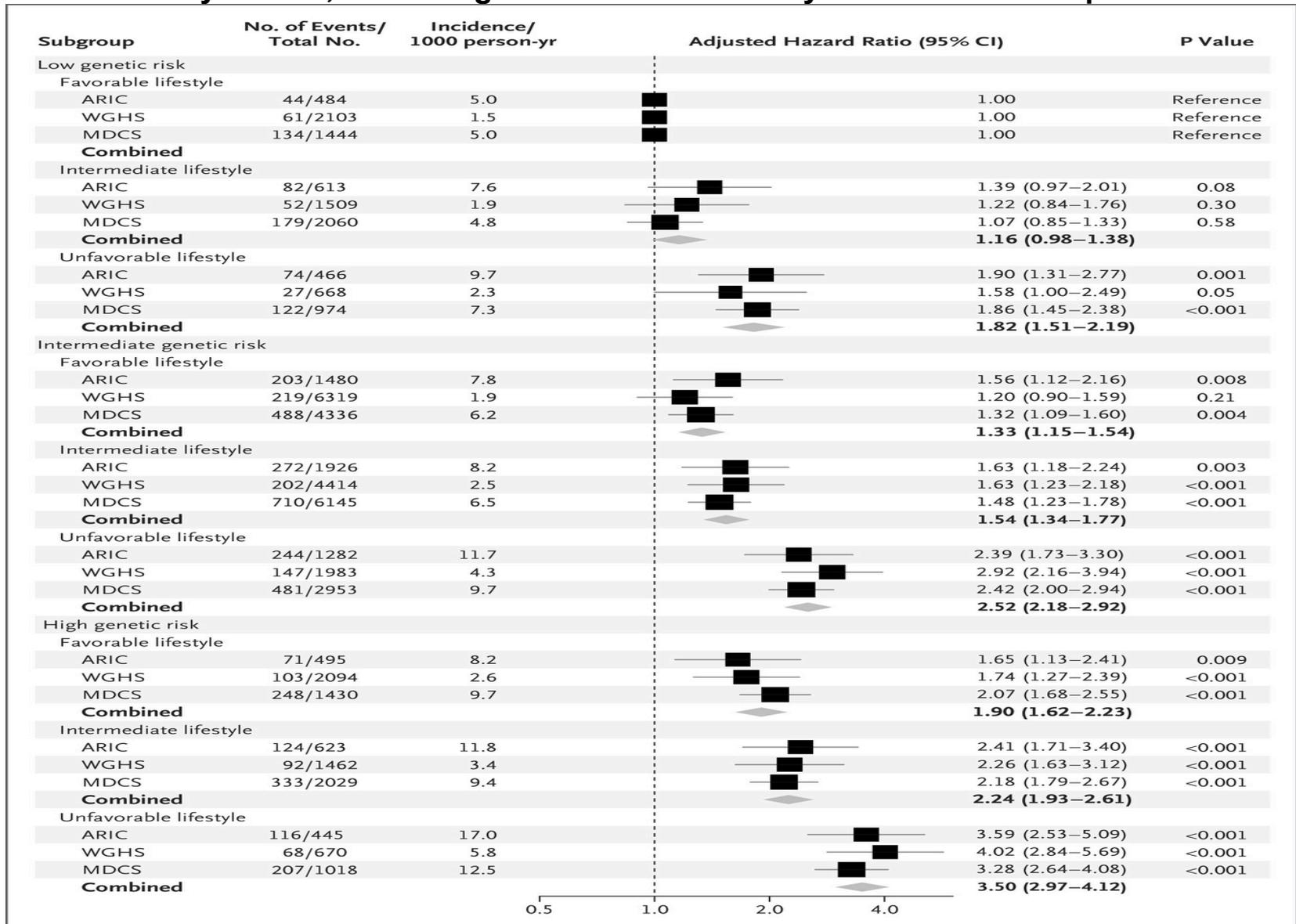
Genetic Risk, Adherence to a Healthy Lifestyle, and Coronary Disease

Amit V. Khera et NEJM 2016 ,

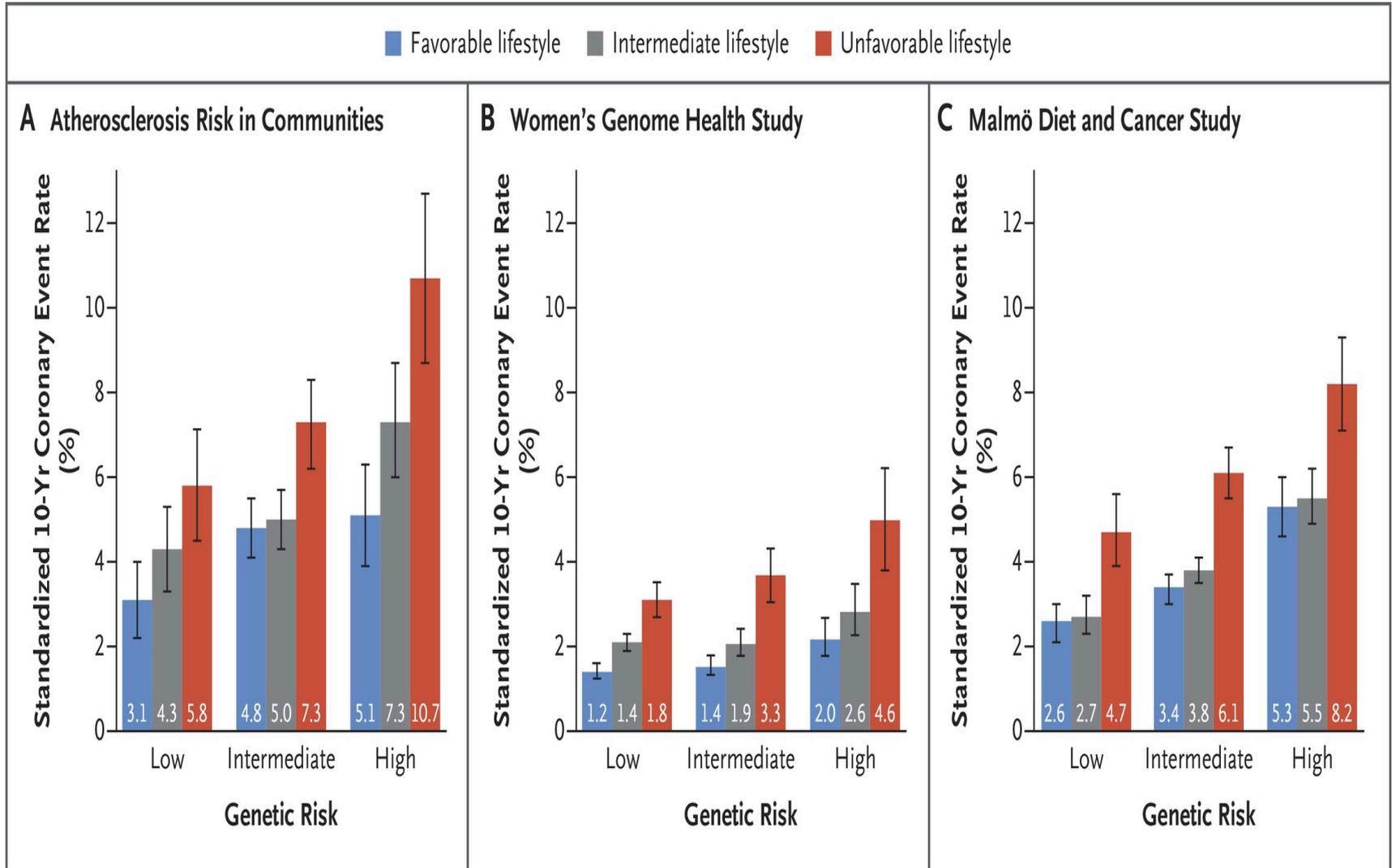
- Using a polygenic score of DNA sequence polymorphisms, the authors of this study quantified genetic risk and assessed four healthy lifestyle factors.
- Across four studies involving 55,685 participants, genetic and lifestyle factors were independently associated with susceptibility to coronary artery disease.
- Among participants at high genetic risk, a favorable lifestyle was associated with a nearly 50% lower relative risk of coronary artery disease than was an unfavorable lifestyle.



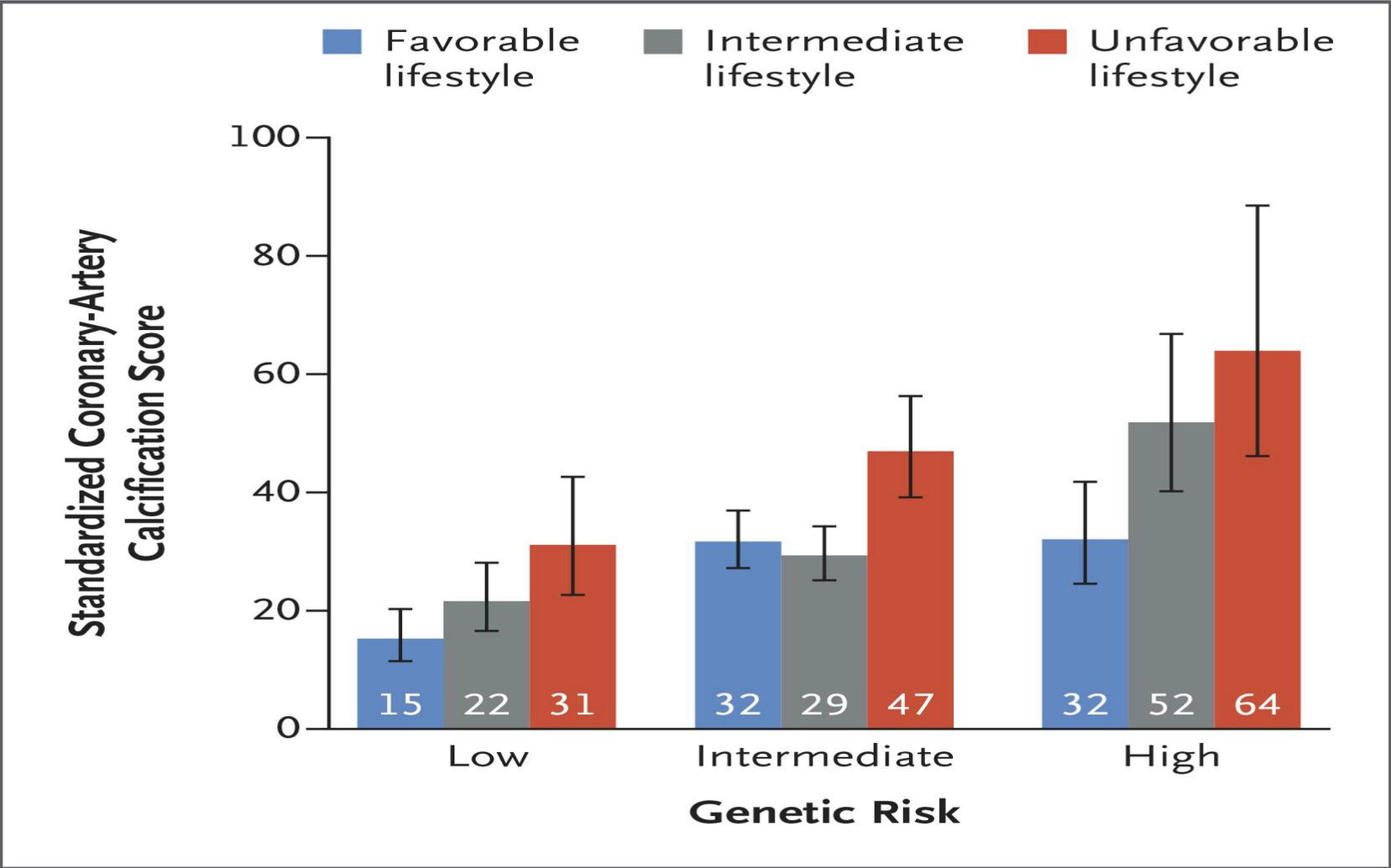
Risk of Coronary Events, According to Genetic and Lifestyle Risk in the Prospective Cohorts.



10-Year Coronary Event Rates, According to Lifestyle and Genetic Risk in the Prospective Cohorts.



Coronary-Artery Calcification Score in the BiImage Study, According to Lifestyle and Genetic Risk.



How do we know what works?

Levels of Evidence

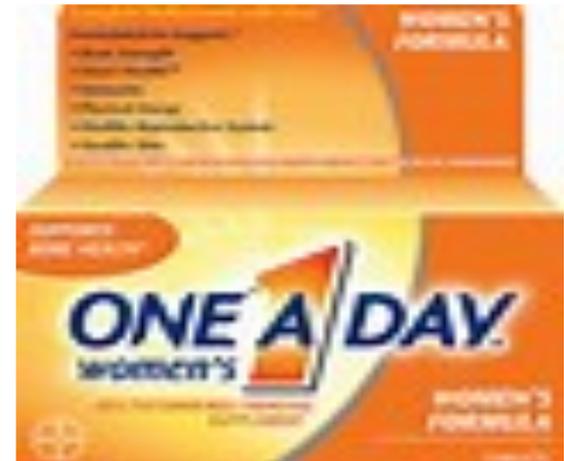
- Customary and sensible practices



- Observational data



- Randomized controlled trials



Where do we get our information ?

- Print Media
- Social media
- Twitter
- Internet
- Dr Google
- Medical journals – Which ones ?
- If journals- what type of study, who funds it , sample size
- Ask questions – be WELL informed



Bolivia, Amazon Jungle

Coronary atherosclerosis in indigenous South American Tsimane: a cross-sectional cohort study

Hillard Kaplan, Randall C Thompson, Benjamin C Trumble, L Samuel Wann, Adel H Allam, Bret Beheim, Bruno Frohlich, M Linda Sutherland, James D Sutherland, Jonathan Stieglitz, Daniel Eid Rodriguez, David E Michalik, Chris J Rowan, Guido P Lombardi, Ram Bedi, Angela R Garcia, James K Min, Jagat Narula, Caleb E Finch, Michael Gurven, Gregory S Thomas

Summary

Background Conventional coronary artery disease risk factors might potentially explain at least 90% of the attributable risk of coronary artery disease. To better understand the association between the pre-industrial lifestyle and low prevalence of coronary artery disease risk factors, we examined the Tsimane, a Bolivian population living a subsistence lifestyle of hunting, gathering, fishing, and farming with few cardiovascular risk factors, but high infectious inflammatory burden.

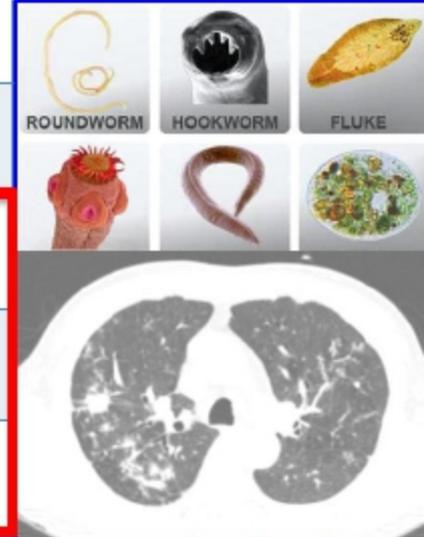
Methods We did a cross-sectional cohort study including all individuals who self-identified as Tsimane and who were aged 40 years or older. Coronary atherosclerosis was assessed by coronary artery calcium (CAC) scoring done with non-contrast CT in Tsimane adults. We assessed the difference between the Tsimane and 6814 participants from the Multi-Ethnic Study of Atherosclerosis (MESA). CAC scores higher than 100 were considered representative of significant atherosclerotic disease. Tsimane blood lipid and inflammatory biomarkers were obtained at the time of scanning, and in some patients, longitudinally.

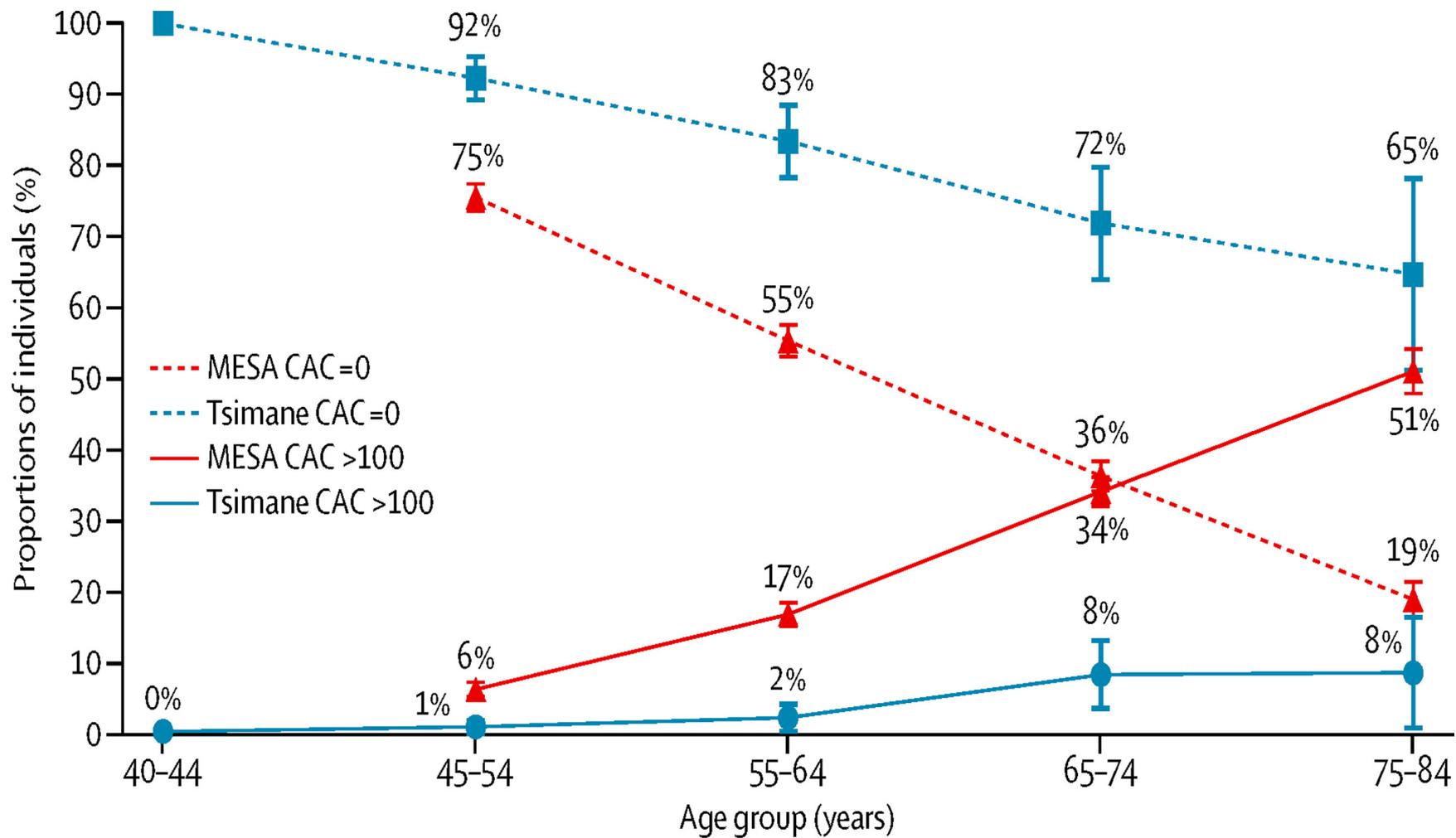
Findings Between July 2, 2014, and Sept 10, 2015, 705 individuals, who had data available for analysis, were included in this study. 596 (85%) of 705 Tsimane had no CAC, 89 (13%) had CAC scores of 1–100, and 20 (3%) had CAC scores higher than 100. For individuals older than age 75 years, 31 (65%) Tsimane presented with a CAC score of 0, and only four (8%) had CAC scores of 100 or more, a five-fold lower prevalence than industrialised populations ($p \leq 0.0001$ for all age categories of MESA). Mean LDL and HDL cholesterol concentrations were 2.35 mmol/L (91 mg/dL) and 1.0 mmol/L (39.5 mg/dL), respectively; obesity, hypertension, high blood sugar, and regular cigarette smoking were rare. High-sensitivity C-reactive protein was elevated beyond the clinical cutoff of 3.0 mg/dL in 360 (51%) Tsimane participants.



Proportion Above High Risk Cut Off

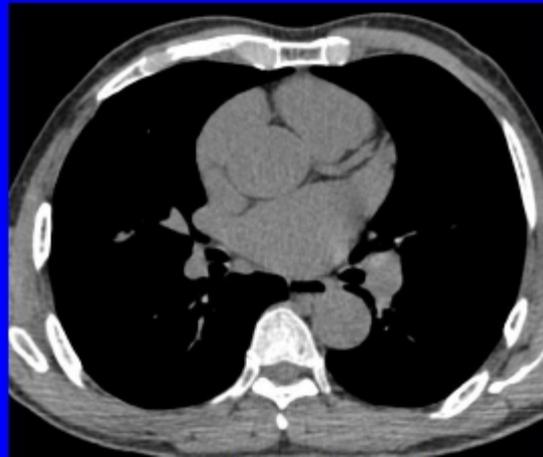
| | |
|------------------------|-----|
| BMI >30 | 6% |
| Hypertensive | 5% |
| Total cholesterol >240 | 0% |
| LDL-C >130 | 9% |
| Triglycerides >200 | 4% |
| Glucose > 125 | 0% |
| HDL-C <40 | 56% |
| Leukocytes >10,700 | 23% |
| ESR Elevated | 27% |
| hs-CRP > 3.0 | 51% |



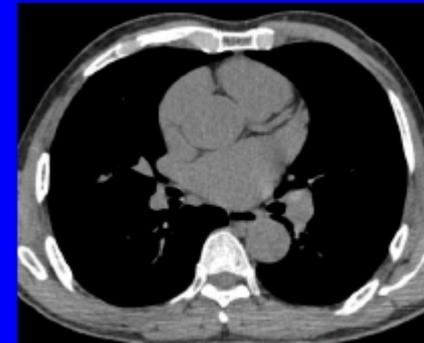


Results

- The overwhelming majority of Tsimane, **85%** (n=596) had **no** CAC .
- Moderate CAD, as defined by a $CAC_{\geq 100}$ was 3%, about 1/10th of the prevalence among matched individuals in industrialized populations.



- **Tsimane CACS are extremely low, even at age 80, 65% have no CAC and only 8.3% have a score >100.**
- **Based on CAC scores and biomarkers, the arterial age of Tsimane is ≈ 28 years younger than matched industrial populations**



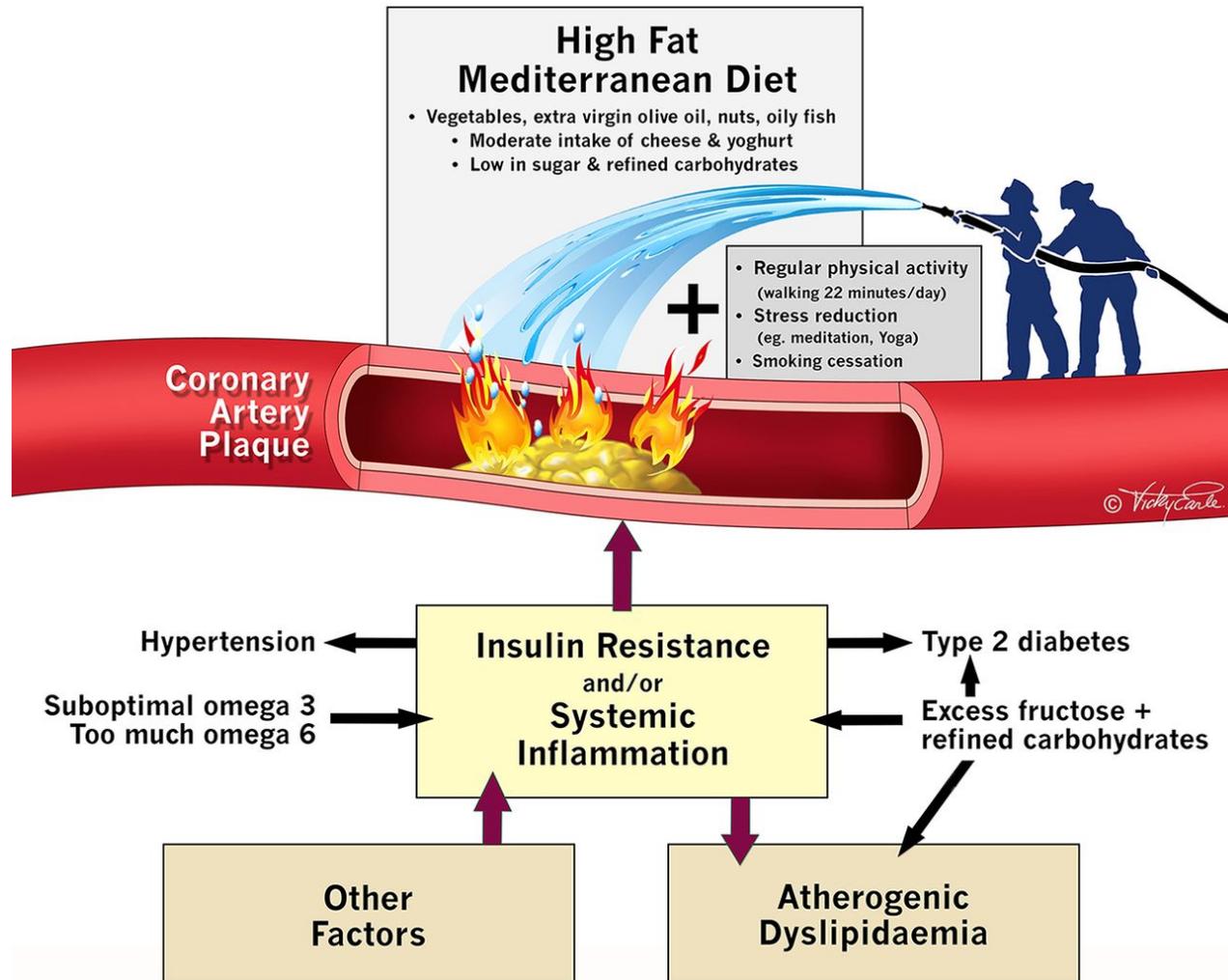
- The available evidence suggests that a lifetime with very low LDL cholesterol, a subsistence diet of wild game, fish, and high-fibre carbohydrates that are very low in saturated fat, combined with physical activity throughout much of the day sets a new target in the prevention of coronary atherosclerosis.

- It has been proposed that a balance between dietary omega 3 and omega 6 polyunsaturated fatty acids protects against cardiovascular disease.
- Although Tsimane consume less fat than Americans, their omega 3:omega 6 ratio is higher and closer to 1 due to a diet rich in fish and plants, like other traditional populations, such as historical hunter-gatherers and today's Indigenous Arctic groups
- Ask your doctor to test for ratio(blood test)

Omega 3 Fats

- Eicosapentaenoic acid / docosahexaenoic acid
- Cold water fish
- Limited evidence on KRILL OR CALAMARI OIL
- 1-2 g /day of active ingredient ideal – choose a supplement that gives this.
- Multiple CVS benefits

Lifestyle interventions for the prevention and treatment of coronary disease.



Aseem Malhotra et al. Br J Sports Med 2017;51:1111-1112

CENTRAL ILLUSTRATION: Evidence for Cardiovascular Health Impact of Foods Reviewed

Summary of heart-harmful and heart-healthy foods/diets

|  Evidence of harm; limit or avoid |  Inconclusive evidence; for harm or benefit |  Evidence of benefit; recommended |
|--|---|---|
|  Coconut oil and palm oil are high in saturated fatty acids and raise cholesterol |  Sunflower oil and other liquid vegetable oils |  Extra-virgin olive oil reduces some CVD outcomes when consumed in moderate quantities |
|  Eggs have a serum cholesterol-raising effect |  High-dose antioxidant supplements |  Blueberries and strawberries (>3 servings/week) induce protective antioxidants |
|  Juicing of fruits/vegetables with pulp removal increases caloric concentration* |  Juicing of fruits/vegetables without pulp removal* |  30 g serving of nuts/day. Portion control is necessary to avoid weight gain.† |
|  Southern diets (added fats and oils, fried foods, eggs, organ and processed meats, sugar-sweetened drinks) |  Gluten-containing foods (for people without gluten-related disease) |  Green leafy vegetables have significant cardio-protective properties when consumed daily  Plant-based proteins are significantly more heart-healthy compared to animal proteins |

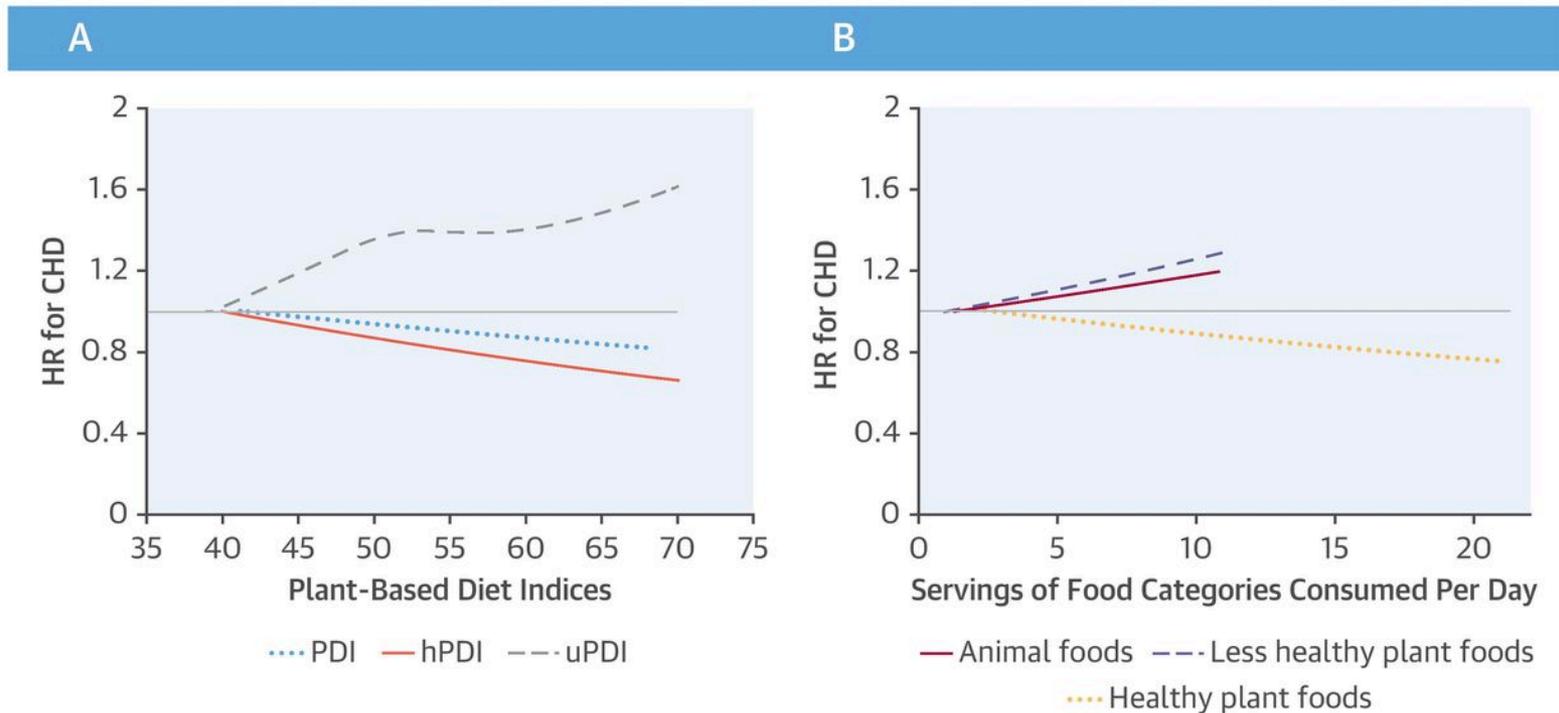
Freeman, A.M. et al. *J Am Coll Cardiol.* 2017;69(9):1172-87.

- Michael Pollan,
- “Eat food. Not too much. Mostly plants”
- Author : In defence of food

- A whole food plant-based diet is associated with reduction in ASCVD risk factors and heart disease.

- Current evidence supports the consumption of fruits and vegetables as sources of antioxidants for ASCVD risk reduction.
- A diet high in green leafy vegetables has significant benefits for reducing ASCVD risk.
- In contrast, there is no evidence of benefit related to antioxidant dietary supplements.

CENTRAL ILLUSTRATION: Dose-Response Relationship of Plant-Based Diet Indices and Animal, Healthy Plant, and Less Healthy Plant Foods With CHD Incidence



Satija, A. et al. *J Am Coll Cardiol.* 2017;70(4):411-22.

73,710 women from the Nurses' Health Study, 92,320 women from the Nurses' Health Study 2 and 43,259 men from the Health Professionals Follow-Up Study. These participants responded to a follow-up questionnaire every two years for over two decades on lifestyle, health behaviors and medical history.

CV DISEASE

People who eat the most red meat (~2 servings a day) have a 40% higher risk of dying from heart attack, stroke, or other CVevent.

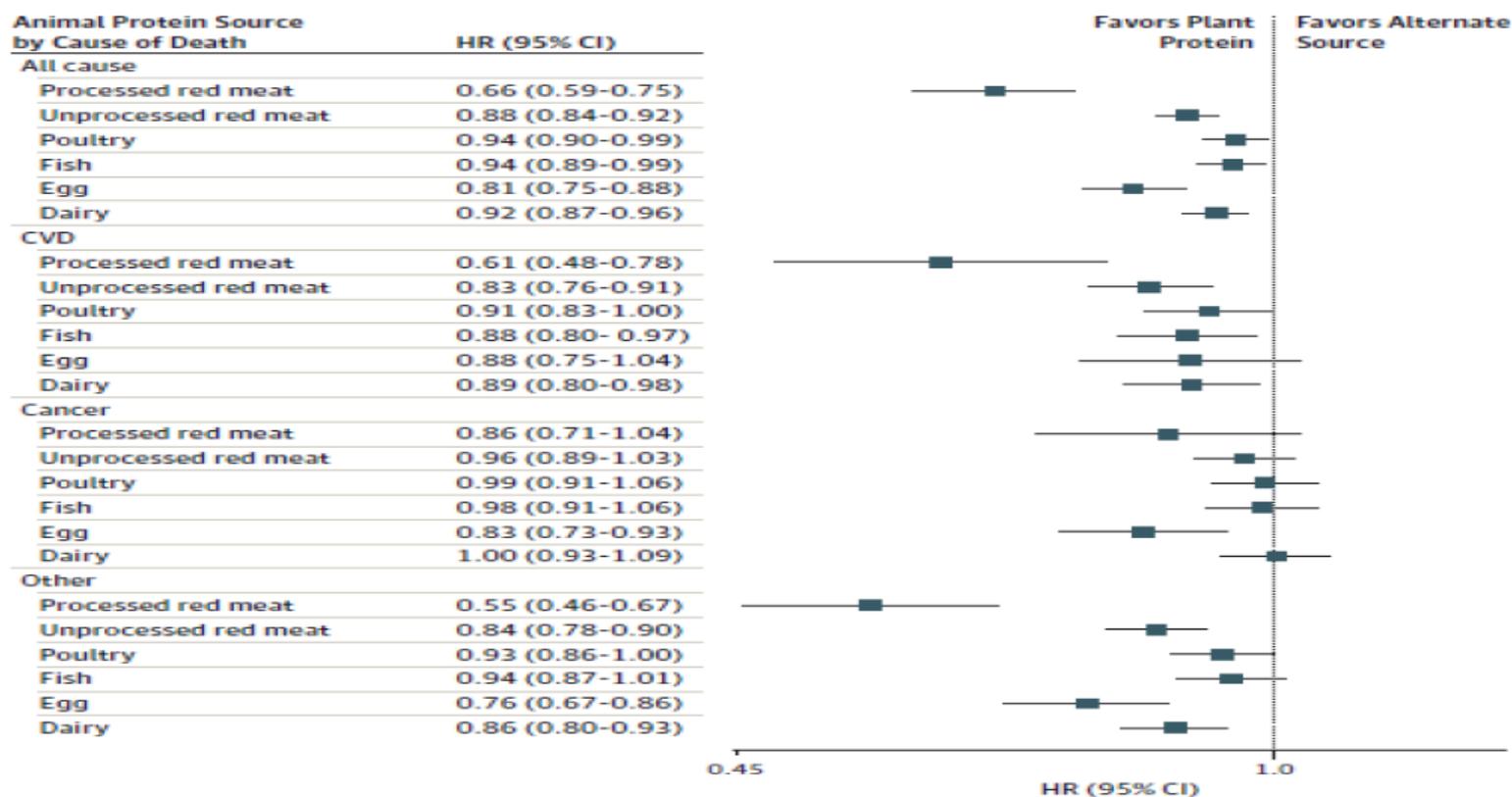
Arch Int Med. 172: 555, 2012



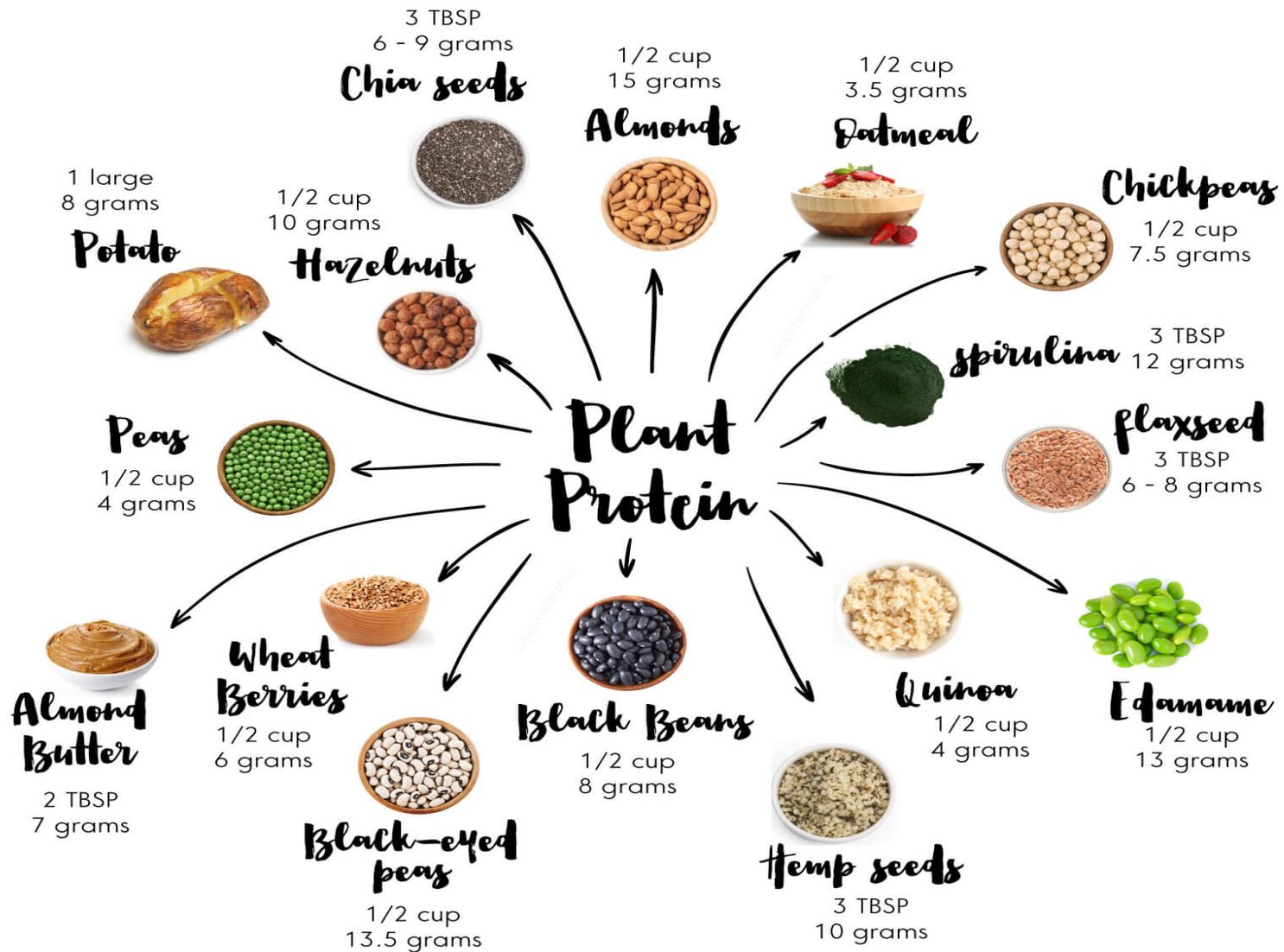
Association of Animal and Plant Protein Intake With All-Cause and Cause-Specific Mortality

Mingyang Song, MD, ScD; Teresa T. Fung, ScD; Frank B. Hu, MD, PhD; Walter C. Willett, MD, DrPH; Valter D. Longo, PhD; Andrew T. Chan, MD, MPH; Edward L. Giovannucci, MD, ScD

Figure. Risk for Mortality Associated With Replacement of 3% Energy From Various Animal Protein Sources With Plant Protein



JAMA Intern Med. 2016 Oct 1;176(10):1453-1463. doi: 10.1001/jamainternmed.2016.4182.



Which of the following is correct about protein content (per 100 g)?

- 1. Chicken < Pork***
- 2. Beef > Peanuts***
- 3. Egg whites > Almonds***
- 4. Quinoa < Cashews***
- 5. Not sure – But I will know after this talk***

Protein content per 100 grams:

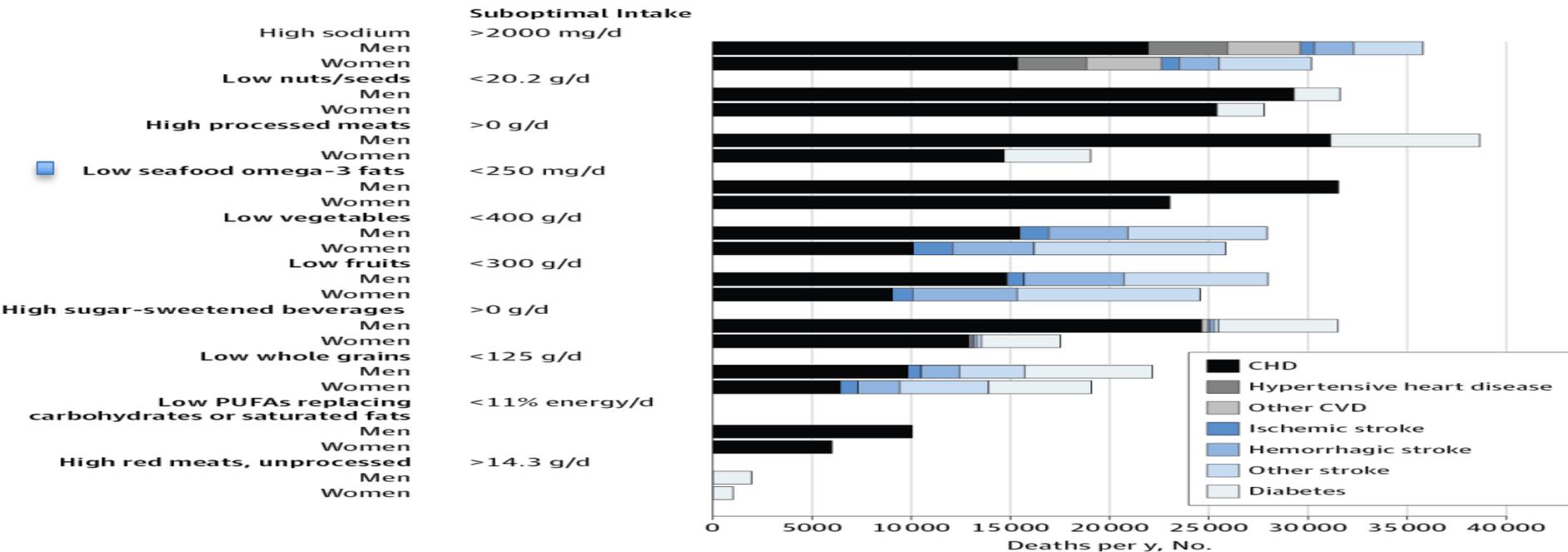
| | |
|--------------------------|--------------------|
| <i>Chicken</i> | <i>31 g</i> |
| <i>Pork</i> | <i>27 g</i> |
| <i>Beef</i> | <i>26 g</i> |
| <i>Peanuts</i> | <i>26 g</i> |
| <i>Almonds</i> | <i>21 g</i> |
| <i>Cashews</i> | <i>18 g</i> |
| <i>Quinoa</i> | <i>13 g</i> |
| <i>Egg whites</i> | <i>11 g</i> |



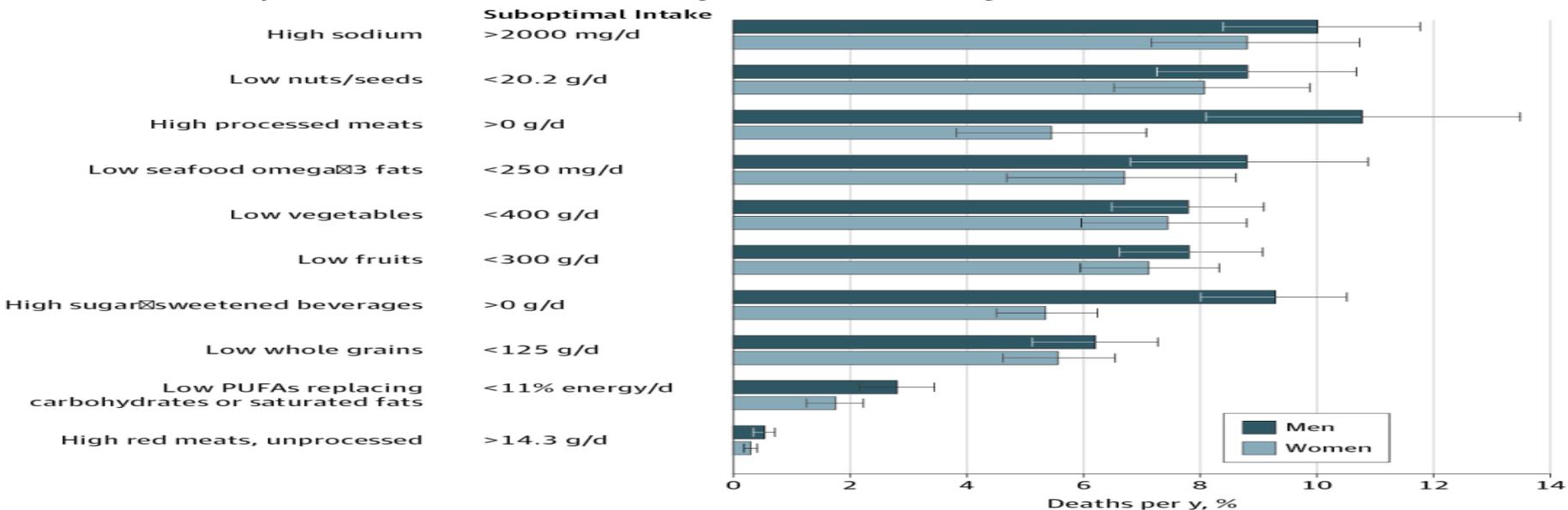
Renata Micha, RD, PhD1; Jose L. Peñalvo, PhD1; Frederick Cudhea, PhD1; et al
March 7, 2017

- **Association Between Dietary Factors and Mortality From Heart Disease, Stroke, and Type 2 Diabetes in the United States**
- In 2012, suboptimal intake of dietary factors was associated with an estimated 318 656 cardiometabolic deaths, representing 45.4% of cardiometabolic deaths.
- The highest proportions of cardiometabolic deaths were estimated to be related to excess sodium intake, insufficient intake of nuts/seeds, high intake of processed meats, and low intake of seafood omega-3 fats.
- Suboptimal intake of specific foods and nutrients was associated with a substantial proportion of deaths due to heart disease, stroke, or type 2 diabetes.

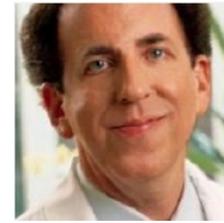
Absolute cardiometabolic mortality attributable to dietary habits in the United States in 2012



Proportional cardiometabolic mortality attributable to dietary habits in the United States in 2012



CV DISEASE – ORNISH INTERVENTION



Small study of 47 patients, all of whom had atherosclerotic plaques that were clearly visible on angiograms.

Half control / Half experimental

Experimental Group:

- Low-fat, vegetarian diet
- Brisk walking for one-half hour per day or one hour three times per week
- Avoidance of tobacco
- Stress management exercises
- The prescribed diet excluded red meat, poultry, and fish, virtually eliminating cholesterol and animal fat. It also minimized vegetable oils, because all oils contain at least some traces of saturated fats.

All patients had a second angiogram one year later.

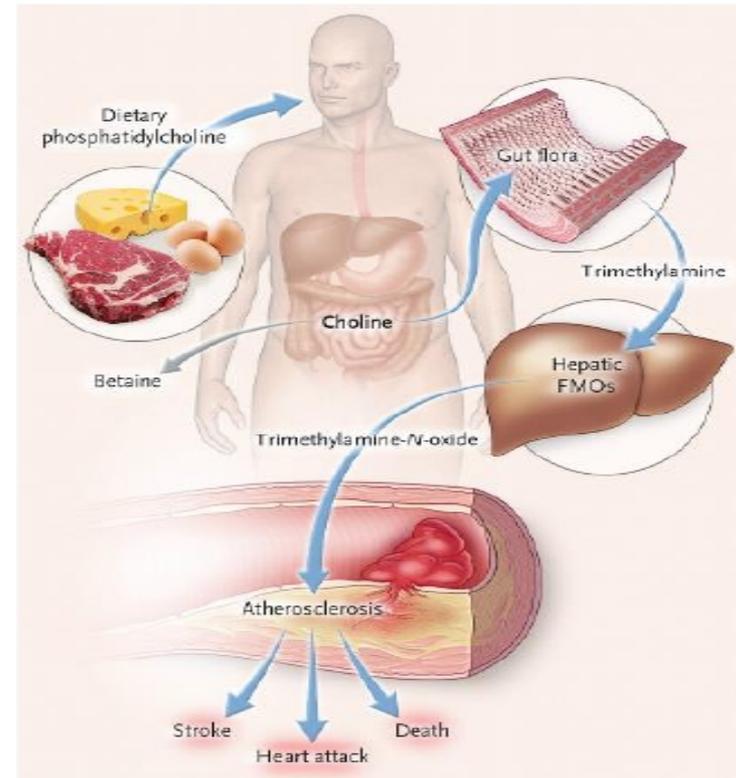
Control group: 100% had disease progression and symptoms

Experimental group: chest pain diminished within weeks. Cholesterol levels dropped dramatically without cholesterol-lowering drugs.

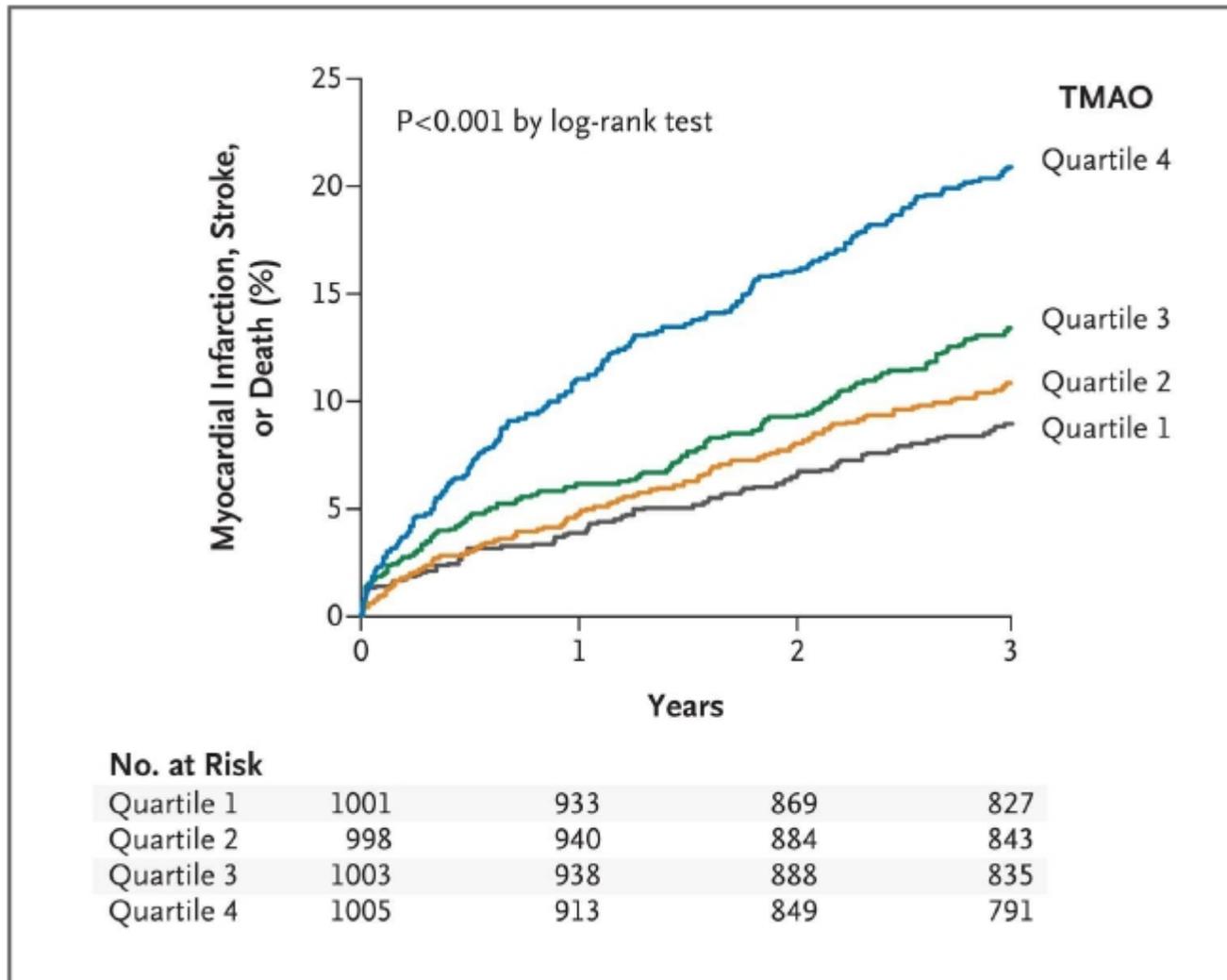
82% of the patients showed measurable reversal of their coronary artery blockages.

TMAO: TRIMETHYLAMINE-N-OXIDE

- Choline (eggs , meats) ingested through animal products
- Gets converted by gut flora to TMAO
- Linked to atherosclerosis, heart attack and stroke
- Study fed just 2 hardboiled eggs to show TMAO production
- Study then followed outcomes of 4000 patients undergoing angiograms and measured TMAO levels



HIGH TMAO levels = DEATH



Tang WHW et al. N Engl J Med 2013;368:1575-1584

TMAO

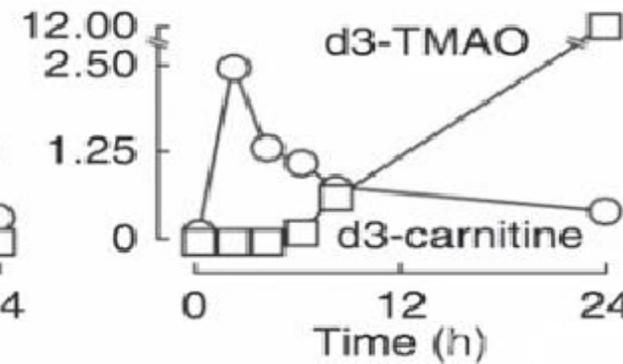
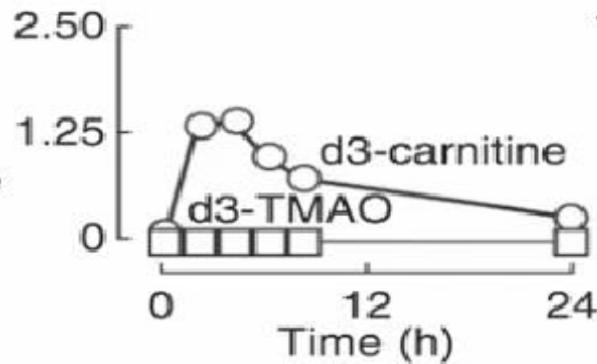
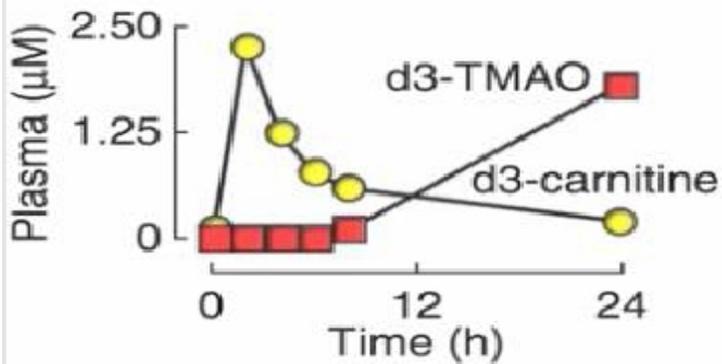
“We also established a correlation between high plasma levels of TMAO and an increased risk of incident major adverse cardiovascular events that is independent of traditional risk factors, even in low-risk cohorts.”



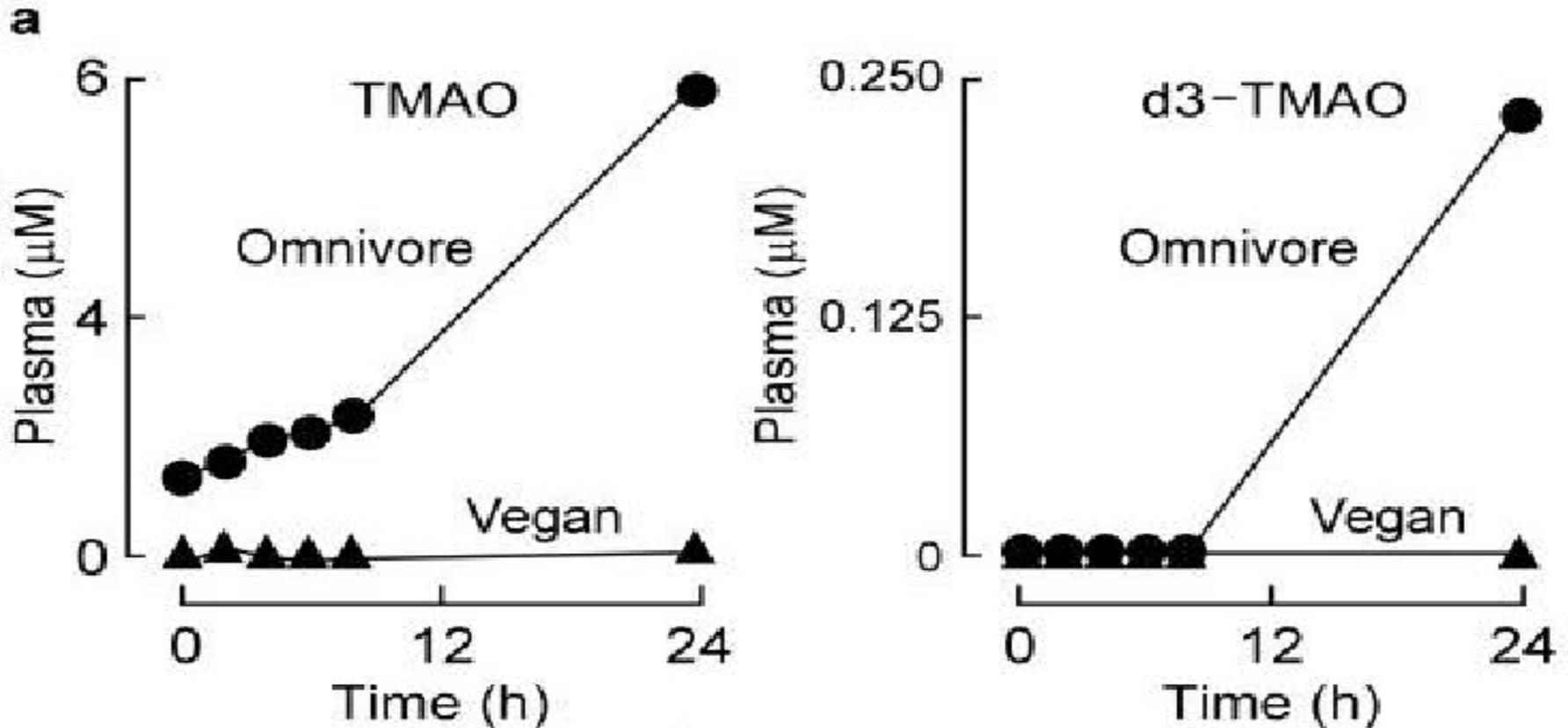
W.H. Wilson Tang, et al. Intestinal Microbial Metabolism of Phosphatidylcholine and Cardiovascular Risk. New England Journal of Medicine. April 2013; 368:1575-1584.

ANOTHER LOOK AT TMAO

Figure 1 TMAO production from L-carnitine is a microbiota-dependent process in humans.



FEED A VEGAN A STEAK?!



The formation of TMAO from ingested L-carnitine is negligible in vegans

Koeth RA, et al. Intestinal microbiota metabolism of L-carnitine, a nutrient in red meat, promotes atherosclerosis. Nat Med. 2013 Apr 7.

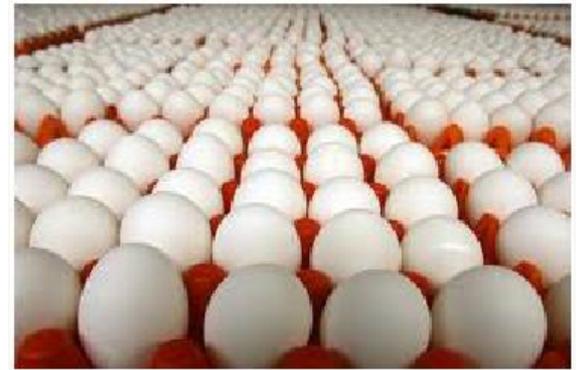
CHOLINE CONTENT

It's not just red meat...

| | Average Choline Content per 100g |
|-------------|----------------------------------|
| Eggs | 251mg |
| Bacon | 125mg |
| Ground Beef | 82mg |
| Chicken | 66mg |
| Legumes | 57mg |
| Vegetables | 15mg |
| Grains | 13mg |
| Fruit | 7mg |

Zeisel SH, Mar MH, Howe JC, Holden JM. Concentrations of choline-containing compounds and betaine in common foods. J Nutr. 2003 May;133(5):1302-7.

WHAT ABOUT EGGS?

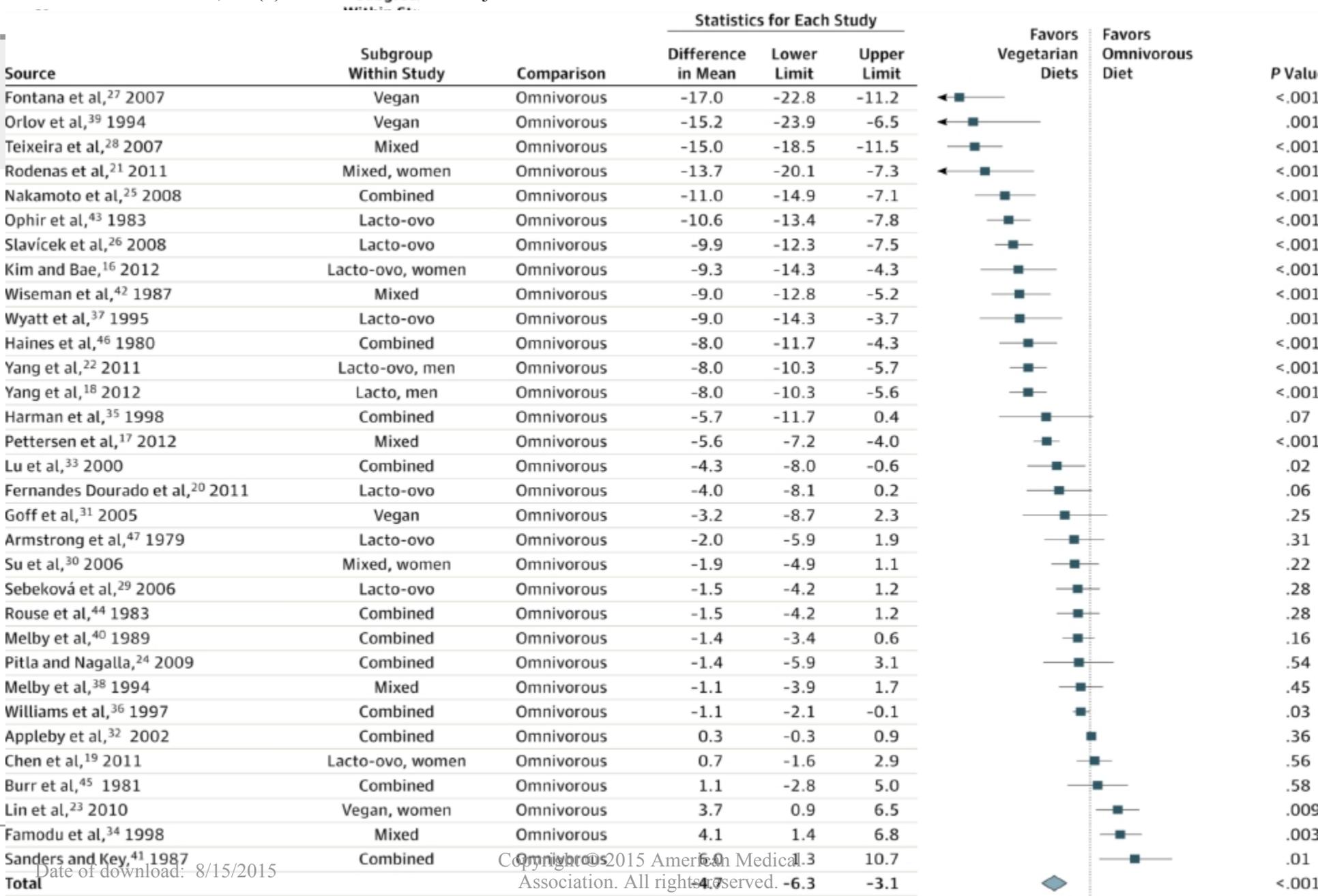


Analysis of 14 studies found that those who consumed the most eggs:

19% and 68% percent increased risk for developing cardiovascular disease and diabetes, respectively, compared with those who ate the fewest eggs.

For those who already had diabetes, the risk for developing heart disease from eating the most eggs jumped to 83%.

Author conclusion: "Our study suggests that there is a dose-response positive association between egg consumption and the risk of CVD and diabetes."





**YOU WOULDN'T EAT 22
PACKS OF SUGAR*. WHY ARE
YOU DRINKING THEM?**

*Sugar in a 20-oz. soda

Extra calories in sugar-loaded drinks may lead to obesity, diabetes, heart disease and some cancers. **CHOOSEHEALTHLA.com**

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COKE KILLS

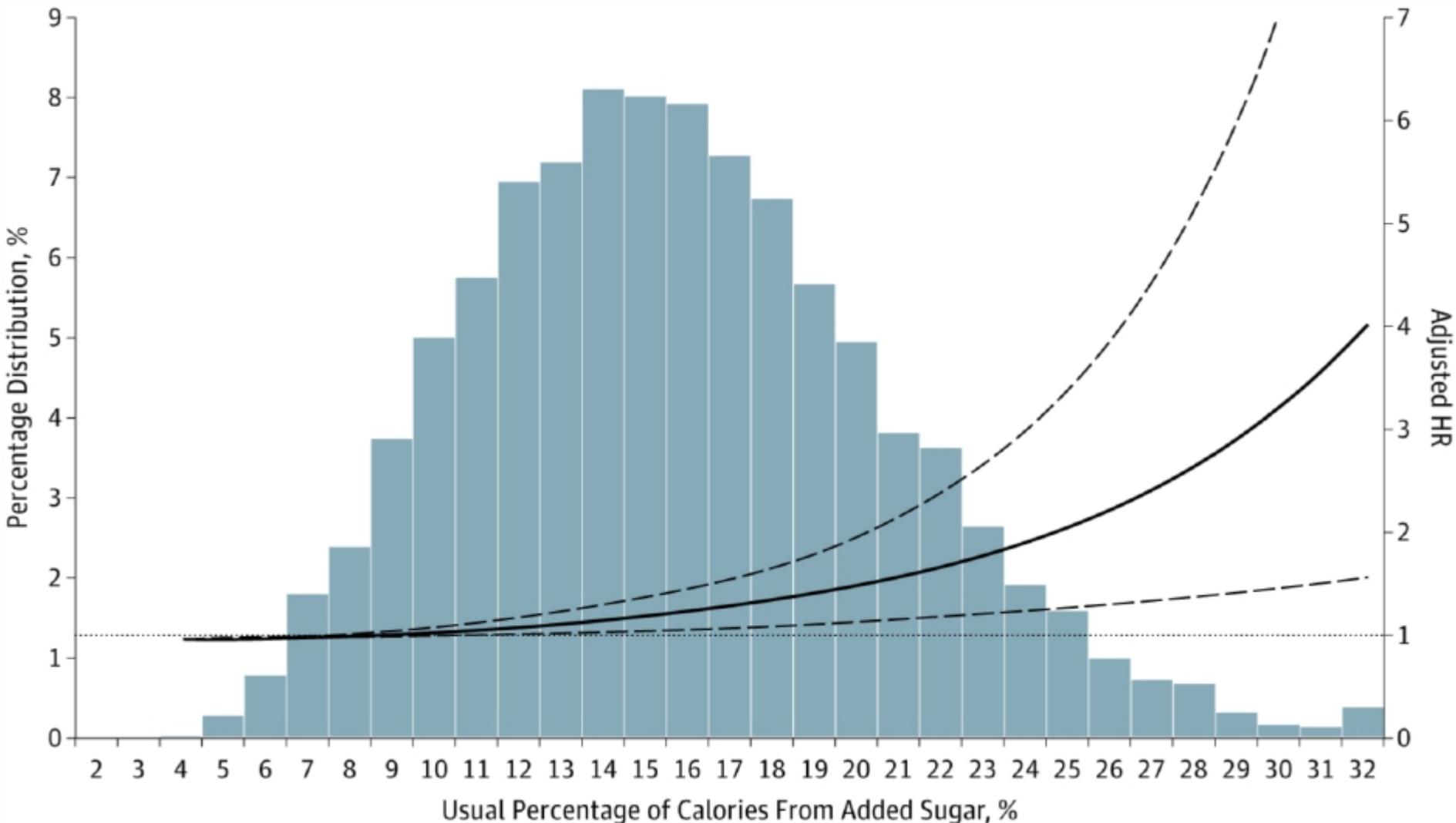


OBESITY **DIABETES**
CANCER **GLOBAL WARMING** **THEFT OF COMMUNITY WATER SOURCES**
HABITAT DESTRUCTION **TOOTH DECAY**

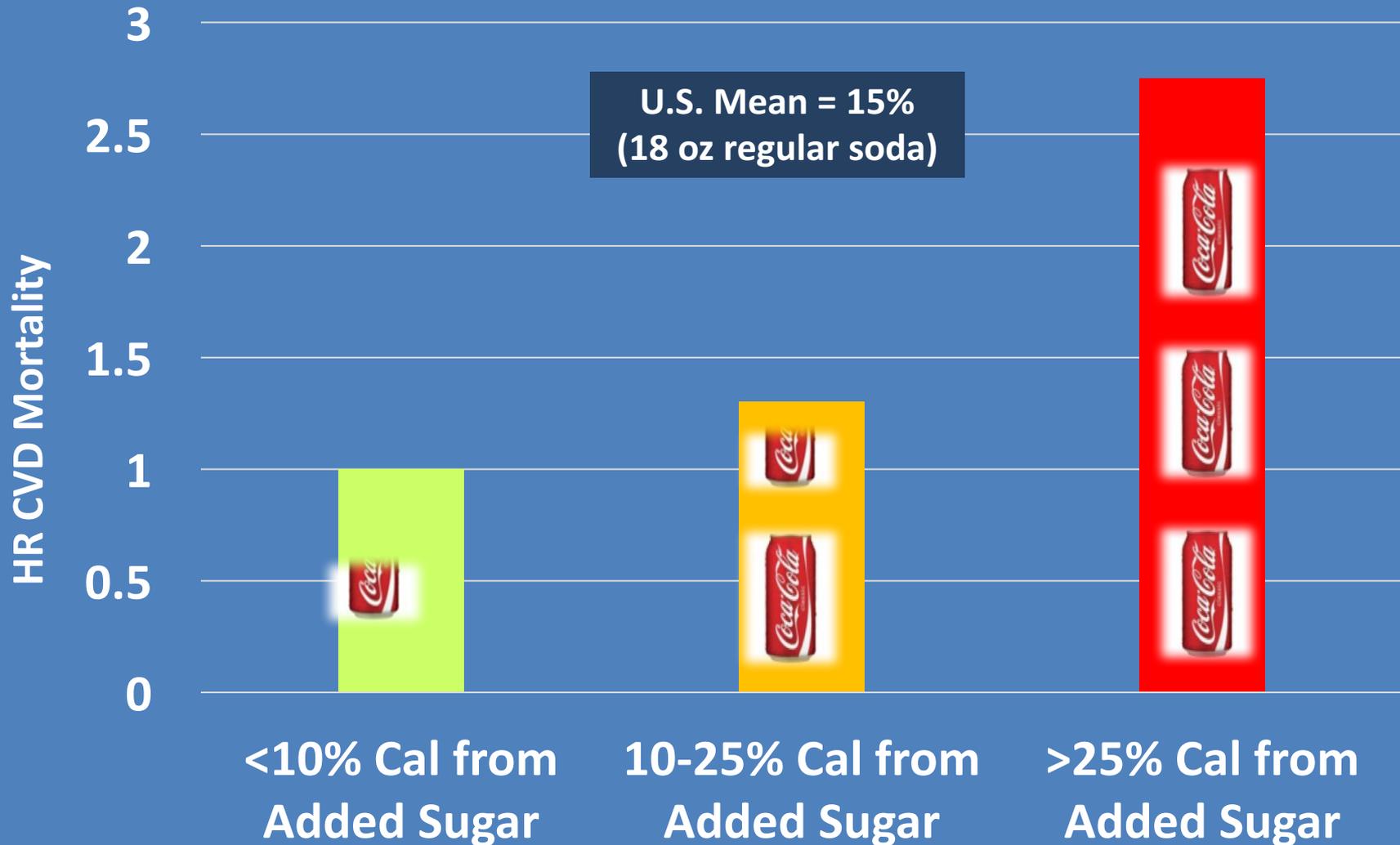
**CHOOSE HEALTH. CHOOSE PEACE. CHOOSE LIFE.
CHOOSE WATER.**

Added Sugar Intake and Cardiovascular Diseases Mortality Among US Adults

JAMA Intern Med. 2014;174(4):516-524. doi:10.1001/jamainternmed.2013.13563



CV Mortality vs. Dietary Added Sugar in 11,733 Healthy Subjects in NHANES III





American Journal of Epidemiology

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December 6, 2010

Original Contribution

Risk Factors for Mortality in the Nurses' Health Study: A Competing Risks Analysis

Heather J. Baer*, Robert J. Glynn, Frank B. Hu, Susan E. Hankinson, Walter C. Willett, Graham A. Colditz, Meir Stampfer, and Bernard Rosner

* Correspondence to Dr. Heather J. Baer, Division of General Medicine and Primary Care, Brigham and Women's Hospital, 1620 Tremont Street, Boston, MA 02120 (e-mail: hbaer@partners.org).

Table 2. Associations of Risk Factors With All-Cause Mortality From a Cox Proportional Hazards Model Among 50,112 Participants in the Nurses' Health Study, 1986–2004^a

| | HR ^b | 95% CI |
|---|-----------------|------------|
| Age (per 19 years) ^c | 5.78 | 5.06, 6.61 |
| Body mass index at age 18 years (per 7 kg/m ²) ^d | 1.23 | 1.15, 1.31 |
| Weight change since age | 1.07 | 1.00, 1.15 |

Table 2. Continued

| | HR ^b | 95% CI |
|--|-----------------|------------|
| Glycemic load (per 41 units) ^f | 1.22 | 1.12, 1.34 |
| Dietary cholesterol (per 105 mg/1,000 kcal) ^f | 1.17 | 1.08, 1.26 |
| Cereal fiber (per 4 g, energy adjusted) ^f | 0.84 | 0.78, 0.91 |

Nut consumption, servings/week^c

| | | |
|--|------|------------|
| None | 1.0 | Referent |
| ≤1 | 0.92 | 0.87, 0.98 |
| ≥2 | 0.86 | 0.77, 0.95 |
| Polyunsaturated fat (per 3% energy) ^f | 0.85 | 0.79, 0.91 |

Table continues

Table 2. Continued

| | HR ^b | 95% CI |
|--|-----------------|------------|
| Glycemic load (per 41 units) ^f | 1.22 | 1.12, 1.34 |
| Dietary cholesterol (per 105 mg/1,000 kcal) ^f | 1.17 | 1.08, 1.26 |
| Cereal fiber (per 4 g, energy adjusted) ^f | 0.84 | 0.78, 0.91 |

abolic equivalent; MI, myocardial infarction.

^a Units for continuous variables correspond to the difference between the 90th and 10th percentile values.

^b Adjusted for all other risk factors in table.

^c From 1986 questionnaire.

^d From 1980 questionnaire.

^e From 1976 questionnaire; 1 inch = 2.54 cm.

^f Average of values from 1980, 1984, and 1986 questionnaires.

^g From 1988 questionnaire.

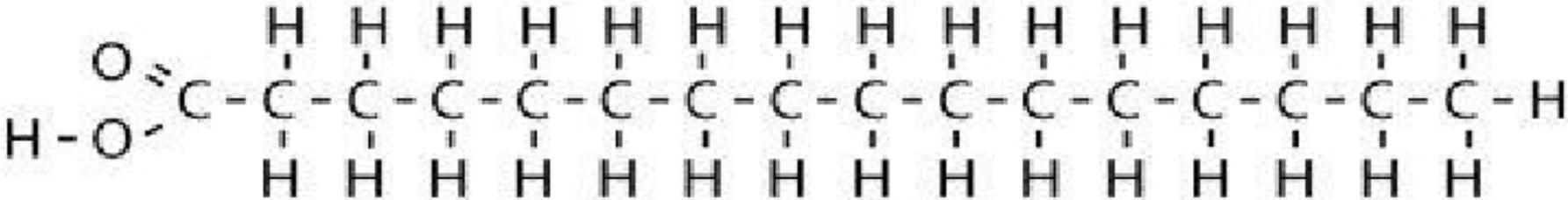
^h From 1986 or previous questionnaires.

FATS

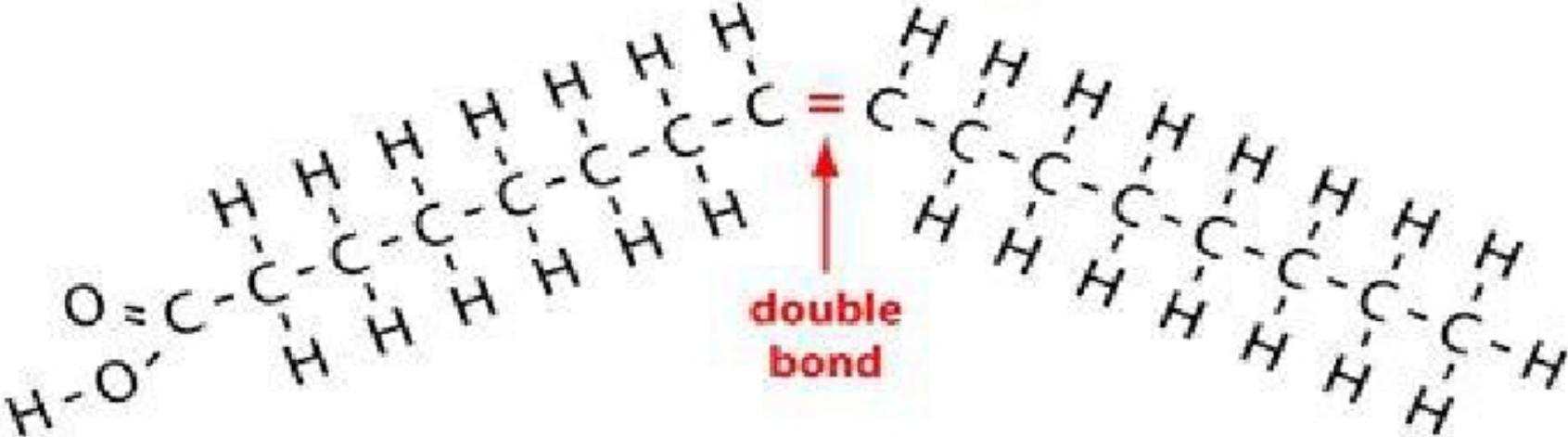
- Solid fats (at room temperature) are not recommended for reduction of ASCVD risk. This includes coconut and palm oils.
- liquid vegetable oils have beneficial effects on lipids including decreasing low-density lipoprotein cholesterol.
- The evidence base for olive oil is the most comprehensive, with clear evidence for a benefit in ASCVD risk reduction.

Saturated Fats

saturated fatty acid



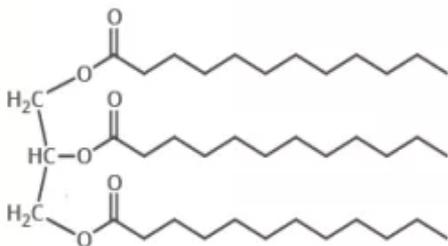
unsaturated fatty acid



A GUIDE TO THE DIFFERENT TYPES OF FAT

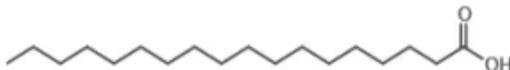
Fat is an essential part of our diets, and has a number of important roles in the body. However, there are different types, and there are health concerns surrounding eating too much of some types of fat. Here, we look at what distinguishes different types of fat, and their effects on the body.

TRIGLYCERIDES & FATTY ACIDS



Triglycerides account for around 95% of the fat in our diet, and are formed from the combination of glycerol and three fatty acid molecules. The three fatty acids are often different, and the chemical structures of these fatty acids defines the type of fat. Cholesterol is made in the liver, and transported around the body by low density lipoproteins (LDL) and high density lipoproteins (HDL). Different fats affect LDL and HDL differently.

SATURATED FATS



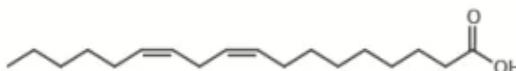
Contain no carbon-carbon double bonds. Saturated fats are solids at room temperature. They increase levels of LDL in the bloodstream. They have previously been associated with heart disease, though more recent studies and reviews have called this association into question.

MONOUNSATURATED FATS



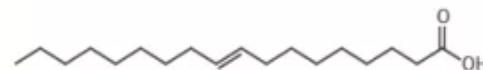
Contain one carbon-carbon double bond. They are liquids at room temperature, but solidify when chilled. They reduce levels of LDL in the bloodstream, thereby decreasing the total cholesterol to HDL ratio (HDL helps take cholesterol back to the liver where it can be disposed of).

POLYUNSATURATED FATS



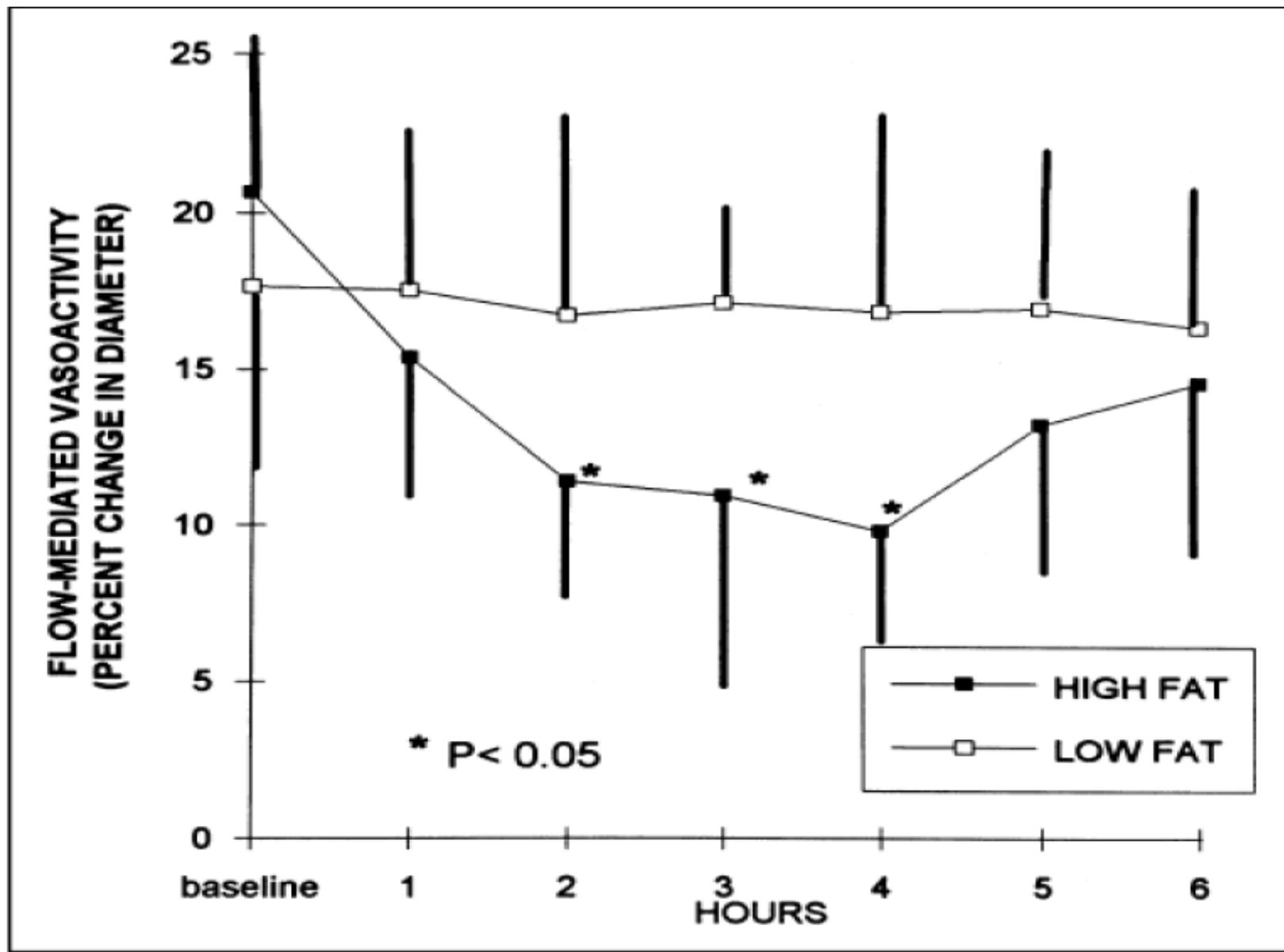
Contain two or more carbon-carbon double bonds. They are liquids at room temperature, but they start to solidify when chilled. They are split into omega-3 and omega-6 fatty acids. Polyunsaturated fats help reduce LDL levels, decreasing the total cholesterol to HDL ratio.

TRANS FATS



Contain carbon-carbon double bonds in a *trans* rather than *cis* configuration. Formed artificially, via a process called hydrogenation; also found naturally in small amounts in meat and dairy products. They raise LDL, and are associated with heart disease. Many countries are phasing them out.





Vogel RA, Corretti MC, Plotnick GD. Effect of a single high-fat meal on endothelial function in healthy subjects. *Am J Cardiol*. 1997 Feb 1;79(2):250-4

Good Fats

Monounsaturated

Foods high in monounsaturated fat

Canola oil

Olive oil

Olives

Monounsaturated margarine spreads

Avocado

Most nuts (almonds, peanuts, cashews, hazelnuts, macadamias, pistachios)

Egg yolk

Polyunsaturated

Foods high in polyunsaturated fat

Most vegetable and seed oils (sunflower, soybean, corn, cottonseed)

Polyunsaturated margarine spreads

Linseeds

Some nuts (walnuts, brazil nuts, pecans, pine nuts)

Wheatgerm

Oily fish and fish oils

Polyunsaturated

```
graph TD; A[Polyunsaturated] --> B[Omega 6]; A --> C[Omega 3]; B --- B1[Vegetable oils, margarine]; B --- B2[Nuts, seeds, grains]; B --- B3[Conventional meats]; C --- C1[Fish like salmon, tuna, sardines, mackarel]; C --- C2[Flaxseed and chia seeds];
```

Omega 6

Vegetable oils, margarine
Nuts, seeds, grains
Conventional meats

Omega 3

Fish like salmon, tuna,
sardines, mackarel
Flaxseed and chia seeds

Omega 3 Fats

- Active ingredient EPA /DHA
- Eicosapentaenoic acid / docosahexaenoic acid
- Cold water fish
- FORGET ABOUT KRILL OR CALAMARI OIL
- 1-2 g /day of active ingredient ideal – choose a supplement that gives this .
- Multiple CVS benefits

What about supplements

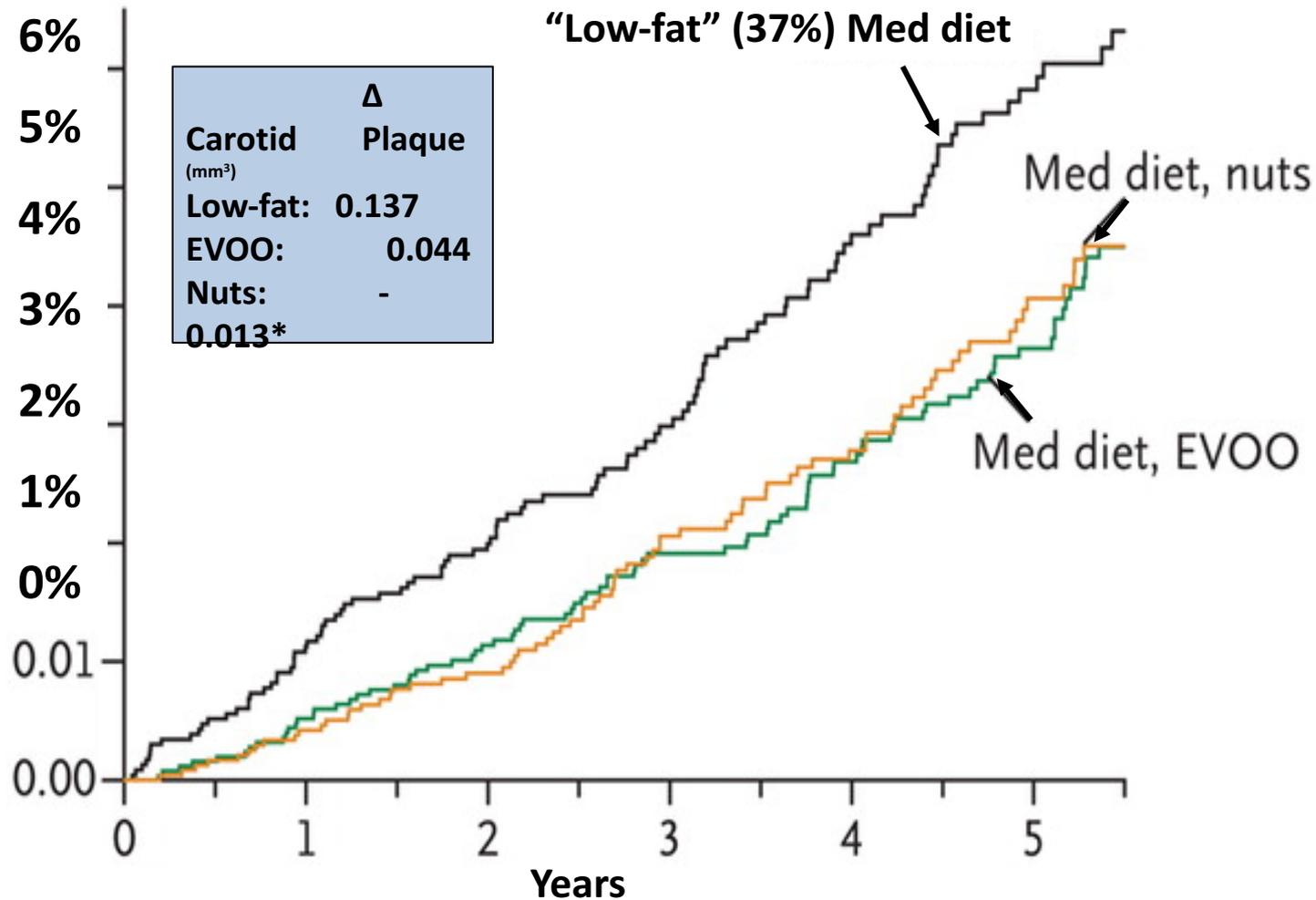
- Better from the plate than the bottle
- You cant supplement yourself out of a poor lifestyle
- Individualize based on circumstances
- If using – use to fill gaps/deficiencies- otherwise just expensive urine !

- Nuts are part of a healthy dietary pattern for the reduction of ASCVD risk.
- portion control is important to reduce excess caloric intake.

Nuts

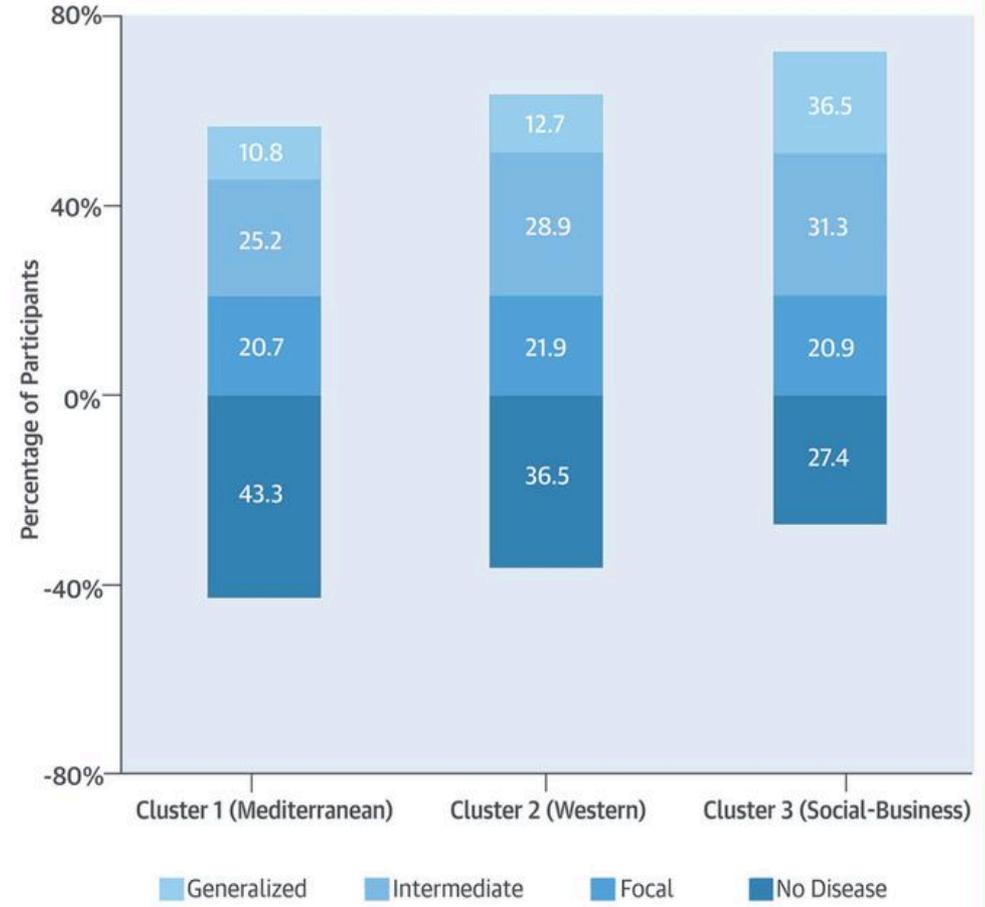
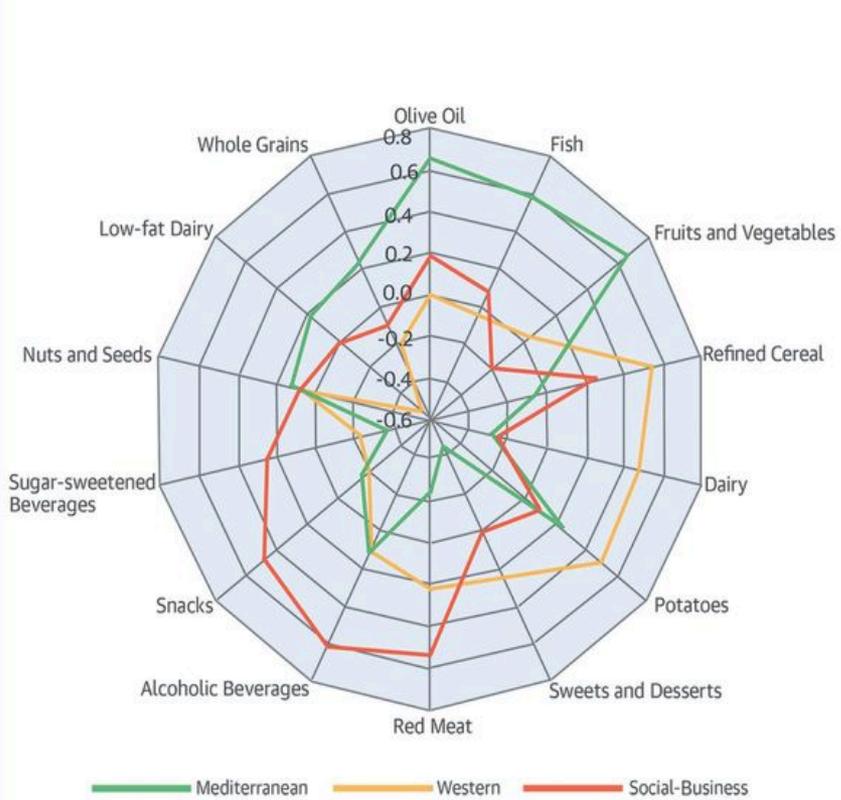
- Multiple studies show CVS benefit
- Substitute fat from 30g nuts from equivalent energy carbohydrates – 30% reduction in CVS risk
- Replace nut fat for saturated fats
- Works out in all ages
- Tree nuts are good (almond, , brazil pecans , walnut)

PREDIMED STUDY: Randomized Mediterranean Diets in 7447 Subjects with High CV Risk over 5 Yrs: Primary Outcome (MI, Stroke, CVD Death)



- Diets defined by single nutrients ignore the fact that the types or quality of fat and carbohydrates are more important than the total amounts.
- Replacing saturated fat from meats and butter with unsaturated fats from vegetable oils, nuts, seeds, avocados, and seafood or high-quality carbohydrates, such as whole grains, helps prevent heart disease, but supplanting saturated fat with refined starch (e.g., white bread, potatoes and added sugar) is unlikely to confer health benefits

CENTRAL ILLUSTRATION: Social Eating and Atherosclerosis: Comparison of Mediterranean Pattern, Western Pattern, and Social-Business Pattern

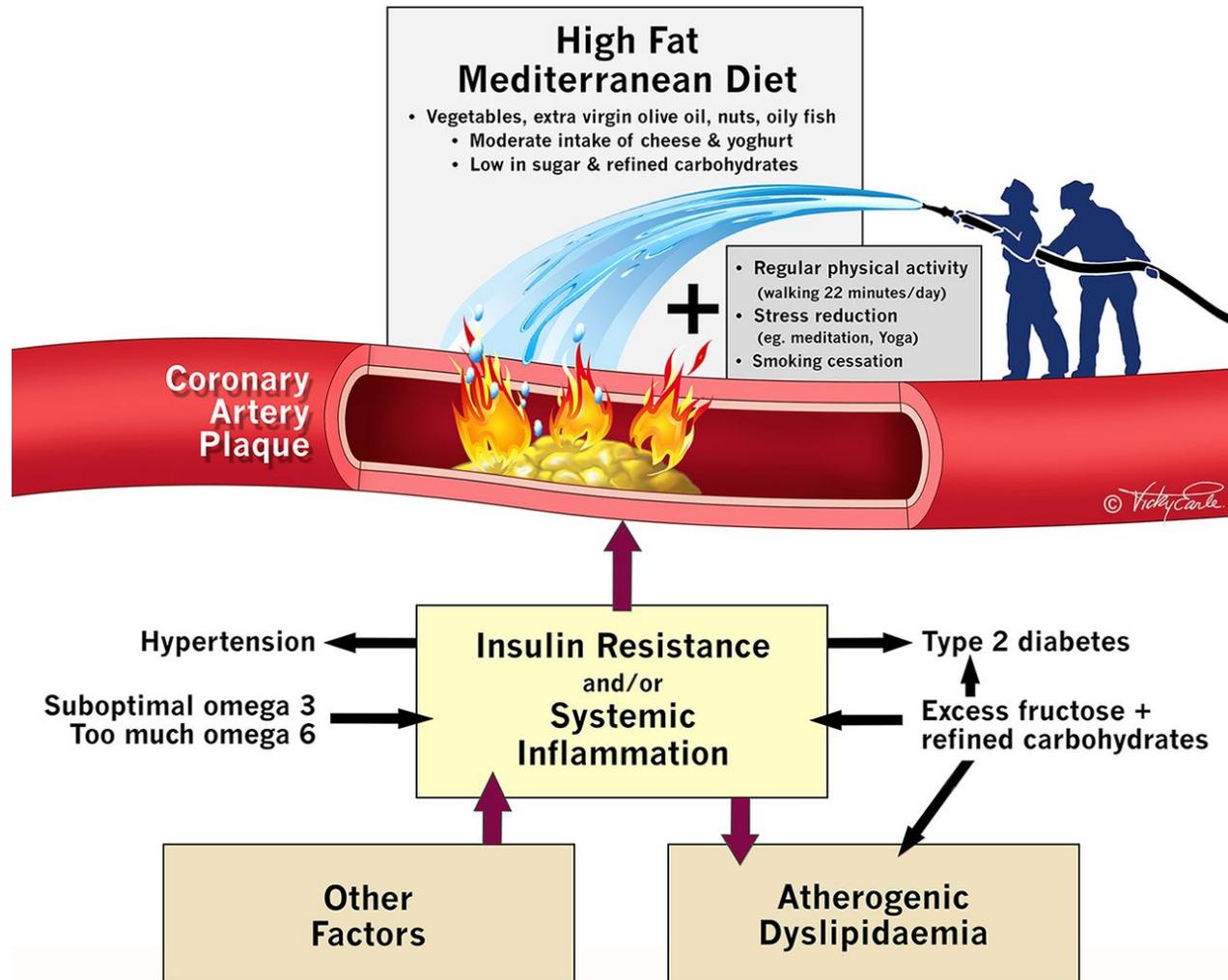


Peñalvo, J.L. et al. J Am Coll Cardiol. 2016;68(8):805-14.

José L. Peñalvo et al. JACC 2016;68:805-814



Lifestyle interventions for the prevention and treatment of coronary disease.



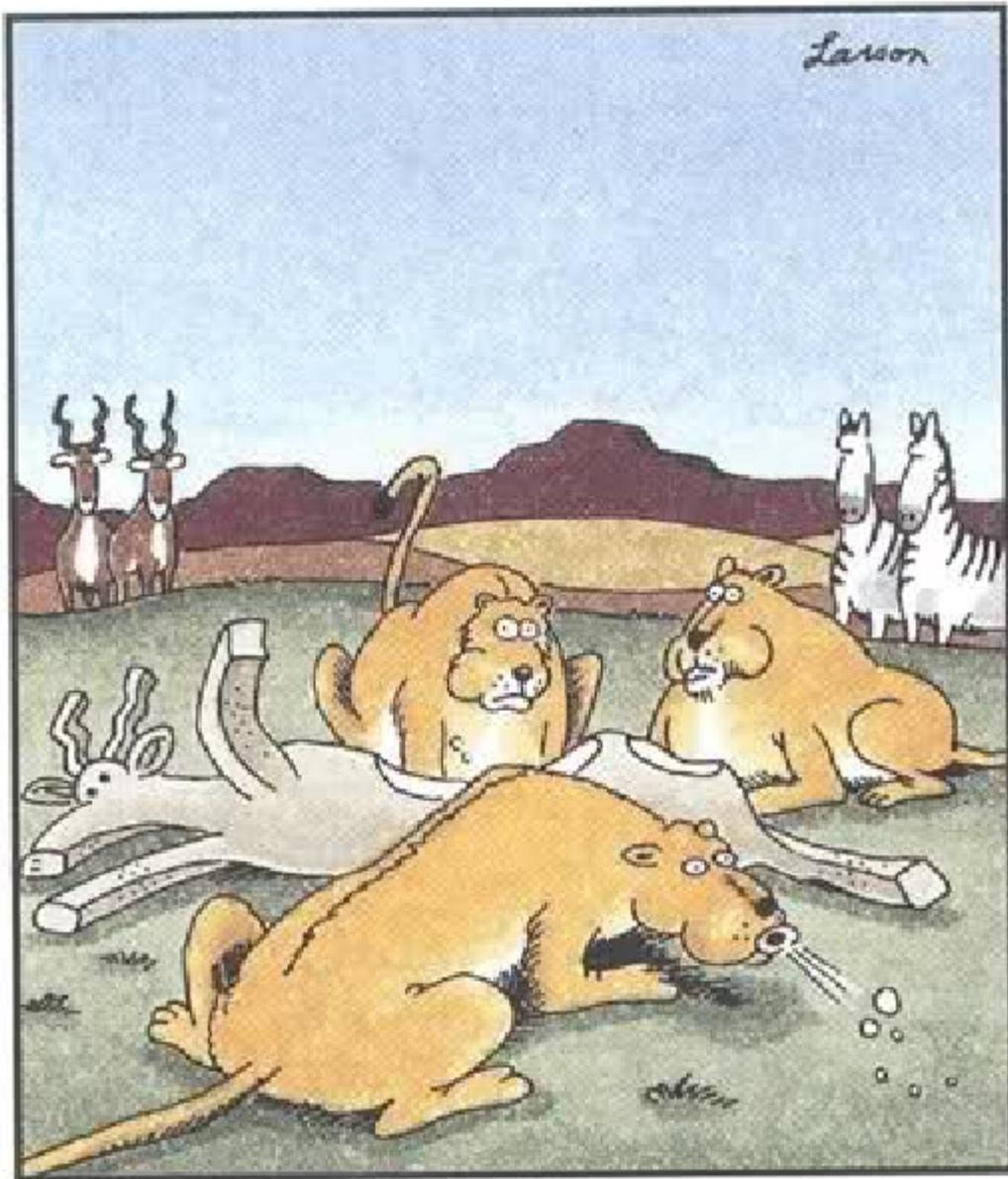
Aseem Malhotra et al. Br J Sports Med 2017;51:1111-1112

Coronary Disease?

No, it's *Culinary Disease!*

- Reduced risk of coronary heart disease (CHD) and coronary disease mortality
- 5 prospective studies reported a combined:
 - *24% lower risk of mortality from IHD in vegetarians*
 - *34% reduced in lacto-ovo vegetarians*
 - *26% reduced risk in vegans*
- The benefit was apparent if diet followed for at least 5 years and was greater in younger age groups

- Another risk factor for CHD is environmental stress. Childhood trauma can lead to an average decrease in life expectancy of 20 years.
- Chronic stress increases glucocorticoid receptor resistance, which results in failure to down regulate the inflammatory response.
- Combining a complete lifestyle approach of a healthful diet, regular movement and stress reduction will improve quality of life, reduce cardiovascular and all-cause mortality.



In sudden disgust, the three lionesses realized they had killed a tofudebeest—one of the Serengeti's obnoxious health antelopes.

- Do vegetables even have protein? Will vegetarians get enough protein?
- *How do horses, elephants and cows get so large without protein?*

YOU CHOOSE

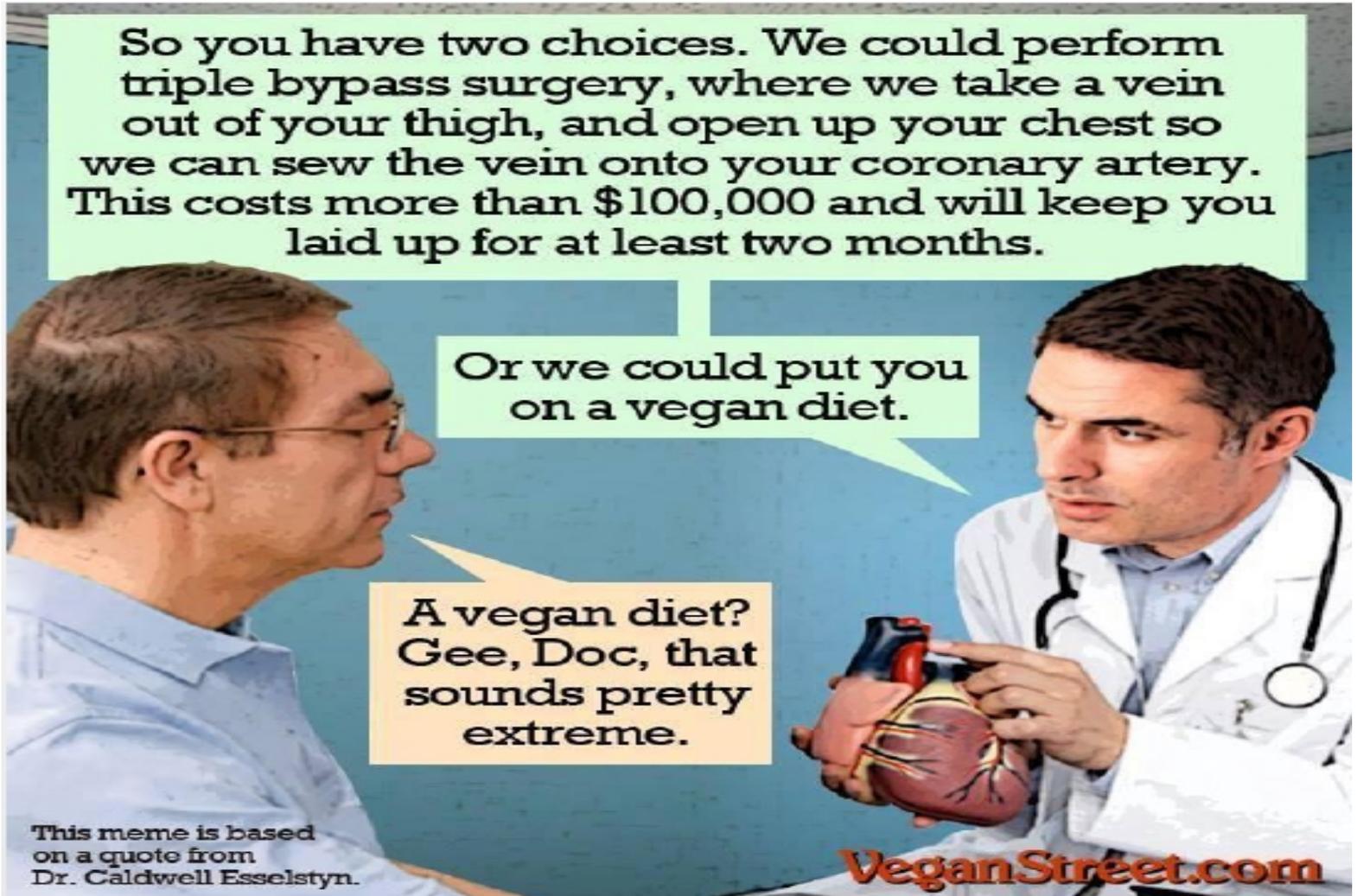
So you have two choices. We could perform triple bypass surgery, where we take a vein out of your thigh, and open up your chest so we can sew the vein onto your coronary artery. This costs more than \$100,000 and will keep you laid up for at least two months.

Or we could put you on a vegan diet.

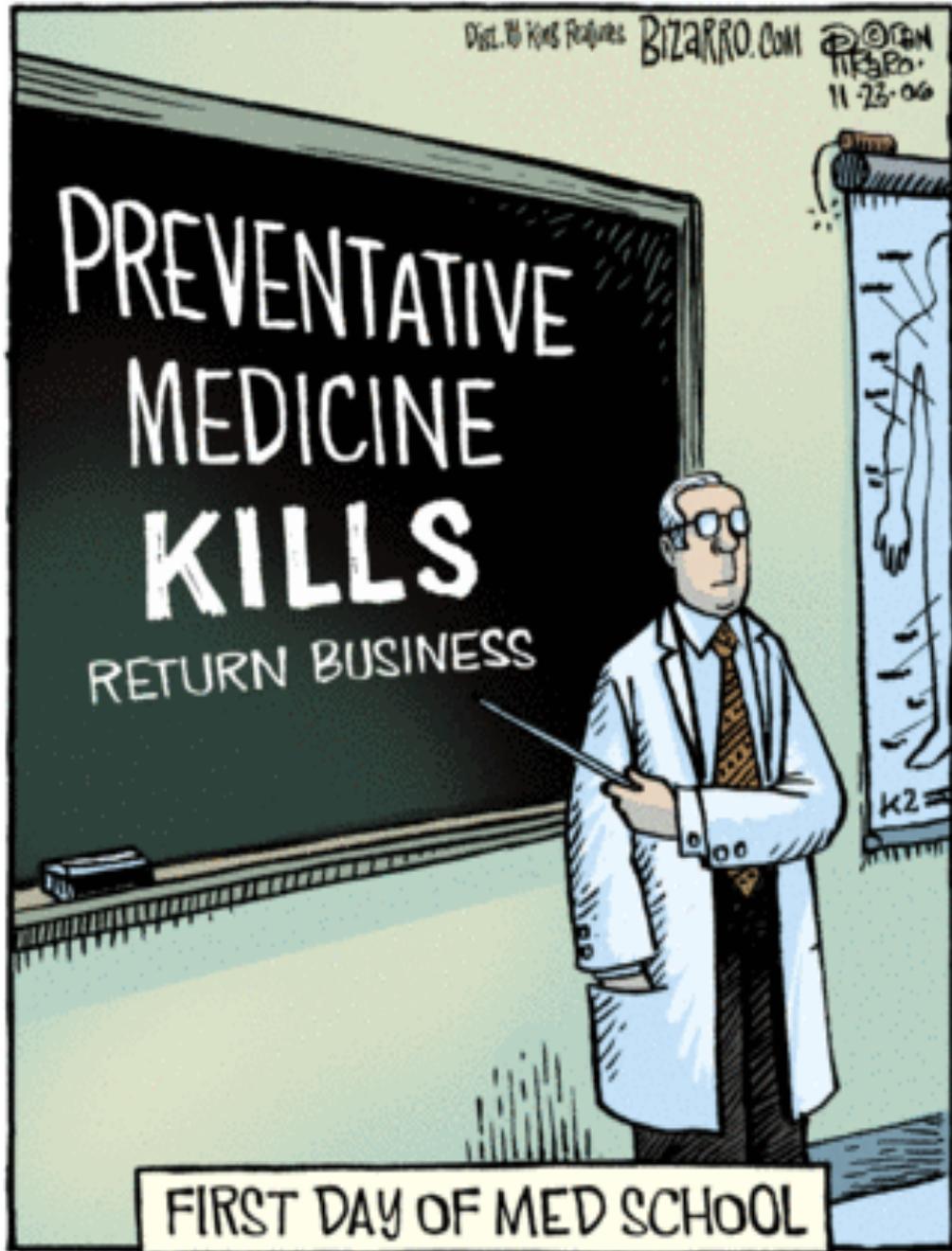
A vegan diet? Gee, Doc, that sounds pretty extreme.

This meme is based on a quote from Dr. Caldwell Esselstyn.

VeganStreet.com



PREVENTATIVE
MEDICINE
KILLS
RETURN BUSINESS



FIRST DAY OF MED SCHOOL

What about supplements

- Better from the plate than the bottle
- You cant supplement yourself out of a poor lifestyle
- Individualize based on circumstances
- If using – use to fill gaps/deficiencies- otherwise just expensive urine !

How to lower cholesterol Naturally

- Sensible food choices , avoid too many foods that high in bad/ trans saturated fat – choose good fats /oils- poly/mono
- Psyllium Husks – natural cholesterol absorption inhibitor
- Garlic- even reduces atherosclerosis
- Fish oils – Omega 3 – not krill – lower triglycerides
- Increase soluble fibre
- Plant sterols

Omega 3 Fats

- Active ingredient EPA /DHA
- Eicosapentaenoic acid / docosahexaenoic acid
- Cold water fish
- FORGET ABOUT KRILL OR CALAMARI OIL
- 1-2 g /day of active ingredient ideal – choose a supplement that gives this .
- Multiple CVS benefits

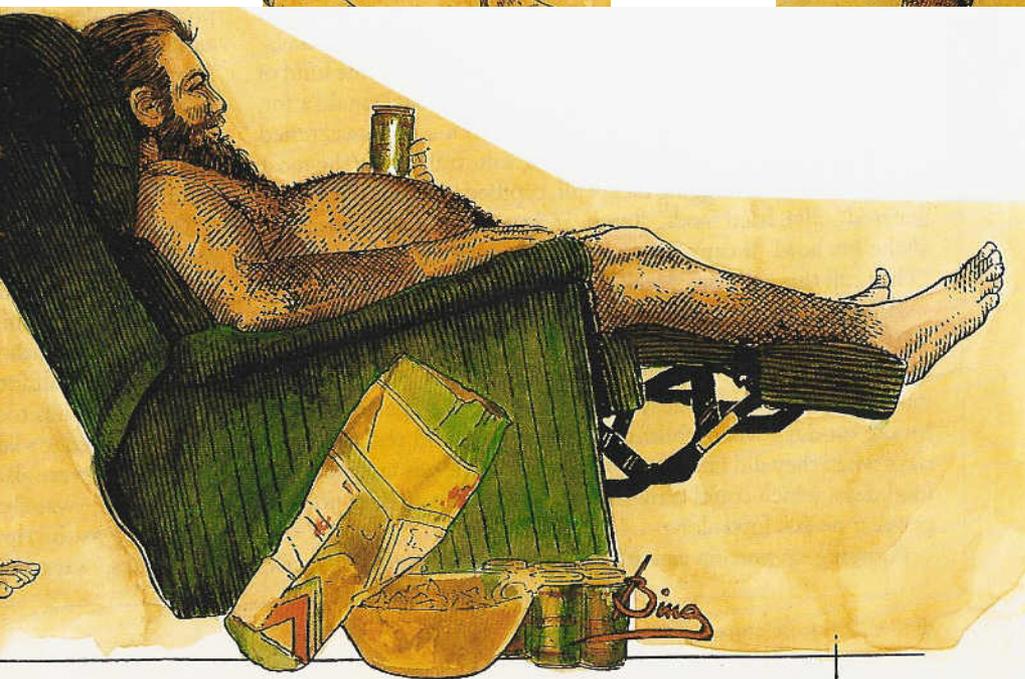
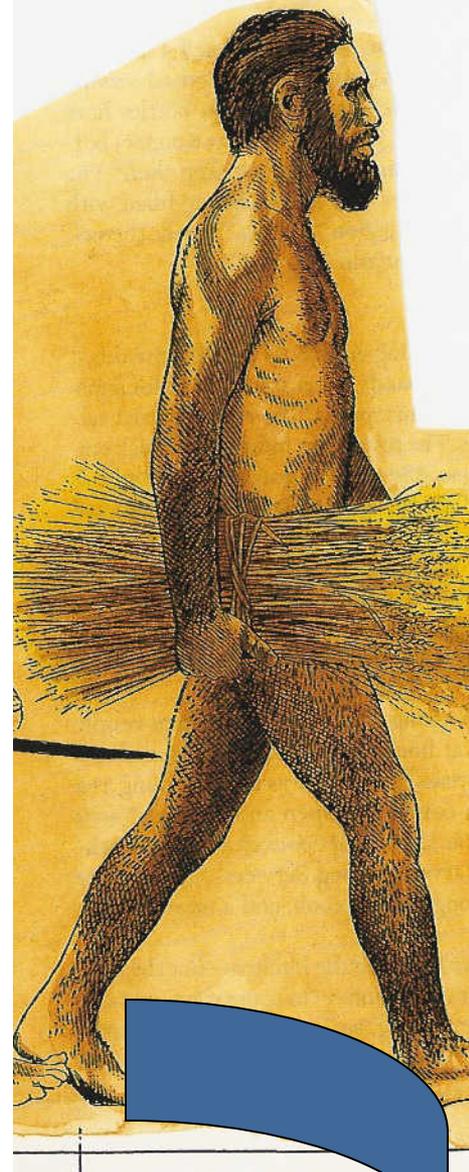
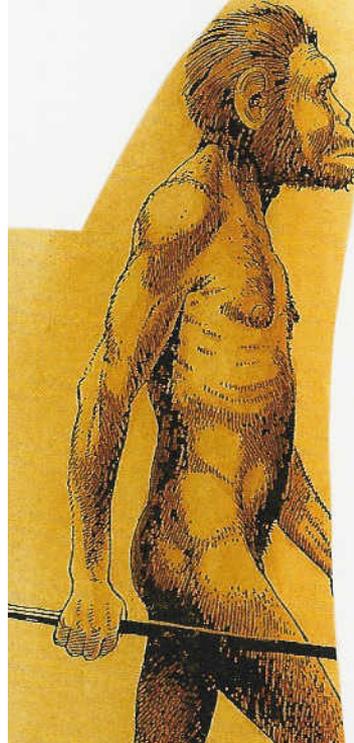
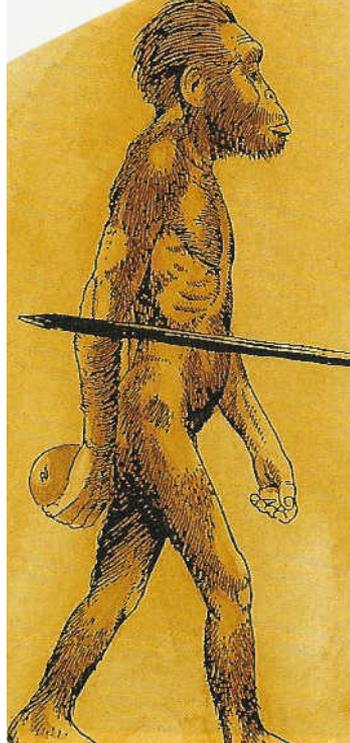
What about supplements

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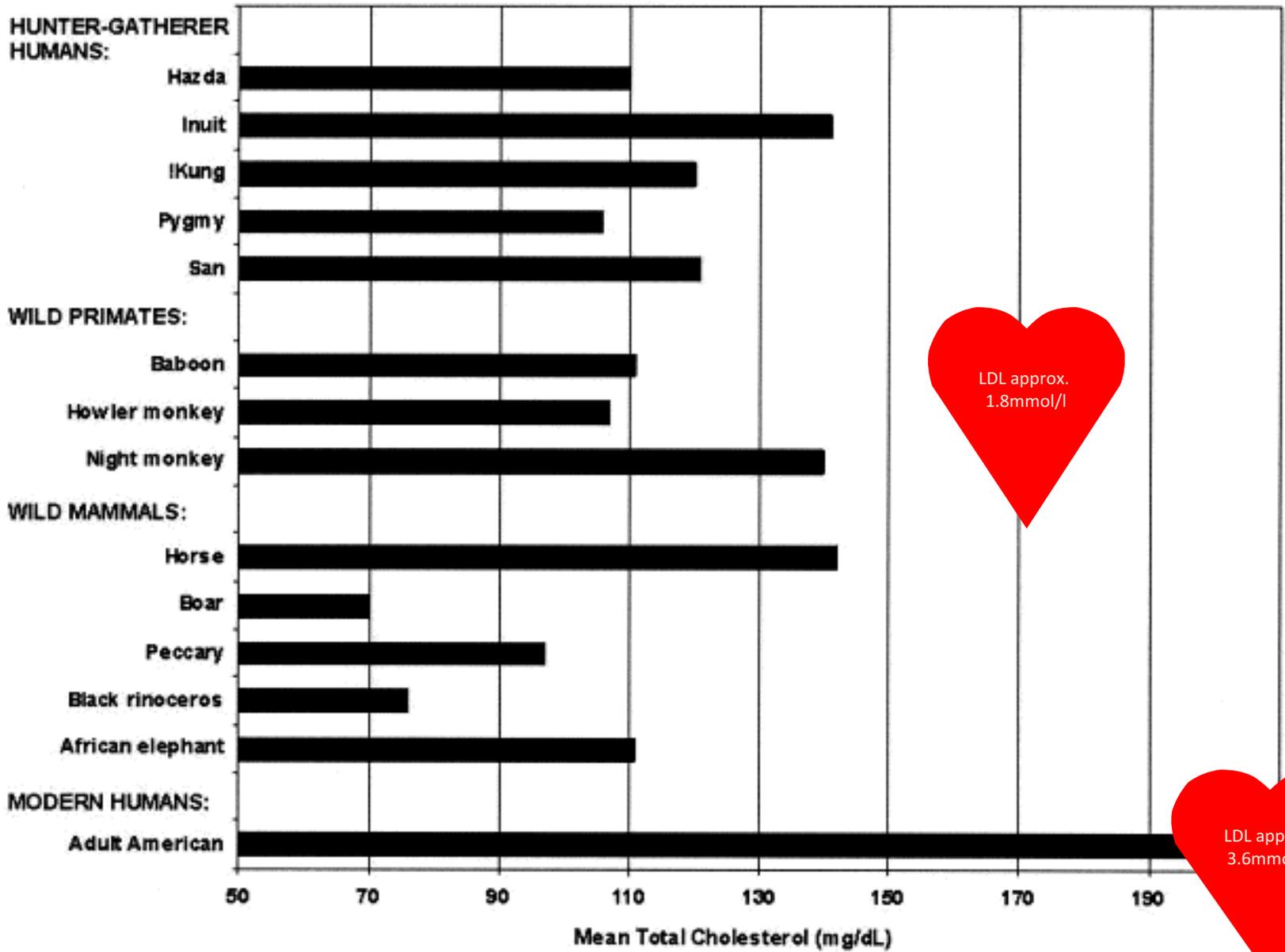
This is not how to exercise



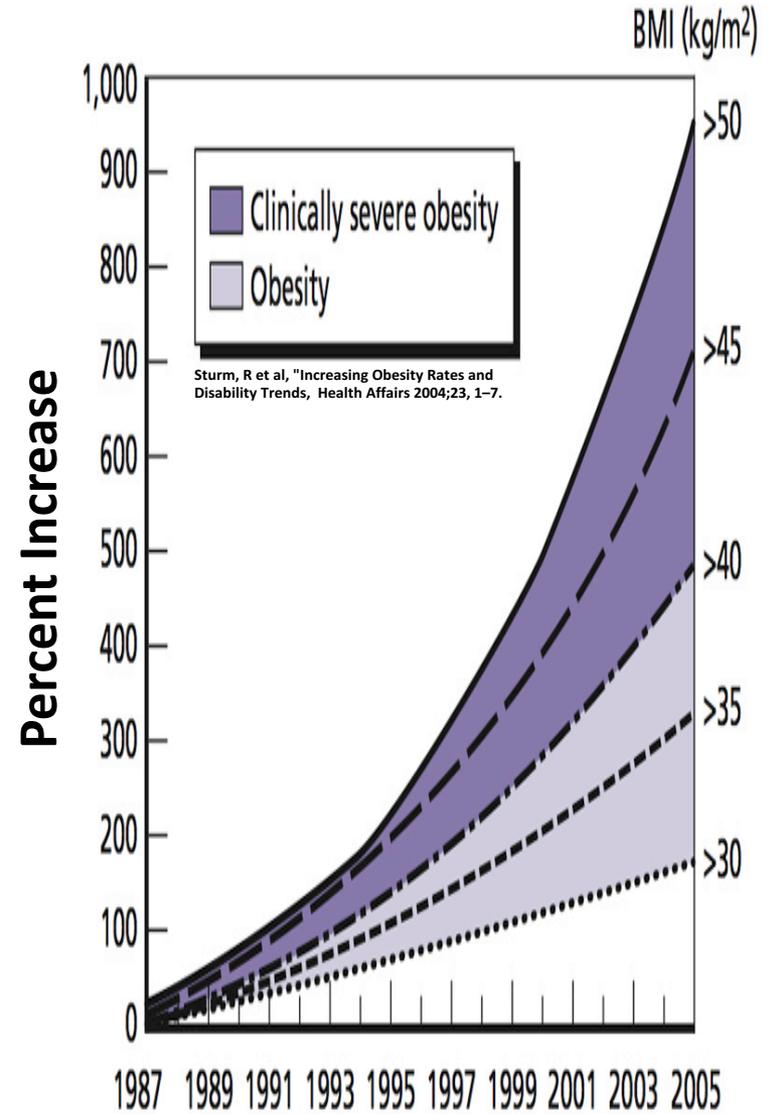
LIFESTYLE – exercise , and everything else



THE SHAPE OF THINGS TO COME !



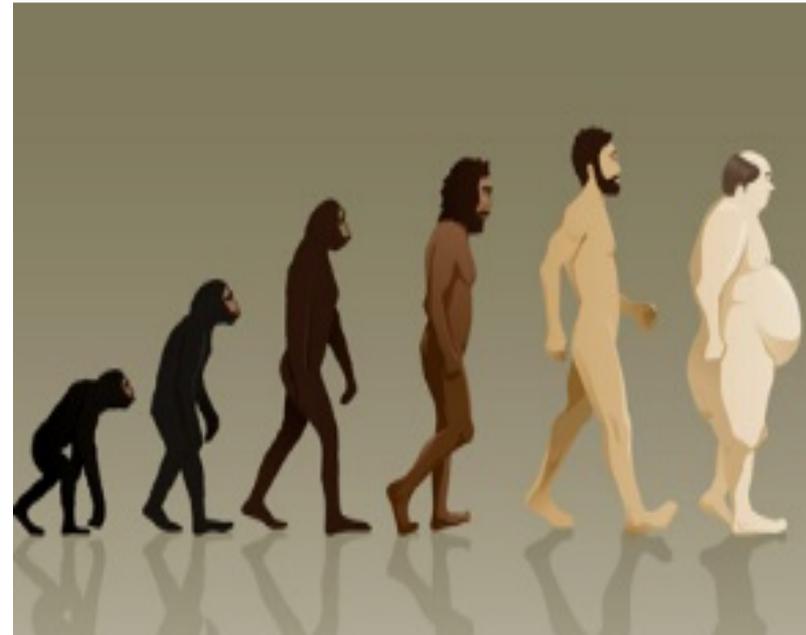
Obesity in Last 25 Years



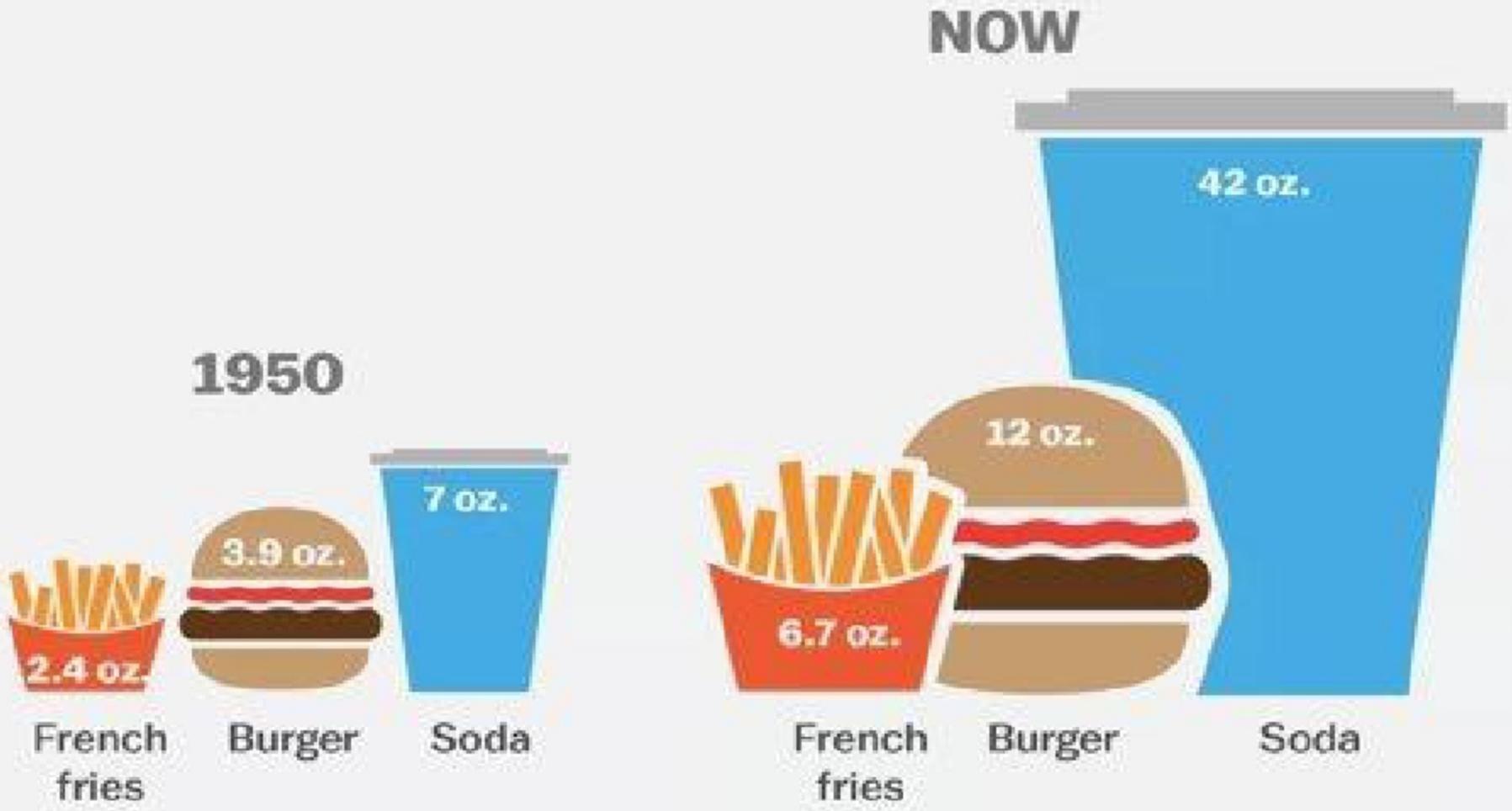
Consequences of Obesity

Obesity causes heart attack, stroke, diabetes, high blood pressure, arthritis, and *depression*.

- Every extra 5 Kg gives you a heart attack 1.5 years earlier.
- Every extra 5 Kg at 21 increases your chance of dying before 90 by 10%.



The average restaurant meal today is more than four times larger than in the 1950s



SOURCE: CDC

Caloric Density



400 Calories of Oil



400 Calories of Beef



400 Calories of Vegetables

Stretch receptors are located throughout the stomach. When they are triggered by food, they send signals to your brain to tell you to stop eating. With high fiber, whole plant foods, you can eat the most quantity for the least amount of calories.

National Weight Control Registry

(lost 15 Kg and kept off for >1 yr)

98% reduced calories (no difference low fat vs. low carb)

- **90% exercise an average *1 hr/day***
- **75% weigh themselves ≥ 1 /wk**
- **62% watch TV <10 hrs/wk**



Original Investigation

Effect of Calorie Restriction on Mood, Quality of Life, Sleep, and Sexual Function in Healthy Nonobese Adults

The CALERIE 2 Randomized Clinical Trial

Corby K. Martin, PhD; Manju Bhapkar, MS; Anastassios G. Pittas, MD; Carl F. Pieper, DrPH; Sai Krupa Das, PhD; Donald A. Williamson, PhD; Tammy Scott, PhD; Leanne M. Redman, PhD; Richard Stein, PhD; Cheryl H. Gilhooly, PhD; Tiffany Stewart, PhD; Lisa Robinson, RD; Susan B. Roberts, PhD; for the Comprehensive Assessment of Long-term Effects of Reducing Intake of Energy (CALERIE) Phase 2 Study Group

IMPORTANCE Calorie restriction (CR) increases longevity in many species and reduces risk factors for chronic diseases. In humans, CR may improve health span, yet concerns remain about potential negative effects of CR.

OBJECTIVE To test the effect of CR on mood, quality of life (QOL), sleep, and sexual function in healthy nonobese adults.

DESIGN, SETTING, AND PARTICIPANTS A multisite randomized clinical trial (Comprehensive Assessment of Long-term Effects of Reducing Intake of Energy Phase 2 [CALERIE 2]) was conducted at 3 academic research institutions. Adult men and women (N = 220) with body

-  [Invited Commentary page 7](#)
-  [Related article page 755](#)
-  [Supplemental content at jamainternalmedicine.com](#)

This is not how to exercise



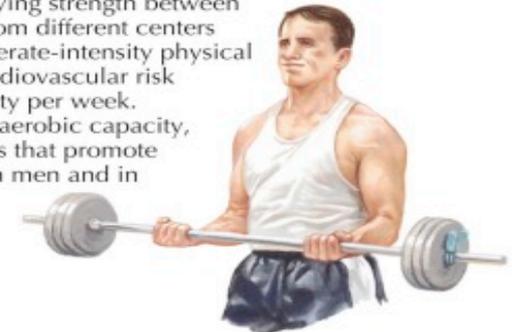
24
HOUR

FITNESS





Epidemiologic research has demonstrated protective effects of varying strength between physical activity and risk for coronary heart disease. Guidelines from different centers of research now strongly recommend at least 150 minutes of moderate-intensity physical activity per week; however, even greater benefits are seen and cardiovascular risk factors are even more reduced with 200 minutes of physical activity per week. In addition to the recommendations to increase activity related to aerobic capacity, the current guidelines strongly encourage participation in activities that promote flexibility and strength. Benefit from fitness has been found both in men and in women and across different races and ethnic groups.



Effects of exercise on cardiac risk factors

- ↓ Myocardial oxygen demand
- ↑ Maximum cardiac output
- ↑ VO_{2max}
- ↓ Resting blood pressure
- ↓ Triglycerides
- ↓ Total cholesterol
- ↓ VLDL-C
- ↓ LDL-C
- ↑ HDL-C
- ↓ Platelet adhesiveness and aggregation
- ↓ PAI-1 activity
 - ↓ Blood viscosity
- ↑ tPA antigen levels
- ↑ Insulin sensitivity

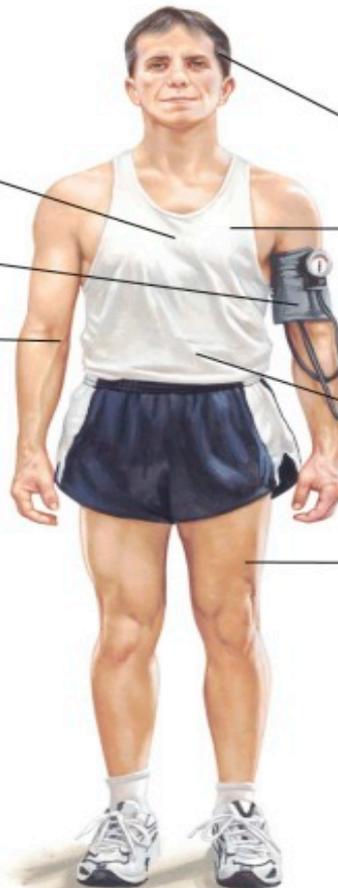
Psychological and other physical benefits

Positive changes in mood and self-perception and relief from tension, depression, and anxiety and, consequently, the deleterious effects related to these emotional conditions

Improvement in respiratory function

Adipose tissue relocation

Capacity of muscles to extract and use oxygen from blood



C. Machado
— M.D.

Physical activity guidelines are targeted to increase physical activity to promote health, but they will not necessarily result in physical fitness and should not diminish the importance of achieving physical fitness.

Exercise capacity and mortality among men referred for exercise testing.

Myers J, Prakash M, Froelicher V, Do D, Partington S, Atwood JE.

Division of Cardiovascular Medicine, Stanford University Medical Center

After adjustment for age, the peak exercise capacity measured in metabolic equivalents (MET) was the strongest predictor of the risk of death among both normal subjects and those with cardiovascular disease.

Each 1-MET increase in exercise capacity conferred a 12 percent improvement in survival.

CONCLUSIONS: Exercise capacity is a more powerful predictor of mortality among men than other established risk factors for cardiovascular disease.

What are METs ?

Brought to you by MISFIT
www.misfitwearables.com/references

How can they help me calculate my calories burned?



METs are a measure of physical activity intensity.

$$\text{Calories burned} = \text{Weight in kg} \times \text{Exercise Intensity in METs} \times \text{Time in Hours}$$



150lb person
sitting
— for a —
one hour
meeting

$$68.0\text{kg} \times 1.3\text{MET} \times 1\text{hr} = 88\text{Cal}$$



130lb person
walking
— for —
one hour

$$59\text{kg} \times 3.5\text{METs} \times 1\text{hr} = 207\text{Cal}$$



170lb person
cycling
— for a —
one hour
race

$$77.1\text{kg} \times 16\text{METs} \times 1\text{hr} = 1234\text{Cal}$$



| Physical Activity | MET |
|--|--------|
| Light Intensity Activities | < 3 |
| • <u>sleeping</u> | 0.9 |
| • <u>watching television</u> | 1.0 |
| • <u>writing, desk work, typing</u> | 1.8 |
| • <u>walking, 1.7 mph (2.7 km/h), level ground, strolling, very slow</u> | 2.3 |
| • <u>walking, 2.5 mph</u> | 2.9 |
| Moderate Intensity Activities | 3 to 6 |
| • <u>bicycling, stationary, 50 watts, very light effort</u> | 3.0 |
| • <u>walking 3.0 mph</u> | 3.3 |
| • <u>calisthenics, home exercise, light or moderate effort, general</u> | 3.5 |
| • <u>walking 3.4 mph</u> | 3.6 |
| • <u>bicycling, <10 mph (16 km/h), leisure, to work or for pleasure</u> | 4.0 |
| • <u>bicycling, stationary, 100 watts, light effort</u> | 5.5 |
| High Intensity Activities | > 6 |
| • <u>jogging, general</u> | 7.0 |
| • <u>calisthenics (e.g. pushups, situps, pullups, jumping jacks), heavy, vigorous effort</u> | 8.0 |
| • <u>running jogging, in place</u> | 8.0 |
| • <u>rope jumping</u> | 10.0 |

TABLE 1 Examples of Moderate- and Vigorous-Intensity Activities to Achieve 2008 Exercise Guideline Recommendations

| Moderate-Intensity Aerobic Activities >150 min/week | Vigorous-Intensity Aerobic Activities >75 min/week |
|---|--|
| Brisk walking (>3 miles/h) | Uphill walking or race walking |
| Bicycling (<10 miles/h) | Bicycling (>10 miles/h) |
| Water aerobics | Running or jogging |
| Tennis (doubles) | Tennis (singles) |
| Ballroom dancing | Aerobic dancing |
| General gardening | Heavy gardening (digging/hoeing) |

from the Centers for Disease Control and Prevention guidelines (12).

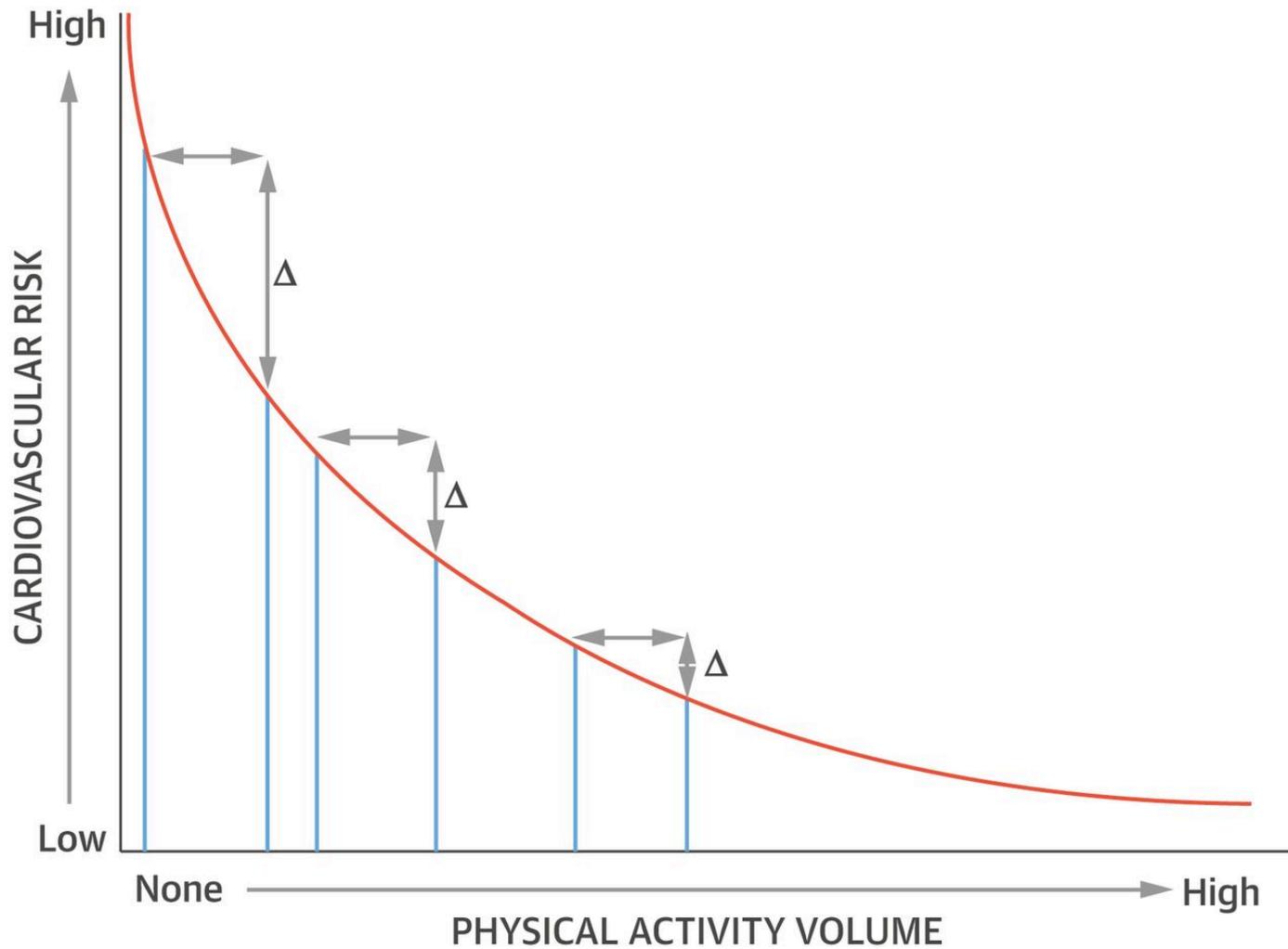


Exercise!

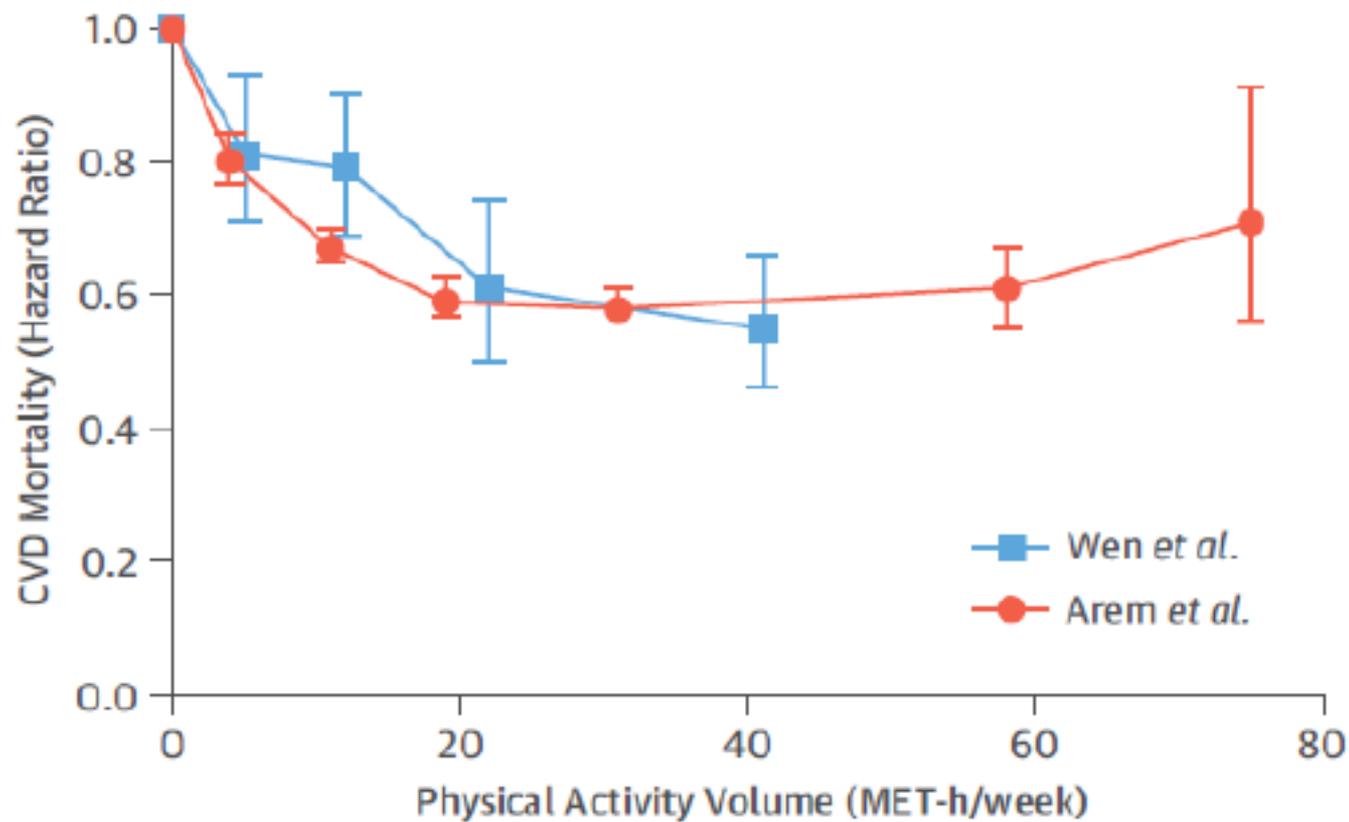
YOUR LEVEL OF FITNESS IN MIDDLE
DETERMINES
LONG YOU WILL LIVE !

Dr. Ken Cooper, of the Cooper Institute of Aerobic Research, found that exercise was associated with a 40 % reduction in heart attacks in females and a 60 % reduction in heart attacks in males.

- people who were in the lower 20 % of cardiovascular fitness had a death rate that was three times higher than the most fit group.**
- men taking up exercise, even after the age of 60, will increase their life expectancy.**



Thijs M.H. Eijvogels et al. JACC 2016;67:316-329



On the basis of data from the studies of Wen et al. (35) (blue squares) and Arem et al. (36) (orange circles). The average exercise volume (MET-h/week) was calculated for the ranges of physical activity that were provided in the study by Arem et al. (36). The maximal risk reduction for cardiovascular mortality was found at an exercise volume of 41 MET-h/week. CVD = cardiovascular disease; MET = metabolic equivalent of task score.

rs) per week of vigorous-intensity exercise at 8.5 METS.

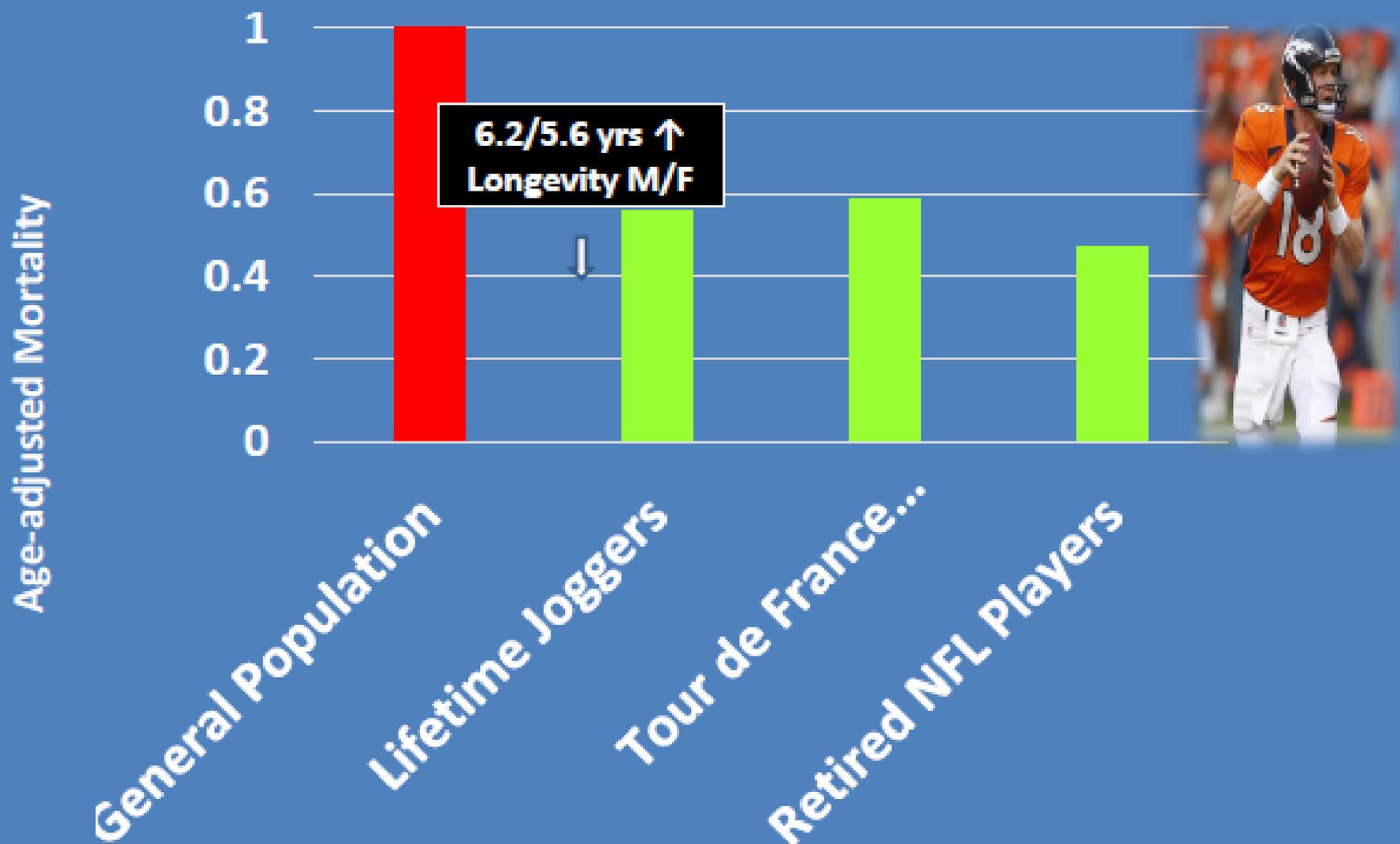
Exercise at the Extremes

The Amount of Exercise to Reduce Cardiovascular

High Intensity Interval Training

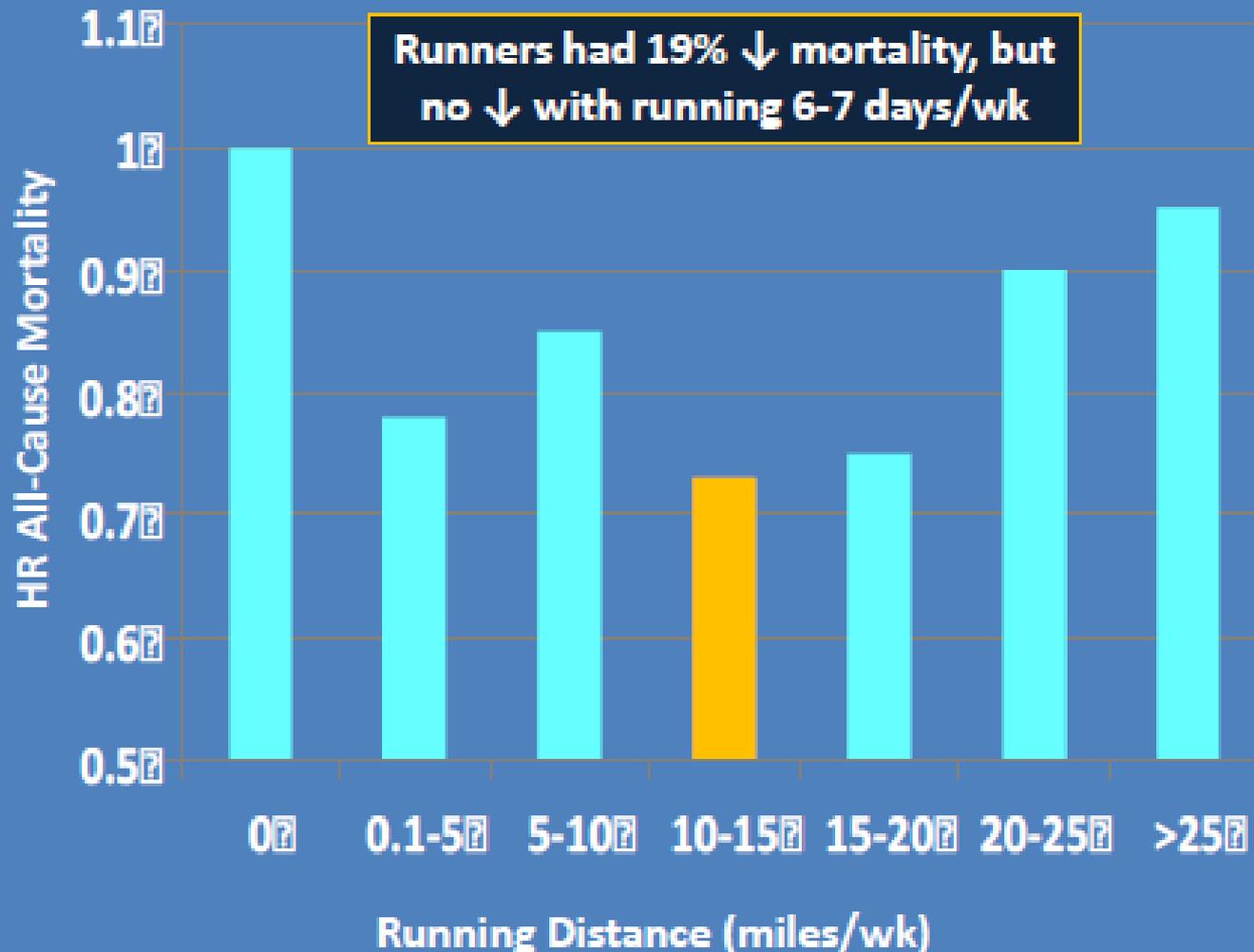
- High-intensity (≥ 6.0 METS) interval training produces greater improvement in cardiorespiratory fitness compared to moderate-intensity (3.0-5.9 METS) sustained activities, and higher fitness levels are in turn associated with lower cardiovascular and all-cause mortality.

Age-Adjusted Mortality in Lifetime Joggers and Elite Athletes vs. the General Population



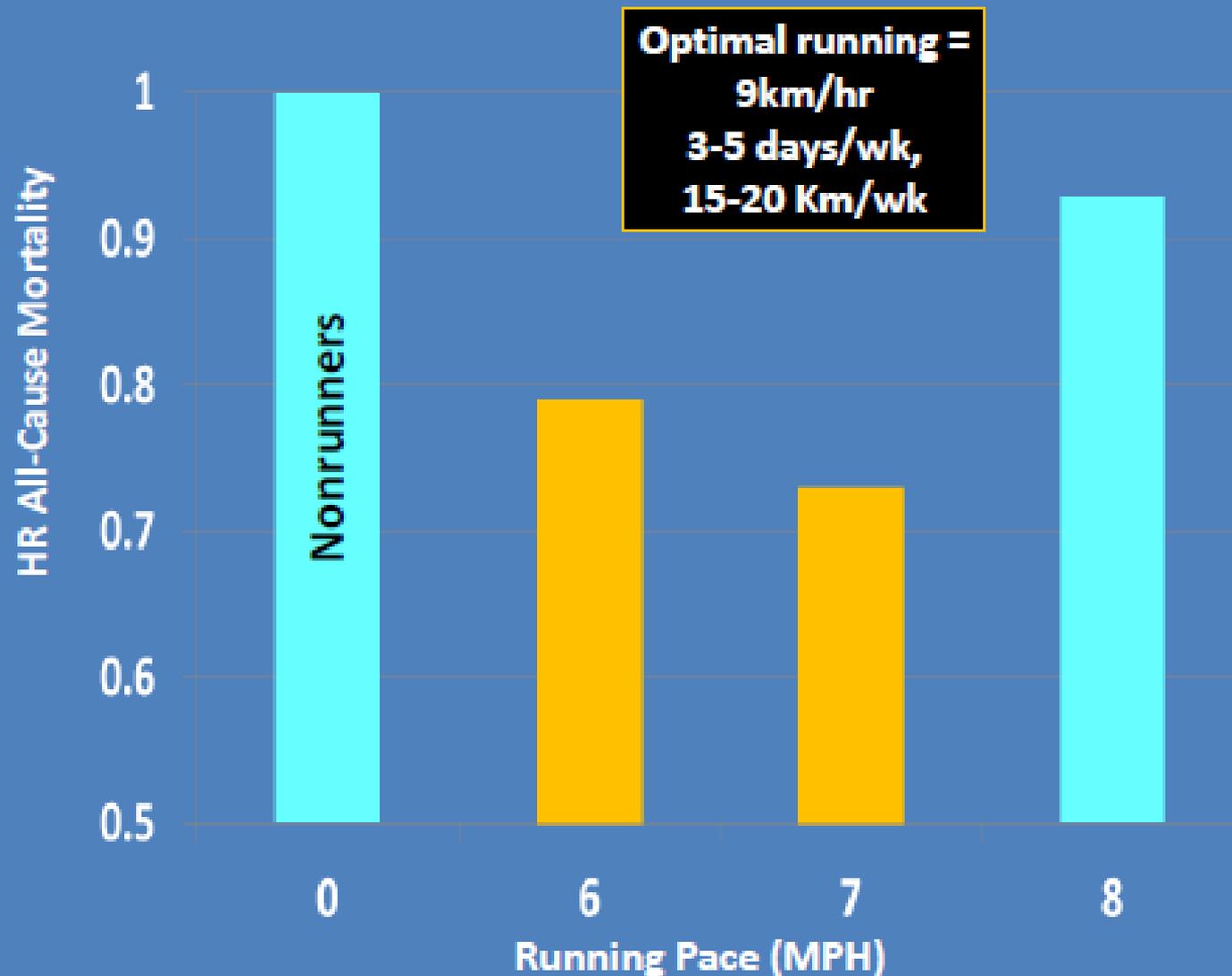
* Copenhagen City Heart, n=1878, 35 yr f/u)

Aerobics Center (Ken Cooper) Longitudinal Study of 52,600 Healthy Subjects for up to 30 Yrs (mean 15 yrs)



IF YOU RUN – IDEALLY 15-20 KM a week -

Aerobics Center (Ken Cooper) Longitudinal Study of 52,600 Healthy Subjects for up to 30 Yrs (mean 15 yrs)



5-10 MINUTES A DAY



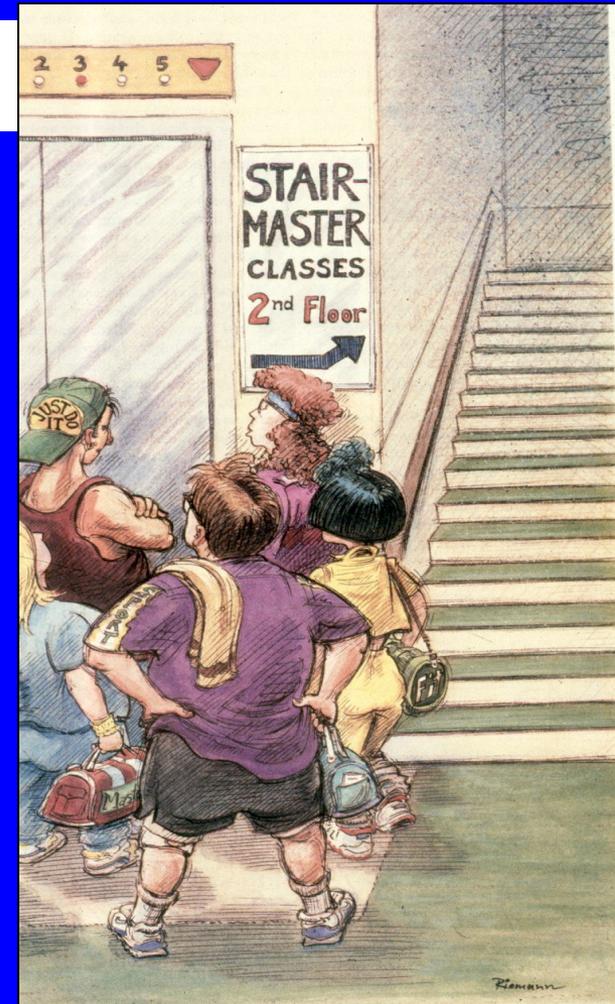
Weekly running even <51 min, <6 miles, 1 to 2 times, <506 metabolic equivalent-minutes, or <6 miles/h was sufficient to reduce risk of mortality, compared with not running.

Persistent runners had the most significant benefits, with 29% and 50% lower risks of all-cause and cardiovascular mortality, respectively, compared with never-runners.

Author Conclusions: **Running, even 5 to 10 min/day and at slow speeds <6 miles/h, is associated with markedly reduced risks of death from all causes and cardiovascular disease.**

10,000 Step Program

- Each add' n 3000 steps/day (½ hr)
7 kg ↓/yr
20-40% ↓ CHD
- Doesn' t have to be continuous
- Incorporate into daily activities
- Incidental Thermogenesis
- USE A FITBIT /JAWBONE OR SIMILAR



Possibly Deleterious Effects of Endurance Exercise

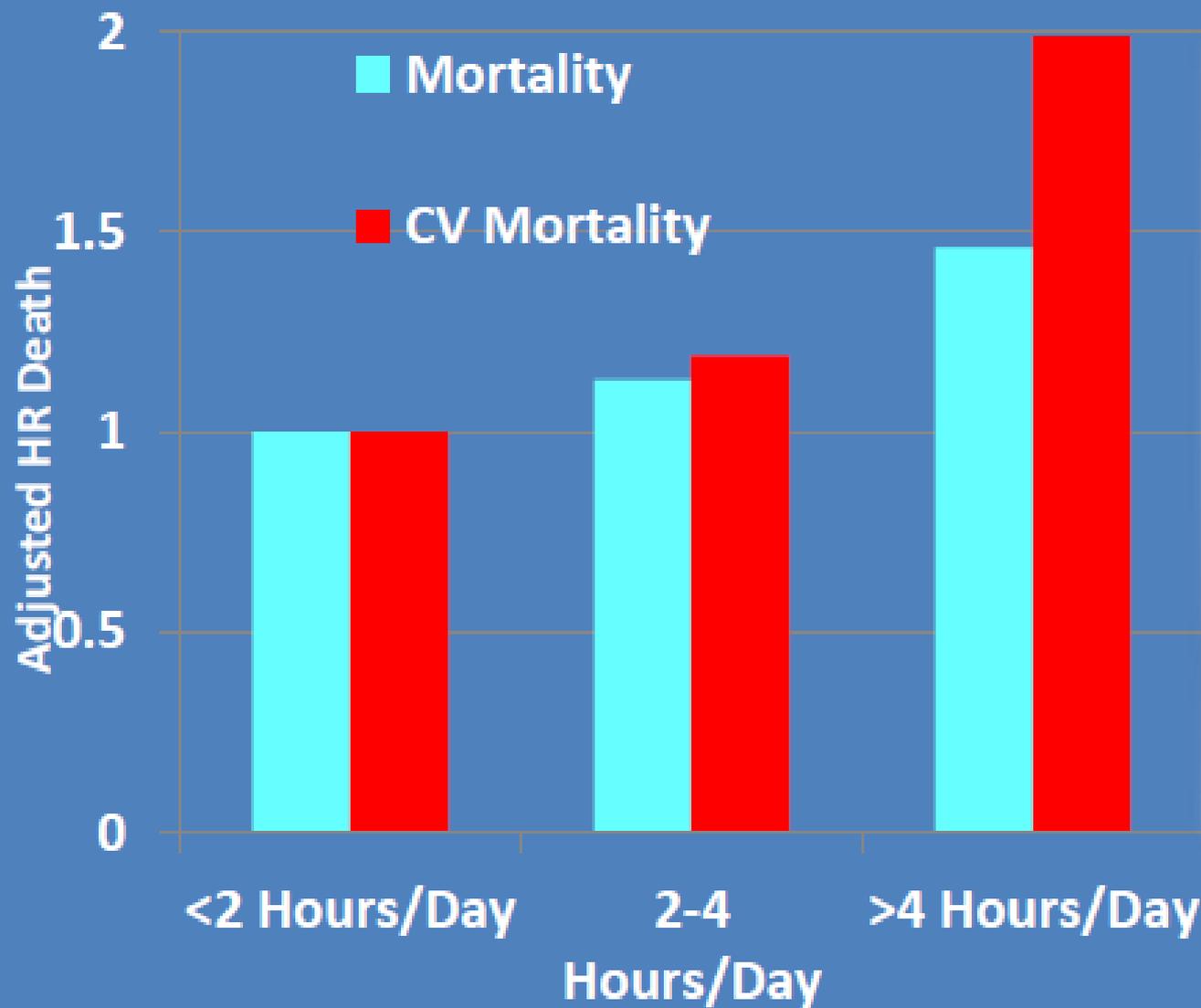
- **Cardiac Events with Exercise**
- **“Cardiac” Bio Markers & Exercise**
- **Ventricular Dysfunction with Exercise**
- **Cardiac Fibrosis in Lifelong Athletes**
- **Accelerated ASCAD ???**
- **Atrial Fibrillation in Athletes**
- **Genetic Vulnerability to Exercise**

Exercise Prescription – Rx

- Exercising for Health and longevity vs Peak Performance
- Different regimens for different Goals
- Optimal Dosing

**Marriage, Success, Sex, TV
Coffee and Chocolate**

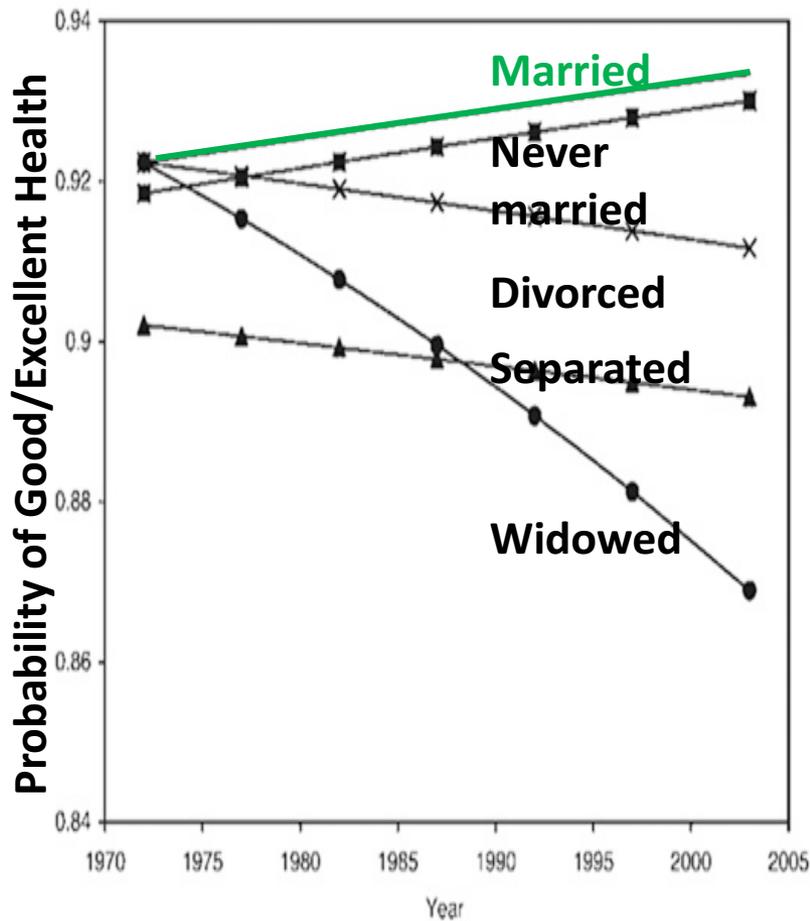
Australian Diabetes Obesity and Lifestyle Study: TV Viewing vs. Mortality in 8800 Healthy Subjects over 25 Years



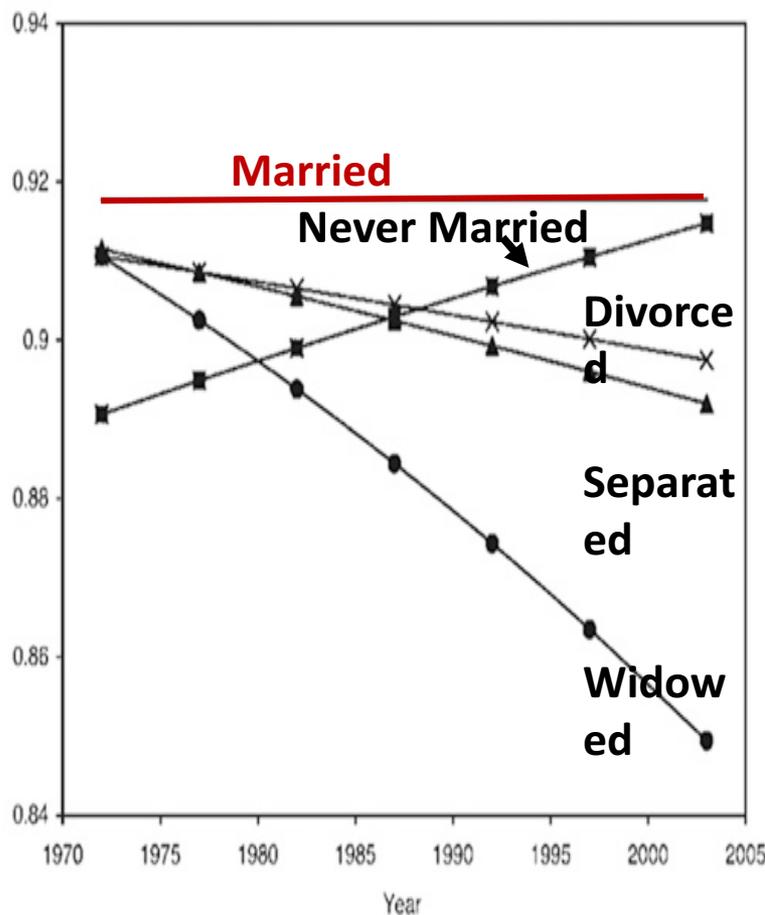
Temporal Trends in Health vs. Marital Status



Women



Men



NAPS- Siesta Therapy:

ESC 2015 – greek study

- **Midday Naps Extend BP Lowering in Treated HTN**
- A midday nap, for those who can swing it, has benefits in middle-aged adults with well-controlled hypertension,
- Men and women who slept 60 minutes, typically after a midday meal, had an average 24-hour blood-pressure reading that was 4 mm Hg lower than non-nappers, and while they slept at night, they had a 2% greater dip in blood pressure.
- The nappers also tended to use fewer blood-pressure medications
- "The message for hypertensive, high-risk patients is that a short nap after lunch could exert a positive cardiovascular effect."

Sitting

- **Too Much Sitting May Up Risk of Coronary Artery Calcification**
- Each added hour spent sitting was associated with a 14% increase in coronary artery calcium (CAC) score, independent of traditional risk factors, in middle-aged adults without cardiovascular disease participating in the **Dallas Heart Study**.
- health consequences of 'sitting too much' appear to be distinct from those of 'too little exercise,' and suggests that increased subclinical atherosclerosis may be one of the mechanisms through which sedentary behavior increases CV risk
- New CVS risk factors- lack of exercise and “too much sitting”

Comparison of selected markers in two cities Differing in ambient air pollution

- Higher systolic blood pressure in males in Krakow and no difference in whole studied group
- Increased inflammatory biomarkers –CRP, fibrinogen in Krakow
- Association between increase in BMI and blood pressure selected inflammatory biomarkers were observed particularly in Krakow (high Pollution)

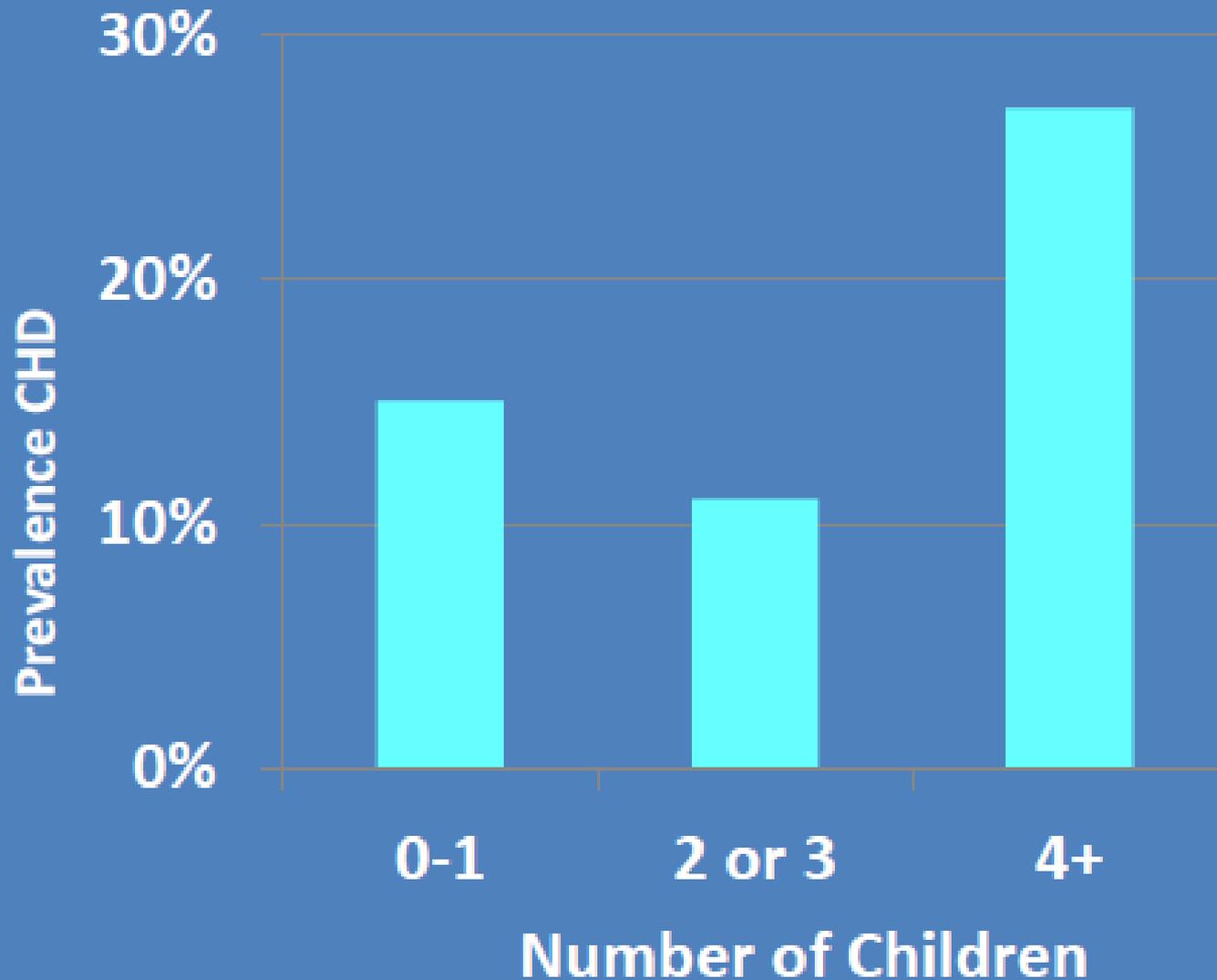


Benefits of Sexual Activity



- Sexual frequency is associated with a decrease in death and CV events (heart attack, stroke).
- Early cessation of sexual activity is associated with increased mortality.
- Sexual frequency is not associated with longevity.
- Sexual frequency is associated with younger appearance (>7 years), less pain in general, and improved QOL.

Dallas Heart Study: Prevalence of Coronary Artery Disease by CAC in 1644 Women vs. Number of Children



Myriad Health Effects of Chocolate



- Contains caffeine/theobromine (stimulant)
- Contains anandamine (intoxicant)
- Contains phenylethylamine (infatuation)
- Releases endorphins (well being)
- Rich in antioxidants
- High in calories, sugar & saturated fats
- Contains caffeine (esophageal reflux)
- Contains tyramine (triggers migraine)
- Contains oxalate (kidney stones)

Chocolate

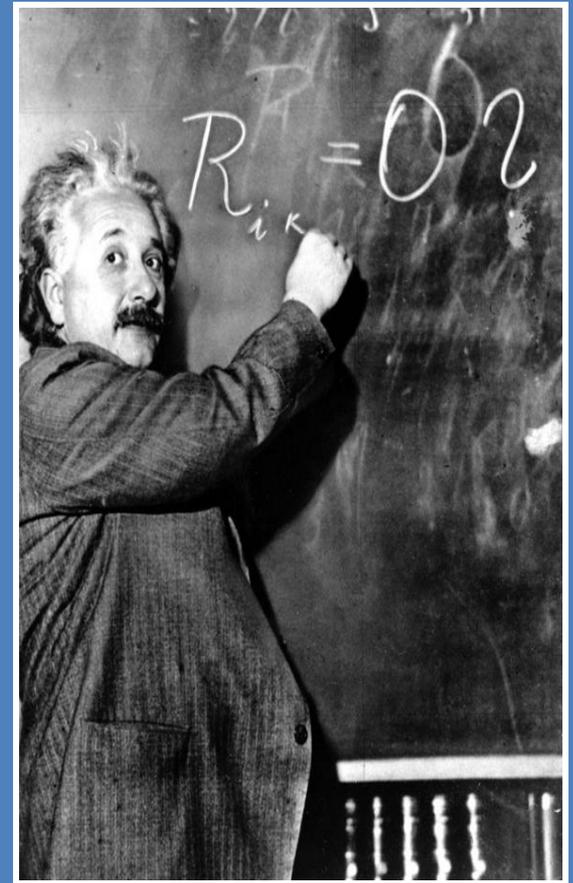
- Dark probably better
- Lowers BP – up to 5 mmHg
- Flavenoids may lower LDL- Cholesterol
- Improves mood / Happiness) most of the time)
- 1-2 squares

What about Coffee?

- Care with what comes with coffee (sugar, milk , pastry)
- Filtered coffee prob better than espresso (reduces compounds that may raise cholesterol)
- Black with less milk prob better
- Recent large studies have shown no major detrimental cardiac effects , but other detrimental effects can be seen

Extreme Success and Longevity

- Oscar winners: \uparrow 3.6 yrs c/w nominees
- Nobel laureates: \uparrow 1.9 yrs c/w nominees
- 2X Nobel laureates: 87 yrs mean longevity
(Curie, Sanger, Pauling, Bardeen)



GENIUSES AGREE...

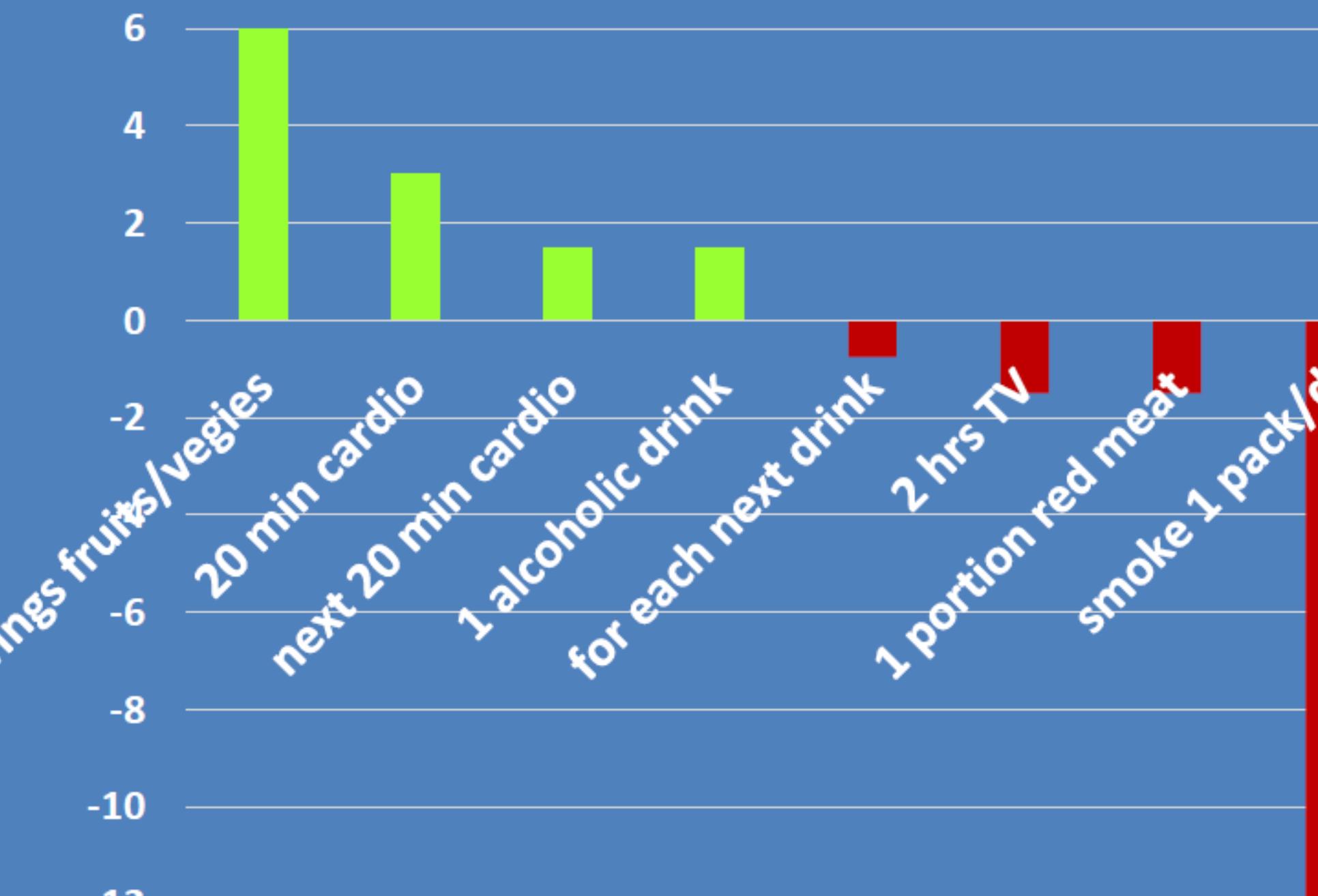
“Nothing will benefit human health and increase our chances of survival for life on Earth as much as the evolution to a vegetarian diet.” – Albert Einstein



DIET OR SURGERY... WHICH IS TOO EXTREME?



Top 10 Daily Activities that Increase or Decrease Longevity



Message from British Heart Foundation

TAKING THE STAIRS

SEX

GARDENING

SWIMMING

WALKING THE DOG

Get your 30 mins a day, any way.



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