



Session 081 PD - Why Cover Expensive Medical Treatments That Don't Work?

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Why cover expensive medical treatments that don't work?

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VP, Risk Methodology, Aegon/Transamerica

October 17, 2017



How do we decide if a treatment “works”?

- Increase in expected life span
- Cost-effectiveness
 - Cost per QALY (Quality-Adjusted Life Years)
- Eliminates the root cause of the condition

What is a reasonable threshold for cost-effectiveness?

“Originally proposed by Weinstein and Zeckhauser, a ... solution to the cost–effectiveness standard problem is to cite the cost–effectiveness of a benchmark intervention that has already been adopted in the relevant country and to use that as a threshold for acceptable cost–effectiveness. ... This threshold is established by a retrospective analysis of existing practice. In the USA, for example, a threshold still used in cost–effectiveness analyses – US\$ 50 000 per QALY gained – was based on an estimate of the cost–effectiveness of dialysis for chronic renal disease. This threshold has recently been updated to US\$ 100 000 or US\$ 150 000 per QALY gained. ... There is already evidence of a willingness to pay US\$ 150 000 per QALY gained.”

Bulletin of the World Health Organization 2015;93:118-124.

Thresholds for the cost–effectiveness of interventions: alternative approaches

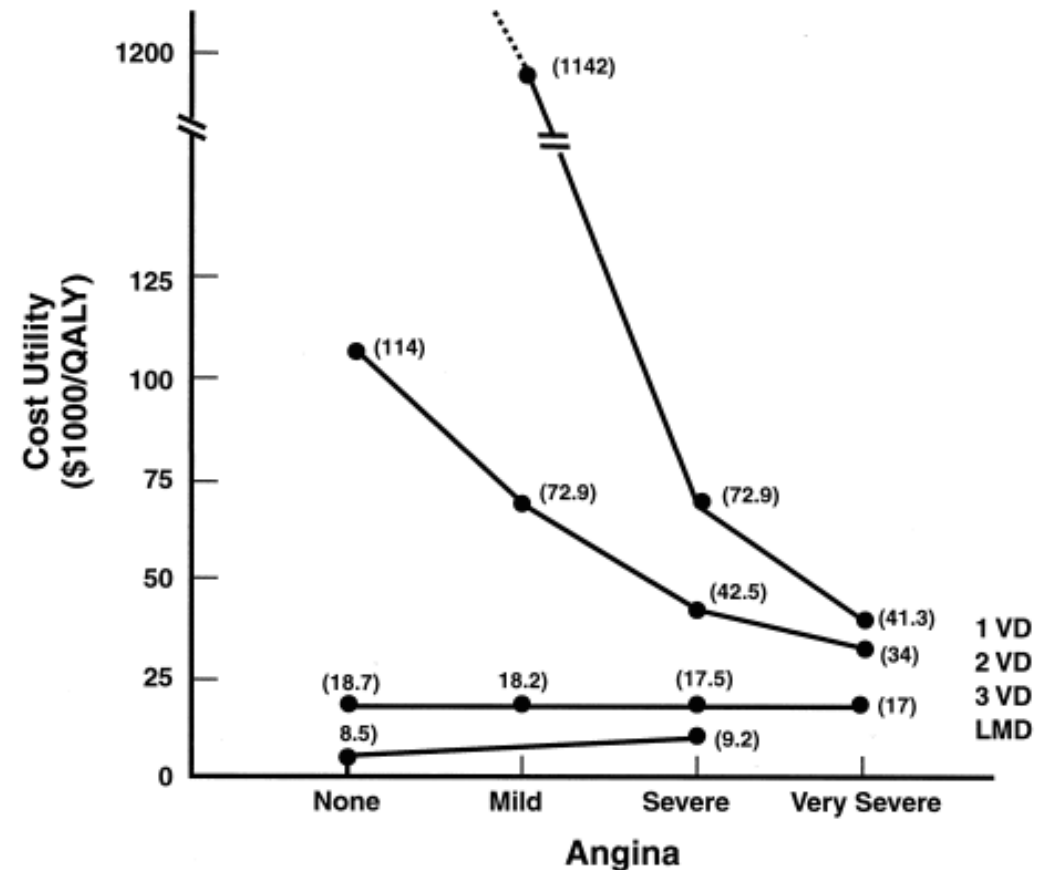
Elliot Marseille, Bruce Larson, Dhruv S. Kazi, James G. Kahn & Sydney Rosen

To Discuss

- Heart Disease Treatments
 - Bypass surgery
 - Angioplasties
 - Stents
 - Lifestyle interventions
- Diabetes Treatments
- Cancer Screenings & Treatments

Bypass surgery

- Cost-effective only in high-risk / severe symptom patients
- Still expensive
- High risk of recurrence of cardiac events
- Does it address the cause?
- Are there cheaper ways that address the cause and prevent recurrence?



VD = vessel disease
(# indicates how many vessels)
LMD = left main disease

Angioplasties & Stents

- Similar picture, but complex
- Cost-effective in some cases, under certain conditions
- Still expensive
- High risk of recurrence of cardiac events
- Do not address the cause
- Are there cheaper ways that address the cause and prevent recurrence?

Heart Disease: Lifestyle Intervention

- Randomized controlled trial (1986-1992) using a randomized invitational design
- Objectives:
 - Determine feasibility of patients to sustain intensive lifestyle changes for a total of 5 years
 - Determine effects of these lifestyle changes (w/o lipid-lowering drugs) on coronary heart disease
- Results:

	Experimental Group	Control Group
Program ("Treatment")	Made & maintained comprehensive lifestyle changes for 5 years	Made more moderate changes
# Completed 5-year Follow-Up / # Began	20 / 28 (71%)	15 / 20 (75%)
Avg % Change in Diameter Stenosis (after 1 year)	1.75% absolute <u>decrease</u> (4.5% relative improvement)	2.3% absolute <u>increase</u> (5.4% relative <u>worsening</u>)
Avg % Change in Diameter Stenosis (after 5 year)	3.1% absolute <u>decrease</u> (7.9% relative improvement)	11.8% absolute <u>increase</u> (27.7% relative <u>worsening</u>)
Cardiac events during the 5 years	25 events (among 28 patients)	45 events (among of 20 patients)

JAMA. 1998;280(23):2001-2007. **Intensive Lifestyle Changes for Reversal of Coronary Heart Disease**
Dean Ornish, Larry W. Scherwitz, James H. Billings et al.

Diabetes

- “Costs of treatments for the primary prevention of type 2 diabetes range from <\$1,000 to approximately \$20,000 per QALY-gained”
 - Med Clin North Am. 2011 Mar; 95(2): 373–viii. The Economics of Diabetes Prevention. William H. Herman

Diabetes: Effective treatments

- Diabetes was delayed or prevented by interventions {diet, exercise and pharmacological therapy} vs control (risk ratio 0.83, 95%CI 0.80-0.86). Non-drug approaches were superior to drug-based approaches in diabetes prevention
 - Eur J Cardiovasc Prev Rehabil. 2011 Dec;18(6):813-23. Prevention of diabetes and reduction in major cardiovascular events in studies of subjects with prediabetes: meta-analysis of randomised controlled clinical trials. Hopper, Billah, Skiba, Krum
- Lifestyle changes and treatment with metformin both reduced the incidence of diabetes in persons at high risk. The lifestyle intervention was more effective than metformin. There was zero diabetes among the 49 subjects who best conformed to the goals of the prescribed lifestyle changes (mean follow-up duration: 3.2 years)
 - N Engl J Med. 2002 Feb 7;346(6):393-403. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. Knowler, Barrett-Connor, Fowler, Hamman, Lachin, Walker, Nathan

Cancer Screenings & Treatments

- Depending on the type of cancer, the method of screening, and the frequency of screening, screening + conventional treatment can be cost-effective
 - Not the case for prostate cancer
- Still very expensive
- Do these approaches address the cause?
- Are there cheaper ways that address the cause and significantly reduce risk?

Wrap-Up

- Lifestyle interventions work superiorly (when properly designed and adhered to); furthermore, they address root causes
- Standard medical procedures for leading diseases/causes of death, while sometimes “cost-effective” by common thresholds, are quite expensive and fail to address root causes
- Why are lifestyle inventions not used more often?
 - Unwilling patients (“too hard”)
 - Unwilling doctors (“too hard” to convince patients or not convinced themselves)
 - Uninformed doctors
- 1998 Ornish study showed that it is possible
- Given the high costs of standard medical treatments, there is potentially a lot of money to work with to engage with patients on lifestyle/wellness approaches

Why Cover Expensive Medical Treatments That Don't Work?

Benefits of Whole Food Plant based diet

Carl Turissini, M.D, FACC
October 17, 2017



Disclosures

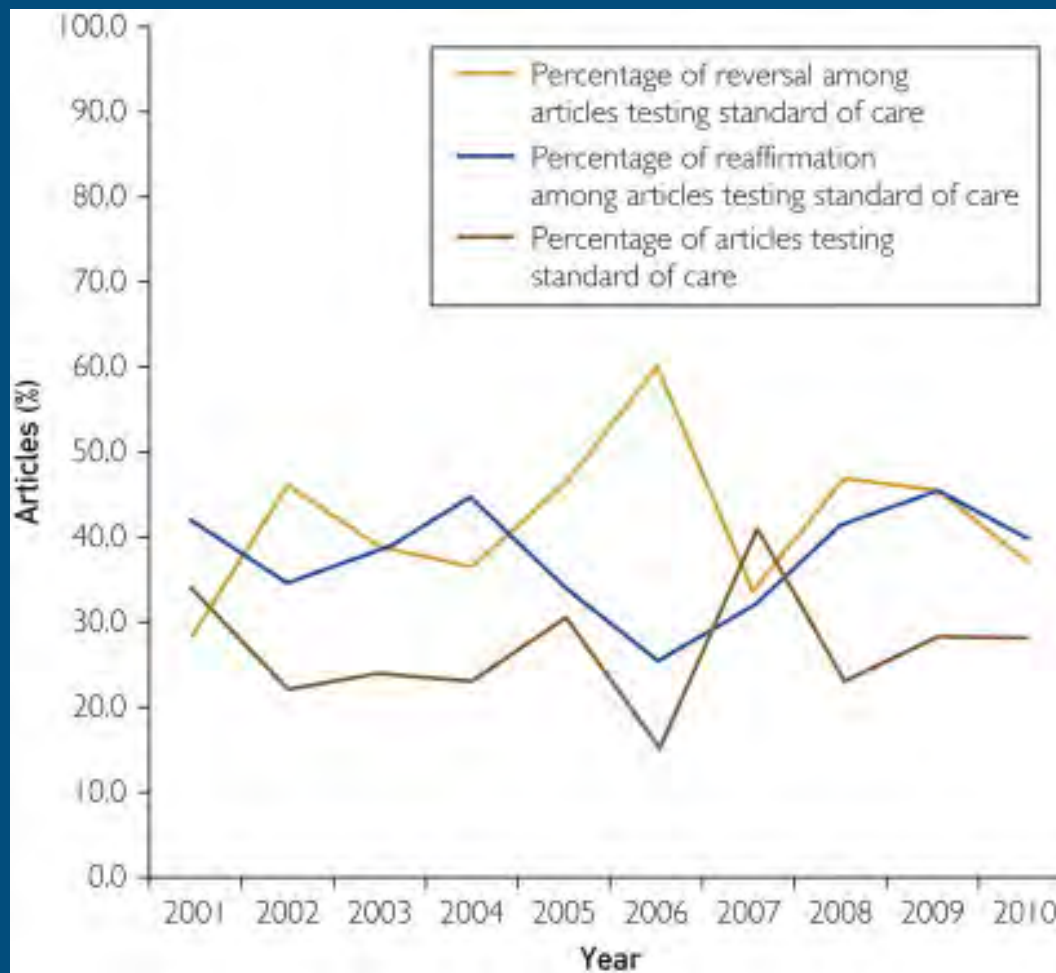
Conflicts of interest

None

Mortality and Economic Cost of Medical Intervention

Table 1: Estimated Annual Mortality and Economic Cost of Medical Intervention

Condition	Deaths	Cost	Author
Adverse Drug Reactions	106,000	\$12 billion	Lazarou ⁽¹⁾ , Suh ⁽⁴⁹⁾
Medical error	98,000	\$2 billion	IOM ⁽⁶⁾
Bedsore	115,000	\$55 billion	Xakellis ⁽⁷⁾ , Barczak ⁽⁸⁾
Infection	88,000	\$5 billion	Weinstein ⁽⁹⁾ , MMWR ⁽¹⁰⁾
Malnutrition	108,800	-----	Nurses Coalition ⁽¹¹⁾
Outpatients	199,000	\$77 billion	Starfield ⁽¹²⁾ , Weingart ⁽¹¹²⁾
Unnecessary Procedures	37,136	\$122 billion	HCUP ^(3,13)
Surgery-Related	32,000	\$9 billion	AHRQ ⁽⁸⁵⁾
Total	783,936	\$282 billion	

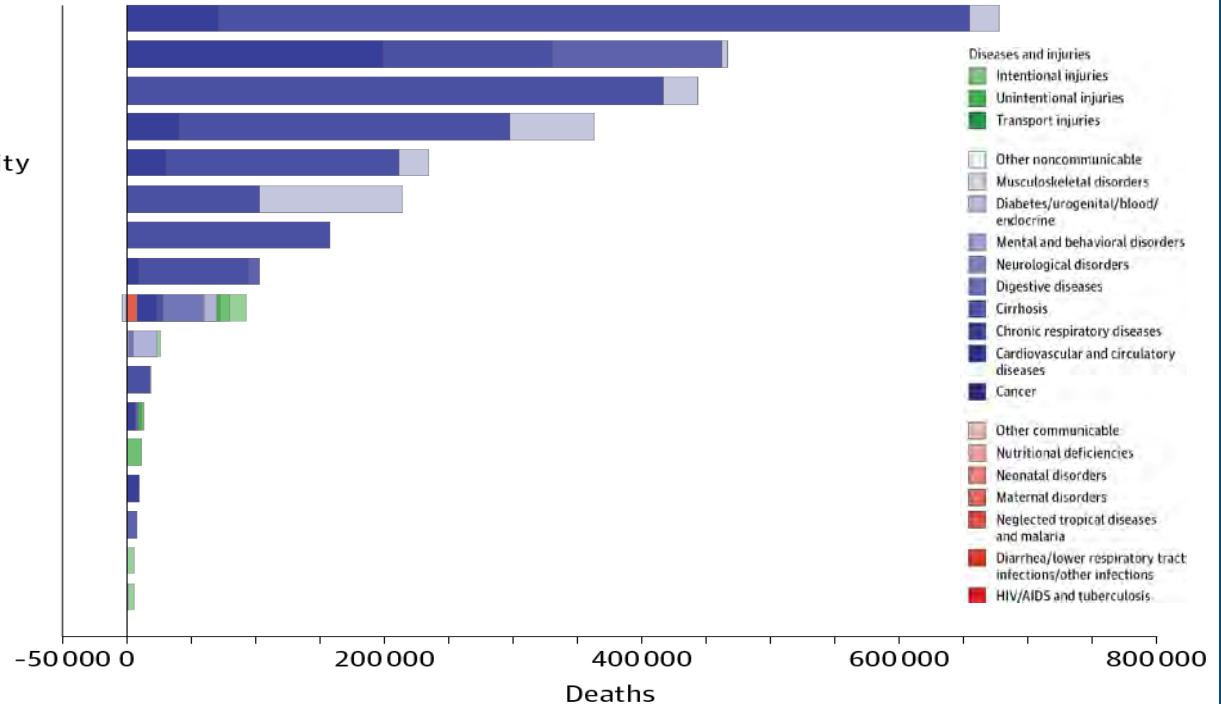


Death associated with 17 risk factors

A Risk factors and related deaths

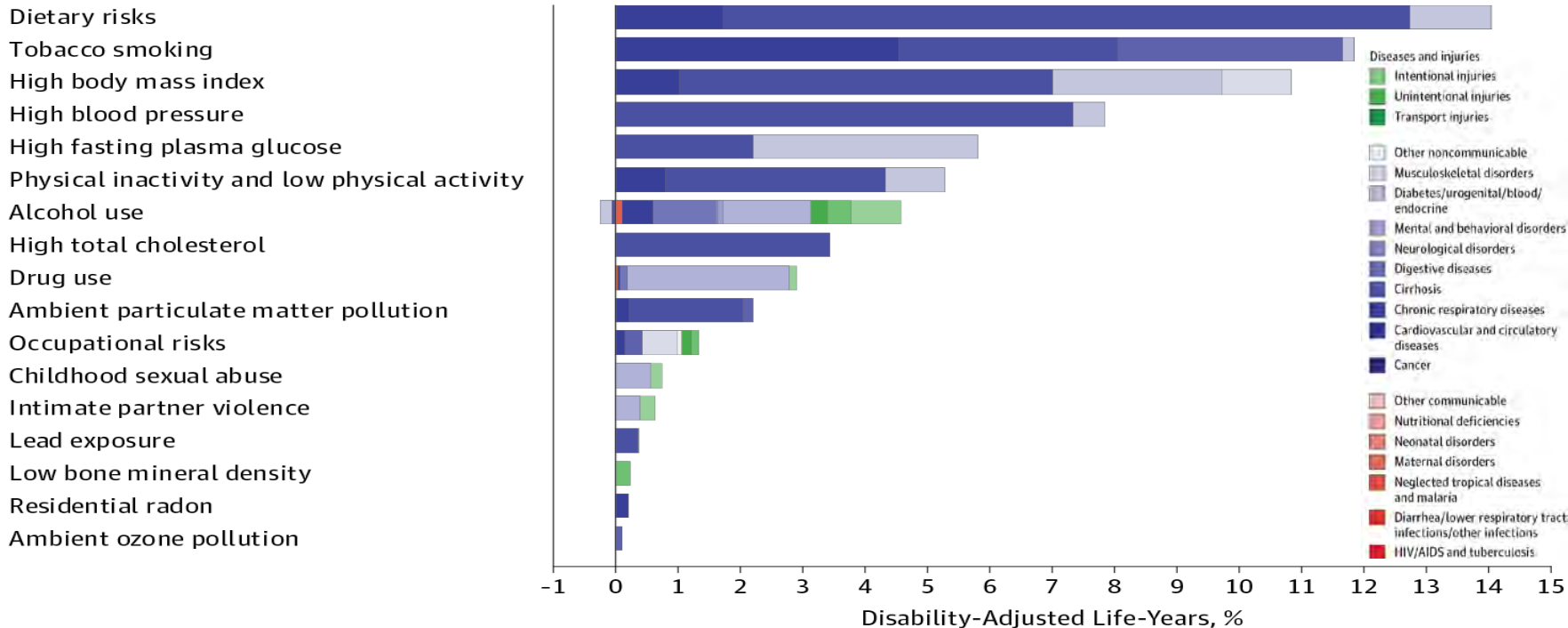
Risk Factors

Dietary risks
Tobacco smoking
High blood pressure
High body mass index
Physical inactivity and low physical activity
High fasting plasma glucose
High total cholesterol
Ambient particulate matter pollution
Alcohol use
Drug use
Lead exposure
Occupational risks
Low bone mineral density
Residential radon
Ambient ozone pollution
Intimate partner violence
Childhood sexual abuse

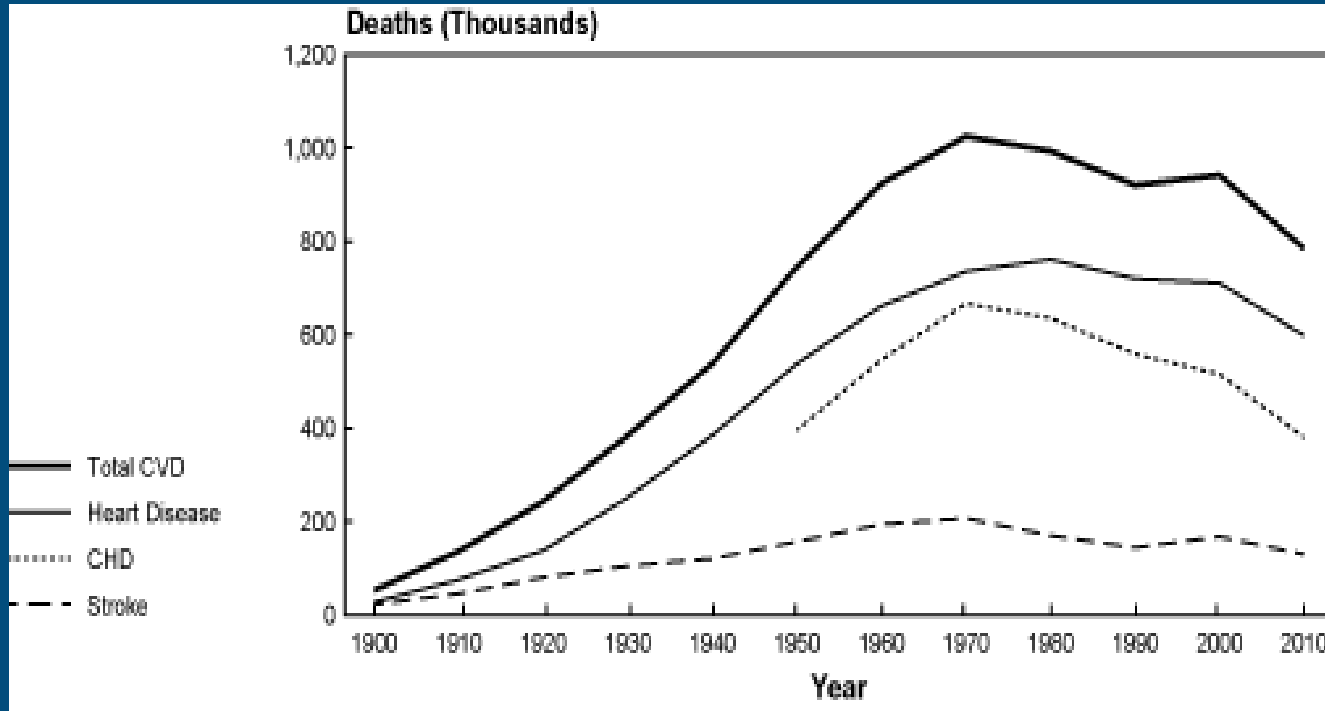


Disability percentage associated with 17 risk factors

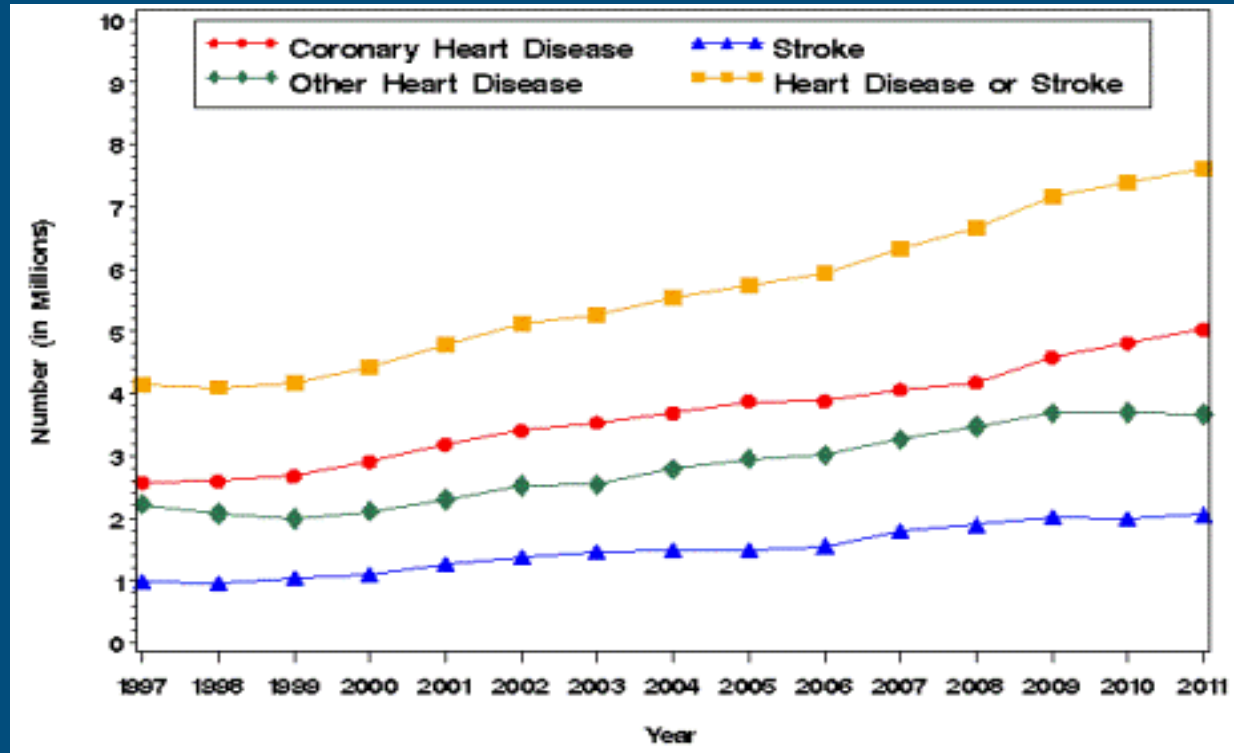
B Risk factors as a percentage of disability-adjusted life-years



Death from Heart disease and Stroke

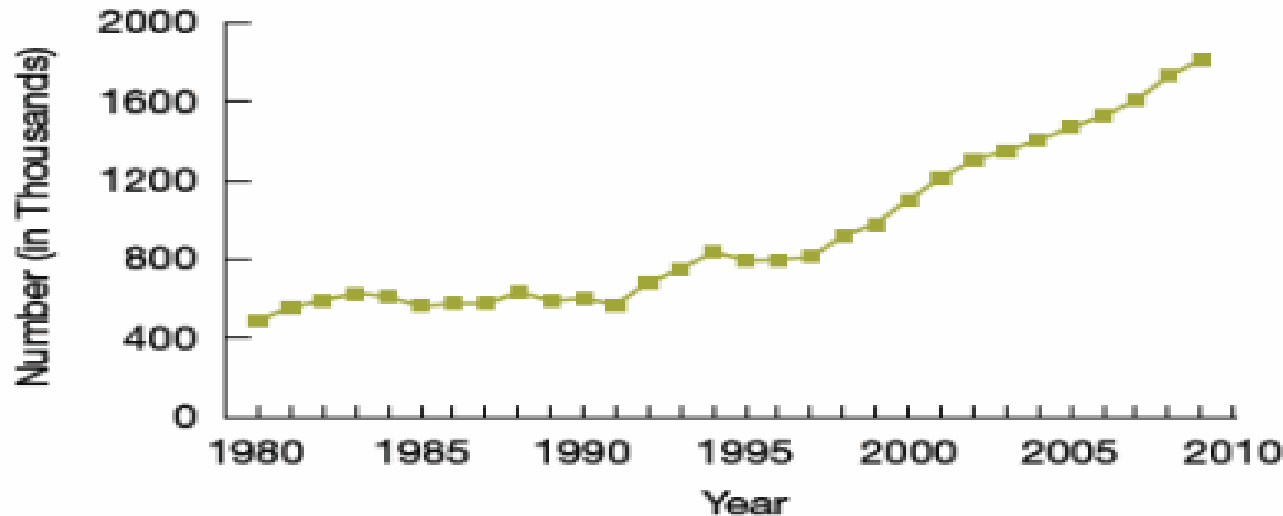


Heart disease and Stroke Incidence



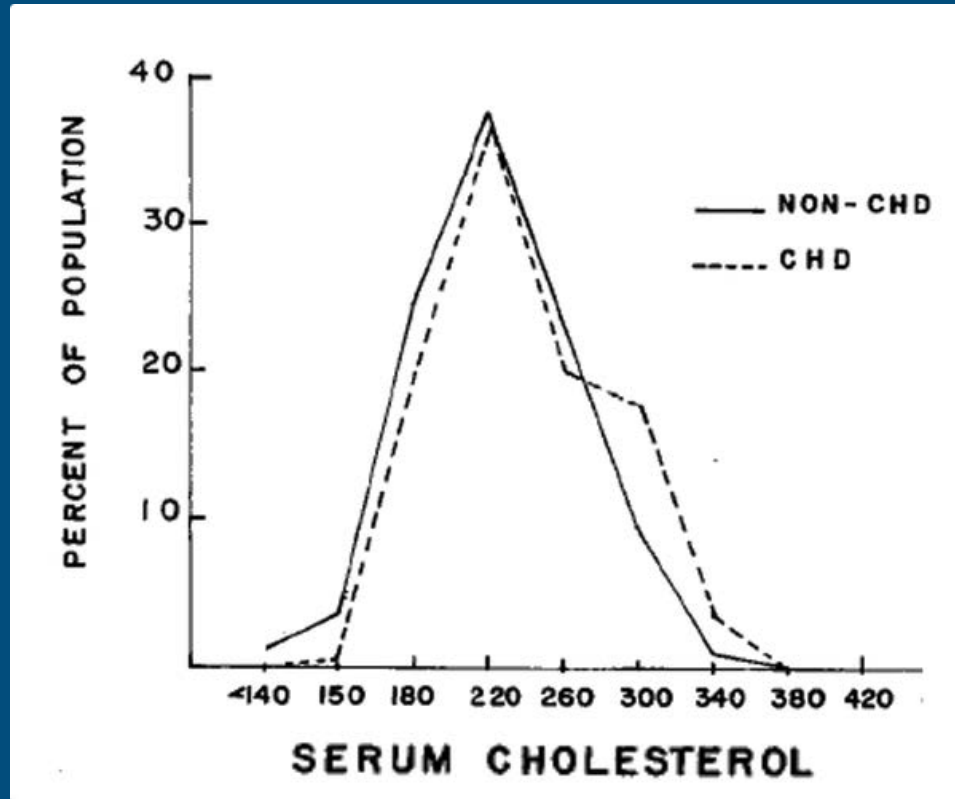
Diabetes incidence

New Cases of Diagnosed Diabetes Among U.S. Adults Aged 18–79 Years, 1980–2009



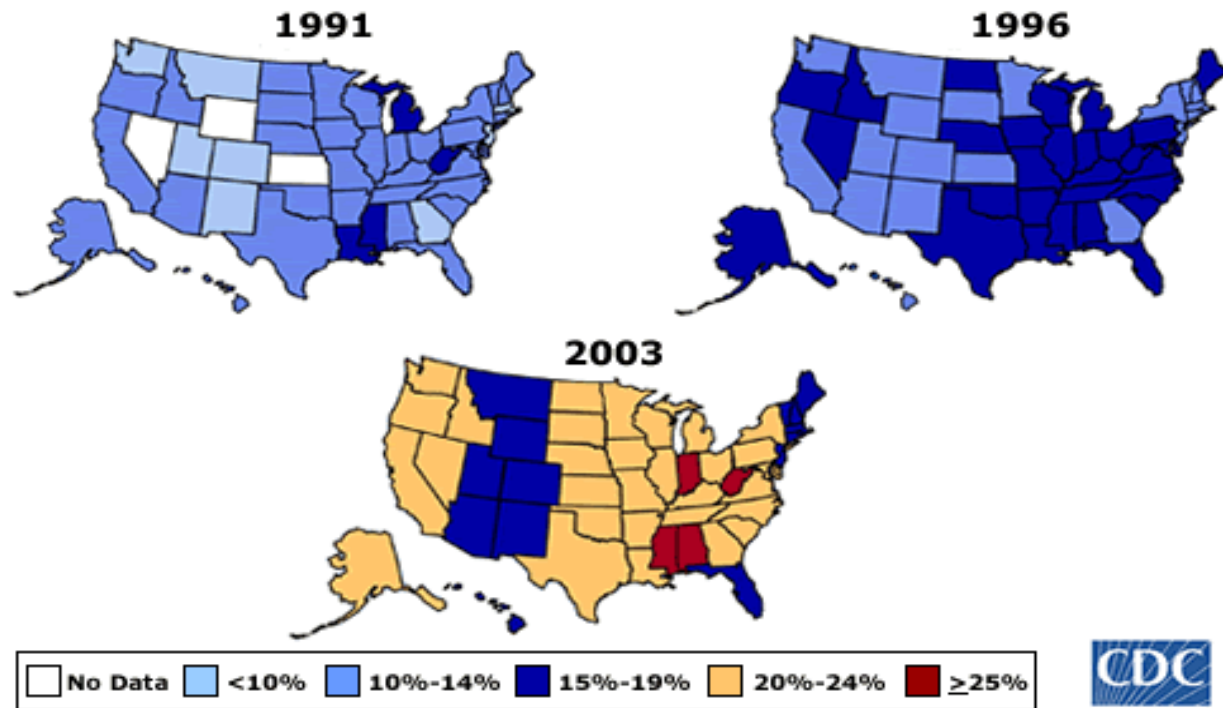
Source: <http://www.cdc.gov/diabetes/statistics/incidence/fig1.htm>.

When low risk is actually high risk

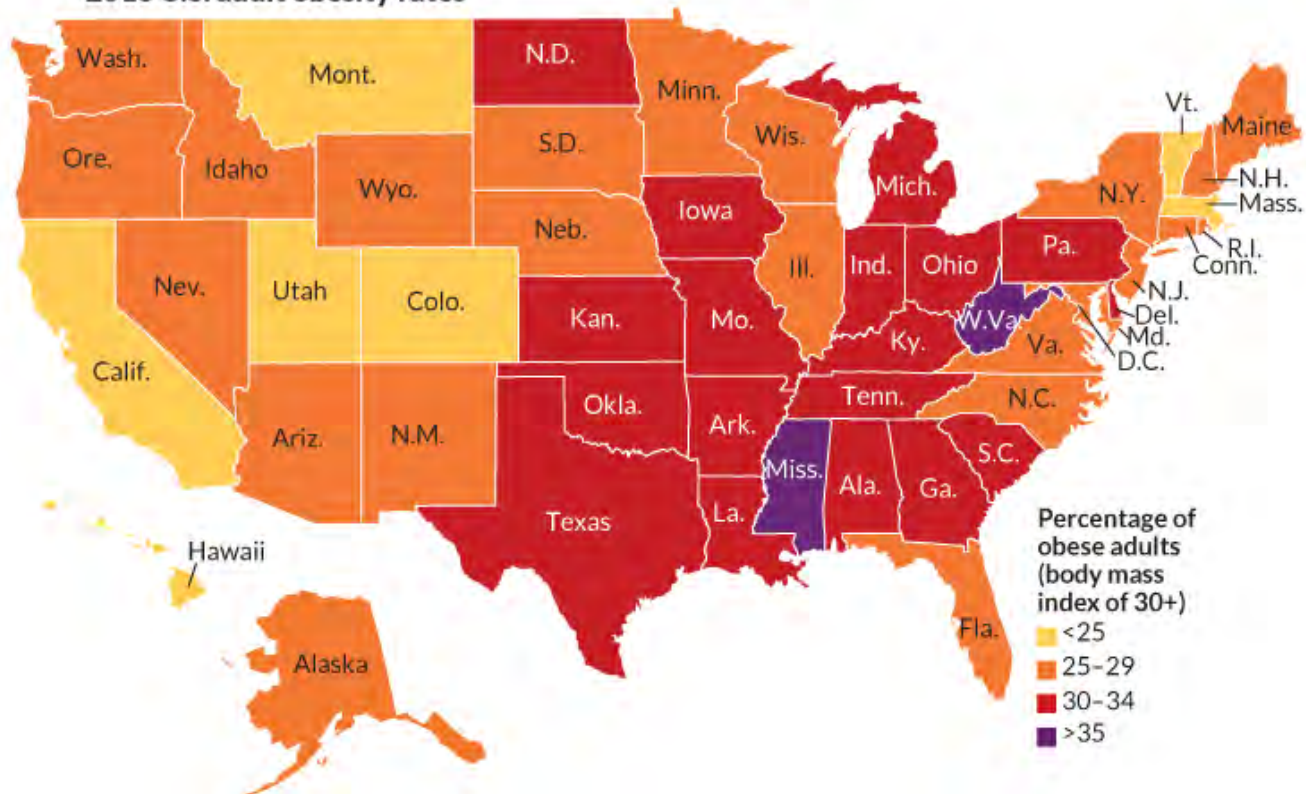


Obesity Trends* Among US Adults CDC's Behavioral Risk Factor Surveillance System 1991-2003

(*BMI $\geq$ 30, or ~ 30 lbs overweight for 5'4" women)



2013 U.S. adult obesity rates



Obesity 2013-2014

- Obesity
 - 37.9 % adults
- Overweight
 - 70.7 % adults



Chauncy Morlan (1869-1906)



Chauncy Morlan (1869-1906)

Toured Europe and America
with Barnum and Bailey Circus

The Additional Costs and Health Effects of a Patient Having Overweight or Obesity: A Computational Model

Saeideh Fallah-Fini^{1,2}, Atif Adam¹, Lawrence J. Cheskin¹, Sarah M. Bartsch¹, and Bruce Y. Lee¹ 

Objective: This paper estimates specific additional disease outcomes and costs that could be prevented by helping a patient go from an obesity or overweight category to a normal weight category at different ages. This information could help physicians, other health care workers, patients, and third-party payers determine how to prioritize weight reduction.

Methods: A computational Markov model was developed that represented the BMI status, chronic health states, health outcomes, and associated costs (from various perspectives) for an adult at different age points throughout his or her lifetime.

Results: Incremental costs were calculated for adult patients with obesity or overweight (vs. normal weight) at different starting ages. For example, for a metabolically healthy 20-year-old, having obesity (vs. normal weight) added lifetime third-party payer costs averaging \$14,059 (95% range: \$13,956-\$14,163), productivity losses of \$14,141 (\$13,969-\$14,312), and total societal costs of \$28,020 (\$27,751-\$28,289); having overweight vs. normal weight added \$5,055 (\$4,967-\$5,144), \$5,358 (\$5,199-\$5,518), and \$10,365 (\$10,140-\$10,590). For a metabolically healthy 50-year-old, having obesity added \$15,925 (\$15,831-\$16,020), \$20,120 (\$19,887-\$20,352), and \$36,278 (\$35,977-\$36,579); having overweight added \$5,866 (\$5,779-\$5,953), \$10,205 (\$9,980-\$10,429), and \$16,169 (\$15,899-\$16,438).

Conclusions: Incremental lifetime costs of a patient with obesity or overweight (vs. normal weight) increased with the patient's age, peaked at age 50, and decreased with older ages. However, weight reduction even in older adults still yielded incremental cost savings.

Obesity (2017) **25**, 1809-1815. doi:10.1002/oby.21965

TABLE 3 Incremental average direct medical costs, productivity losses, and total societal costs incurred per year for obesity or overweight vs. normal weight, as well as obesity vs. overweight for different initial ages

Starting age of patient	Obesity vs. normal weight	Obesity vs. overweight	Overweight vs. normal weight
Third-party payer costs			
20	\$311 (\$309-\$314) ^a	\$198 (\$195-\$200)	\$114 (\$112-\$116)
30	\$393 (\$390-\$396)	\$238 (\$235-\$240)	\$155 (\$153-\$158)
40	\$589 (\$585-\$593)	\$337 (\$333-\$341)	\$252 (\$248-\$256)
50	\$906 (\$899-\$912)	\$462 (\$455-\$469)	\$444 (\$438-\$450)
60	\$1,106 (\$1,098-\$1,114)	\$438 (\$428-\$449)	\$668 (\$659-\$677)
70	\$1,304 (\$1,292-\$1,315)	\$344 (\$328-\$359)	\$960 (\$946-\$974)
80	\$1,386 (\$1,371-\$1,400)	\$269 (\$247-\$291)	\$1,117 (\$1,097-\$1,137)
Productivity losses			
20	\$322 (\$319-\$326)	\$197 (\$193-\$201)	\$125 (\$122-\$128)
30	\$423 (\$418-\$428)	\$226 (\$221-\$231)	\$197 (\$192-\$201)
40	\$698 (\$691-\$706)	\$310 (\$302-\$318)	\$388 (\$381-\$396)
50	\$1,267 (\$1,255-\$1,279)	\$419 (\$406-\$433)	\$847 (\$834-\$860)
60	\$1,924 (\$1,906-\$1,942)	\$406 (\$383-\$428)	\$1,518 (\$1,497-\$1,540)
70	\$2,487 (\$2,461-\$2,513)	\$248 (\$213-\$283)	\$2,239 (\$2,206-\$2,272)
80	\$2,049 (\$2,021-\$2,077)	\$0 ^b	\$2,089 (\$2,048-\$2,129)
Societal costs			
20	\$630 (\$624-\$636)	\$391 (\$385-\$397)	\$239 (\$234-\$244)
30	\$804 (\$797-\$811)	\$459 (\$452-\$467)	\$345 (\$339-\$352)
40	\$1,293 (\$1,282-\$1,303)	\$650 (\$638-\$661)	\$643 (\$632-\$654)
50	\$2,176 (\$2,159-\$2,193)	\$885 (\$866-\$904)	\$1,291 (\$1,274-\$1,309)
60	\$3,030 (\$3,005-\$3,055)	\$836 (\$804-\$867)	\$2,194 (\$2,165-\$2,224)
70	\$3,806 (\$3,772-\$3,841)	\$596 (\$548-\$644)	\$3,210 (\$3,164-\$3,257)
80	\$3,443 (\$3,404-\$3,481)	\$235 (\$175-\$295)	\$3,207 (\$3,152-\$3,263)

^aAverage (95% uncertainty interval).^bThe 95% uncertainty interval contained zero and is thus not statistically significant.

Disconnect

- Survey 1,234 American adults
- 90% say their diet is healthy
 - 52% somewhat healthy
 - 32% very healthy
 - 5% extremely healthy

Disconnect

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 - 0.5% actually met criteria for healthy diet

Disconnect

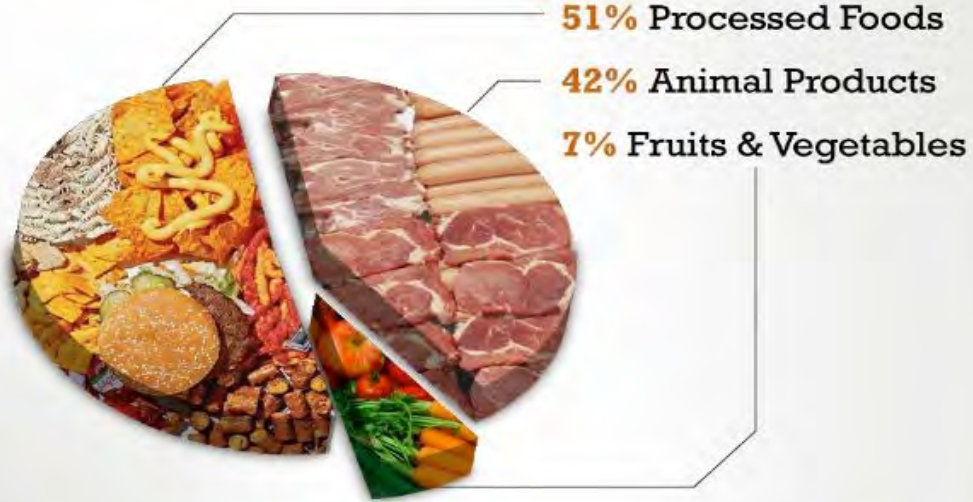
- Survey 1,234 American adults
- 90% say their diet is healthy
 - 52% somewhat healthy
 - 32% very healthy
 - 5% extremely healthy
 - 0.5% actually met criteria for healthy diet
 - Only 37% described themselves as overweight

Influence of “Modern Agriculture”

Year	Sugar (yearly per capita)	Animal (yearly per capita)
1830	15 pounds	Rare
1910	40 pounds	100 pounds
2007	160 pounds	220 pounds

The Standard American Diet

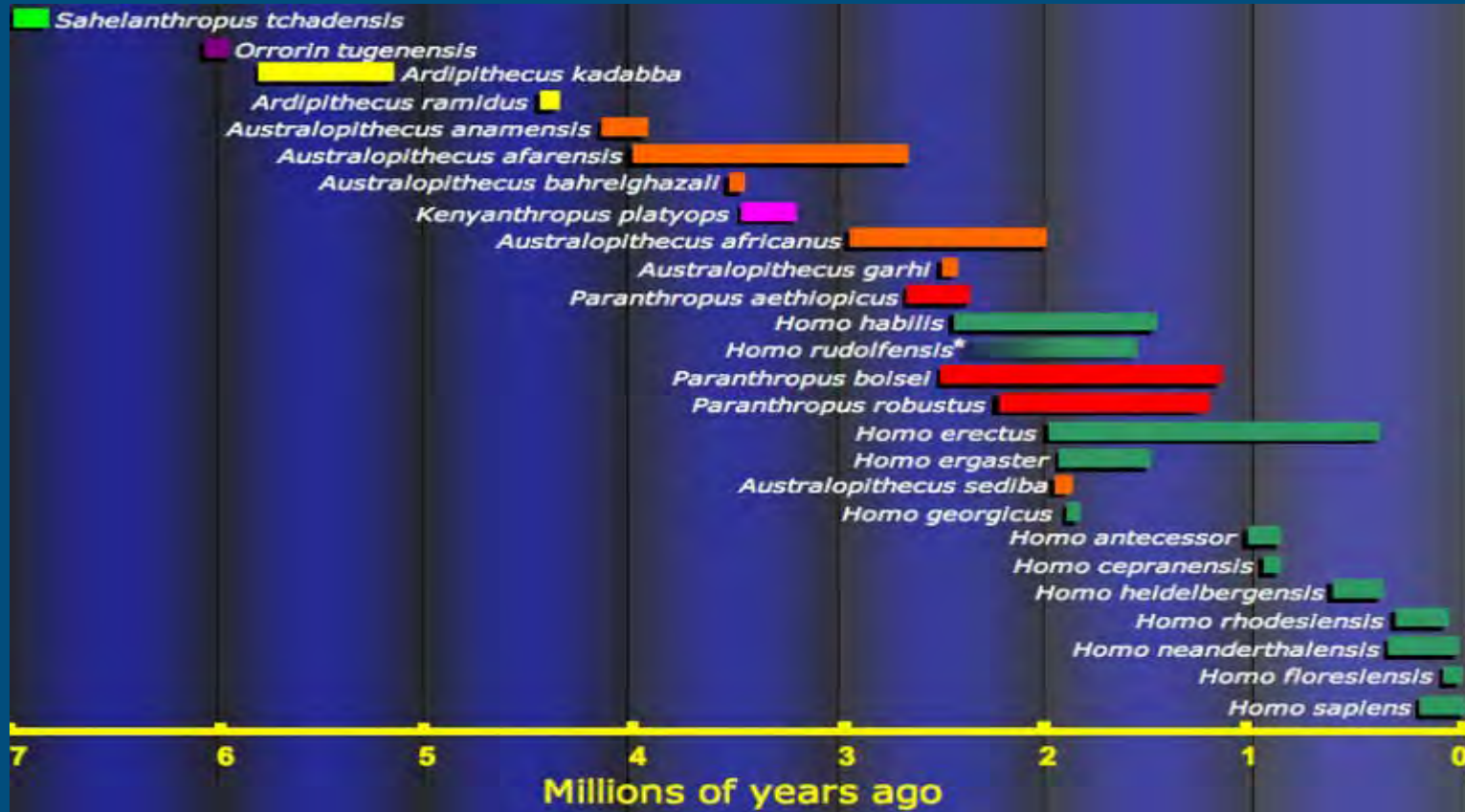
The S.A.D. diet



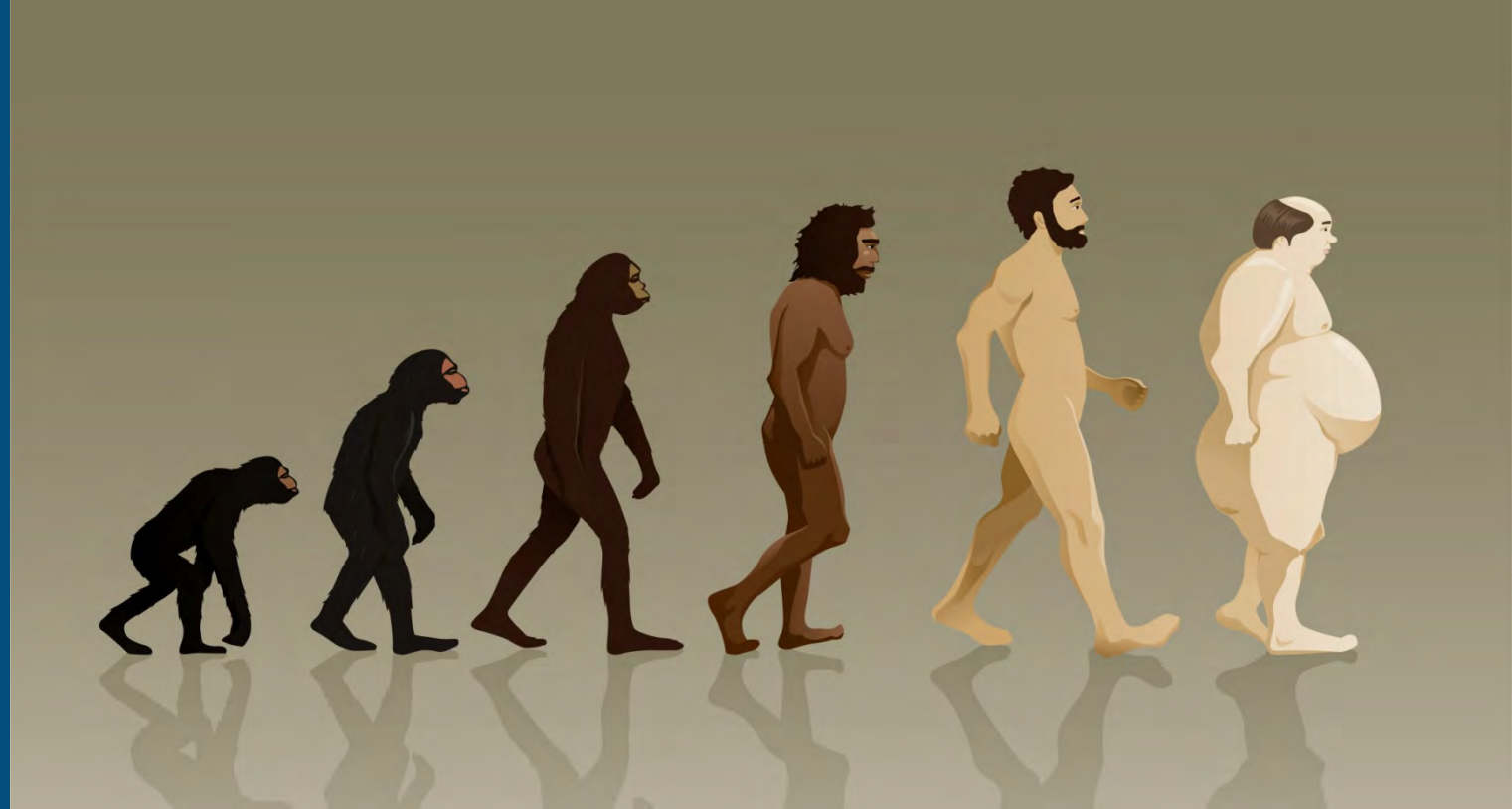
Chimpanzee--our closest relative

- Diversity
 - 102 species of plants
- Fruit
 - Figs
 - Clumps—one or two fruits on any day
- Meat
 - 9 days per year
 - <3% of total calories
- Termites and ants
 - Chitin exoskeleton

Evolution



Modern Evolution



Coronary disease among soldiers killed in Korean war

- 300 autopsies
 - First 100 cases age was not recorded
 - Oldest patient was 33
- 200 autopsies with age recorded
 - Average age 22.1 years
- 77.3% had gross evidence of coronary disease
- 15.3% had > 50% stenosis

Early Atherosclerosis is Present in Virtually All Americans

Strong JP et al. Prevalence and extent of Atherosclerosis in adolescents and young adults: Implications for prevention from the Pathobiological Determinants of Atherosclerosis in Youth Study, JAMA 1999 Feb 24; 281:727-35

- 2876 subjects
- >50% ages 15-19 had fatty streaks

Bogalusa Study

- Longitudinal study children in Louisiana
- 100% of 10 year olds had coronary fatty streaks
- LDL cholesterol –number 1 risk factor

If diet is so obvious...



REITERATION

Sick individuals and sick populations

Geoffrey Rose

Rose G (Department of Epidemiology, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT, UK). Sick individuals and sick populations. *International Journal of Epidemiology* 1985;14:32-38.

Aetiology confronts two distinct issues: the determinants of individual cases, and the determinants of incidence rate. If exposure to a necessary agent is homogeneous within a population, then case/control and cohort methods will fail to detect it: they will only identify markers of susceptibility. The corresponding strategies in control are the 'high-risk' approach, which seeks to protect susceptible individuals, and the population approach, which seeks to control the causes of incidence. The two approaches are not usually in competition, but the prior concern should always be to discover and control the causes of incidence.

The Determinants of Individual Cases

To confine attention in this way to within-population comparisons has caused much confusion, particularly in the clinical

Adventist Study

Compared with regular meat eaters

Diet (n=31766)	Heart Disease	Stroke
Vegans (n=753)	-26%	-30%
Lacto-ovo vegetarians (n=23,265)	-34%	-13%
Fish eaters (n= 23750)	-34%	+4%
Occasional meat (<1/week) (n=8135)	-20%	-3%

Adventist 2 (2002-2009)

	All Cause	Ischemic heart	Cardiovasc disease	Cancer	Other
All (73,308) deaths	2560	372	987	706	867
Vegetarian	0.88	0.81	0.87	0.92	0.85
Nonvegetarian	1	1	1	1	1
Men Vegetarian	0.82	0.71	0.71	1.02	0.83
Men Nonvegetarian	1	1	1	1	1
Women Vegetarian	0.93	0.88	0.99	0.87	0.88
Women Nonvegetarian	1	1	1	1	1

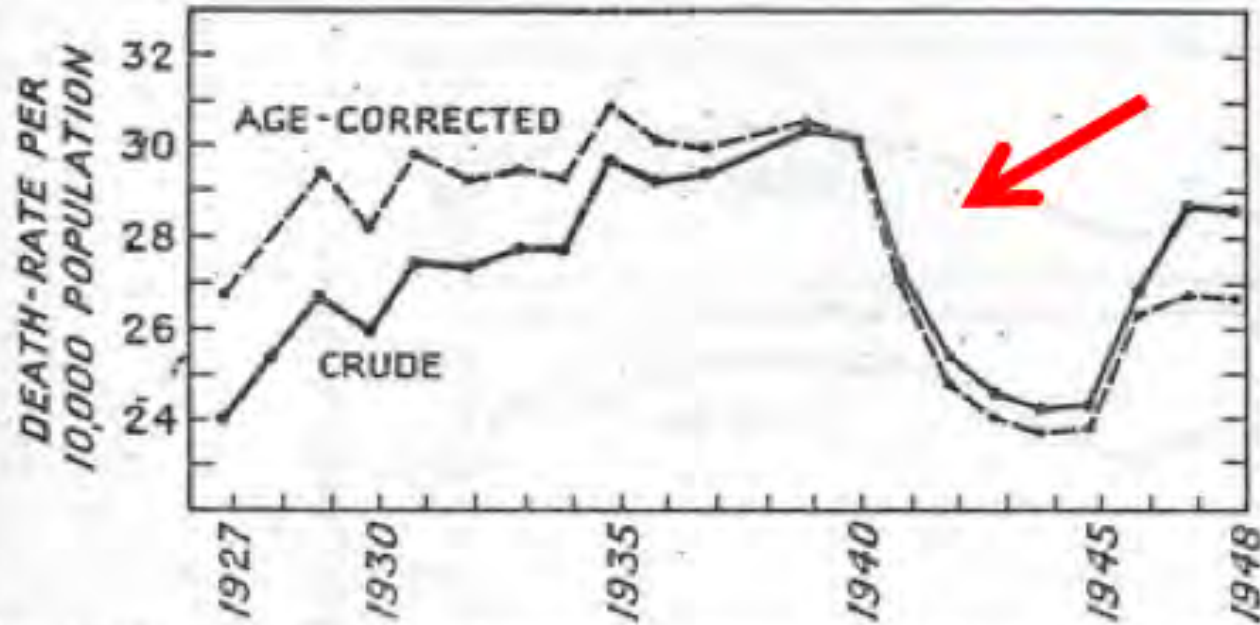


Fig. 1—Mortality from circulatory diseases in Norway in 1927-48. Standard population = population of Norway in 1940.

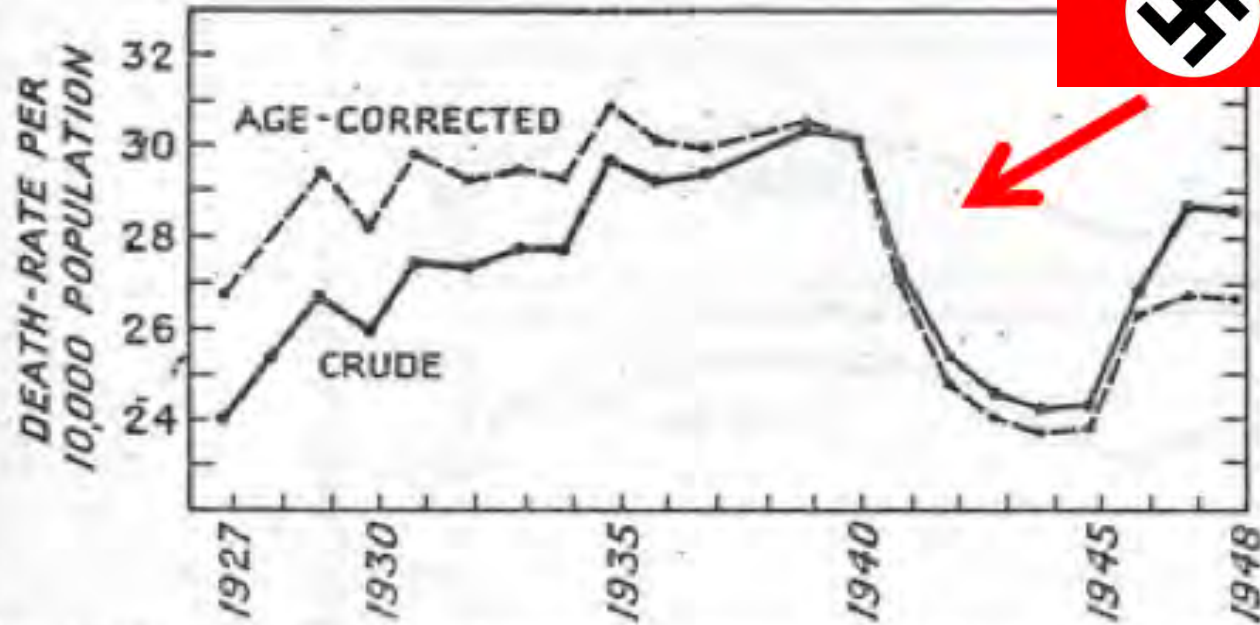


Fig. 1—Mortality from circulatory diseases in Norway in 1927-48. Standard population = population of Norway in 1940.

Dean Ornish

- Near vegan diet
 - Very low fat diet
 - Stress management (meditation)
 - Exercise
 - Group therapy
- Results
 - 82% regression of heart disease
 - 91% decrease in angina
 - 50% reduction in cardiac events/4 years

Caldwell B. Esselstyn, Jr., M.D.

- 12 year longitudinal study
- 44 patients all with coronary disease
 - Majority on statins and aspirin
 - 20--standard diet
 - 24--Low fat, Plant based (6 dropped out)
- 8 years prior to study
 - 18 patients: 49 cardiac events
- 12 years follow up
 - Standard diet—45 events
 - Low fat, Plant based

Caldwell B. Esselstyn, Jr., M.D.

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- 8 years prior to study
 - 18 patients: 49 cardiac events
- 12 years follow up
 - Standard diet—45 events
 - Low fat, Plant based—0 events

TABLE I -- Lipid Profiles of 18 Patients Following a Very Low Fat Diet

Patient	At Five Years				At 12 Years			
	Total Cholesterol (mg/dl)	LDL (mg/dl)	HDL (mg/dl)	Triglycerides (mg/dl)	Total Cholesterol (mg/dl)	LDL (mg/dl)	HDL (mg/dl)	Triglycerides (mg/dl)
1	137	91	28	108	138	85	30	128
2	136	82	33	167	138	73	33	175
3	130	72	37	127	145	78	37	143
4	124	58	33	206	Deceased	-	-	-
5	110	65	29	97	112	64	30	96
6	142	75	52	78	148	80	41	109
7	140	77	43	117	154	86	40	155
8	150	63	32	362	161	77	30	351
9	146	90	40	91	160	89	41	93
10	130	76	41	72	145	90	44	99
11	112	48	31	188	114	48	33	180
12	137	92	26	113	140	90	27	133
13	168	85	64	78	162	84	68	65
14	170	98	38	254	159	87	45	183
15	124	72	32	104	139	85	35	119
16	129	62	26	226	145	70	27	246
17	137	81	39	68	161	100	48	60
18	143	88	35	113	151	102	29	103
Mean	137	76	39	143	145	82	38	143

Reversal of Coronary Disease Achieved with Plant-Based Diet

1996



1999



Coronary angiograms of the distal left anterior descending artery before (left bracket) and after (right bracket) 32 months of a plant-based diet without cholesterol-lowering medication, showing profound improvement. Used with permission from Dr. Caldwell B. Esselstyn, Jr. (Source: *Prevent and Reverse Heart Disease* by Dr. Esselstyn.)

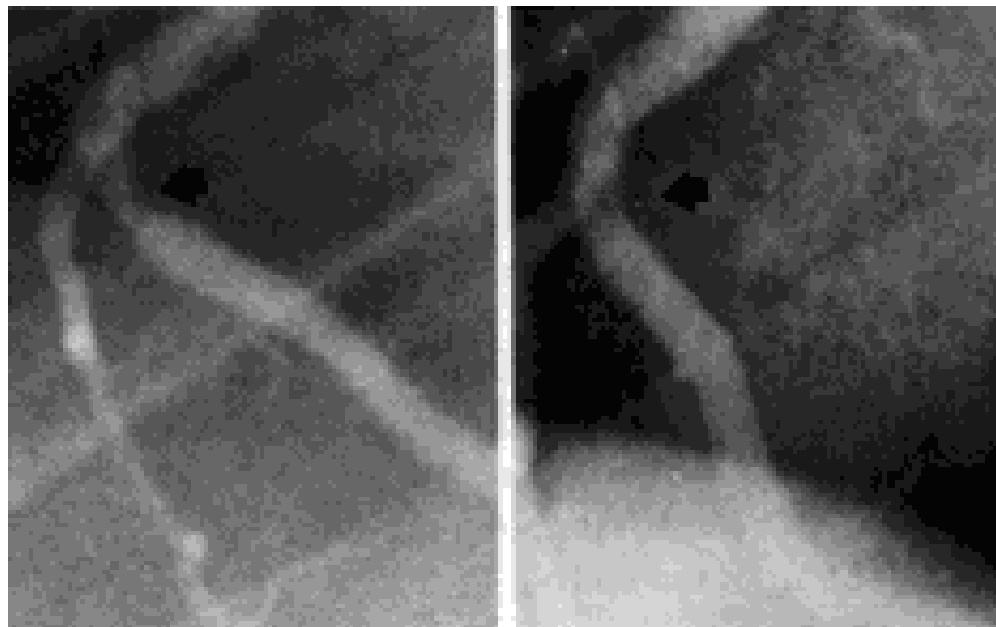
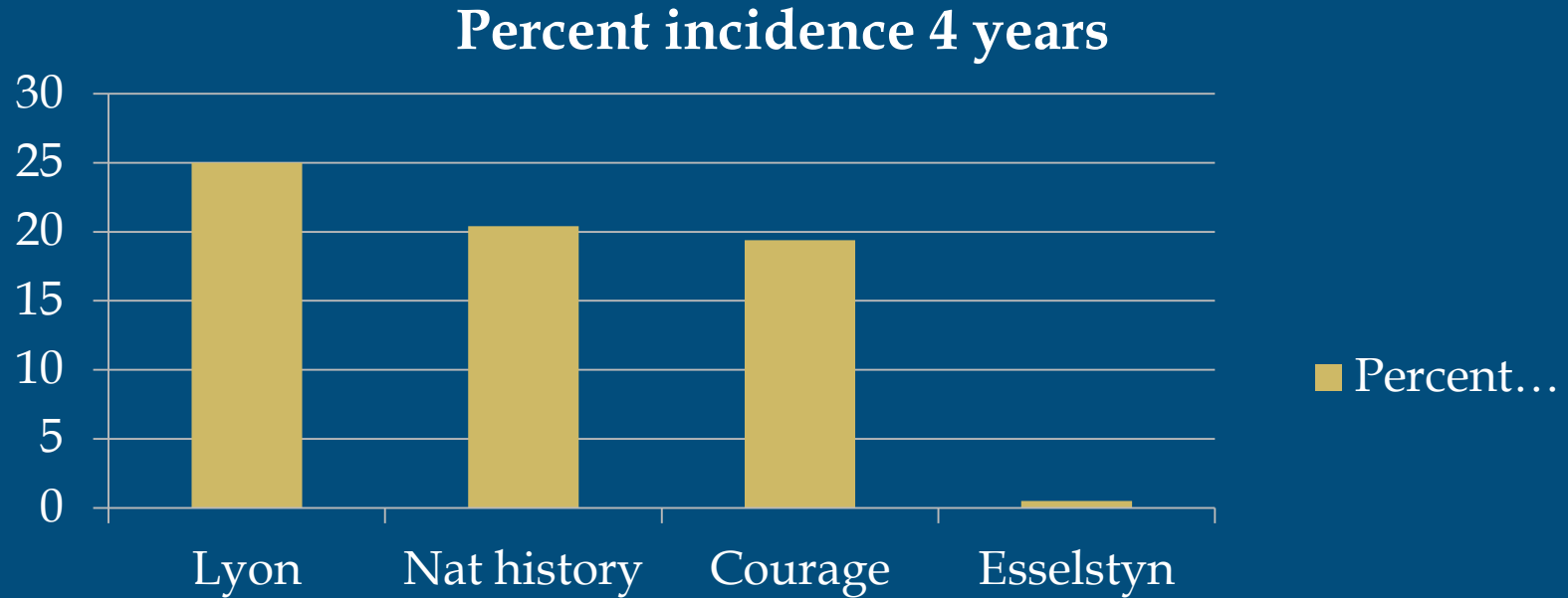


Figure. Angiographic images of the distal right coronary artery in a 54-year-old male patient at baseline in 1987 (left) and in 1992 after 5 years on a very low-fat diet (right). The lesion regressed by more than 30% (1.21 mm).

Non randomized experience

- 226 patients
 - Coronary disease—196 (17 non compliant)
 - Primary prevention—30 (5 non compliant)
- Follow up 3.75 years
 - 17 non compliant—13 cardiac events
 - 179 compliant —1 event (stroke)
 - 97% had improvement or resolution of angina
 - 76% lost weight (average 18.6 lbs)

Recurrent Major Cardiac events



Nitric Oxide

- “Molecule of the Year”
- Nobel prize
- Vasodilatation (nitroglycerin)
- Inhibits:
 - smooth muscle contraction and growth
 - Platelet aggregation
 - Leukocyte adhesion
- Impaired:
 - Atherosclerosis, Diabetes, Hypertension
 - Animal protein and fat

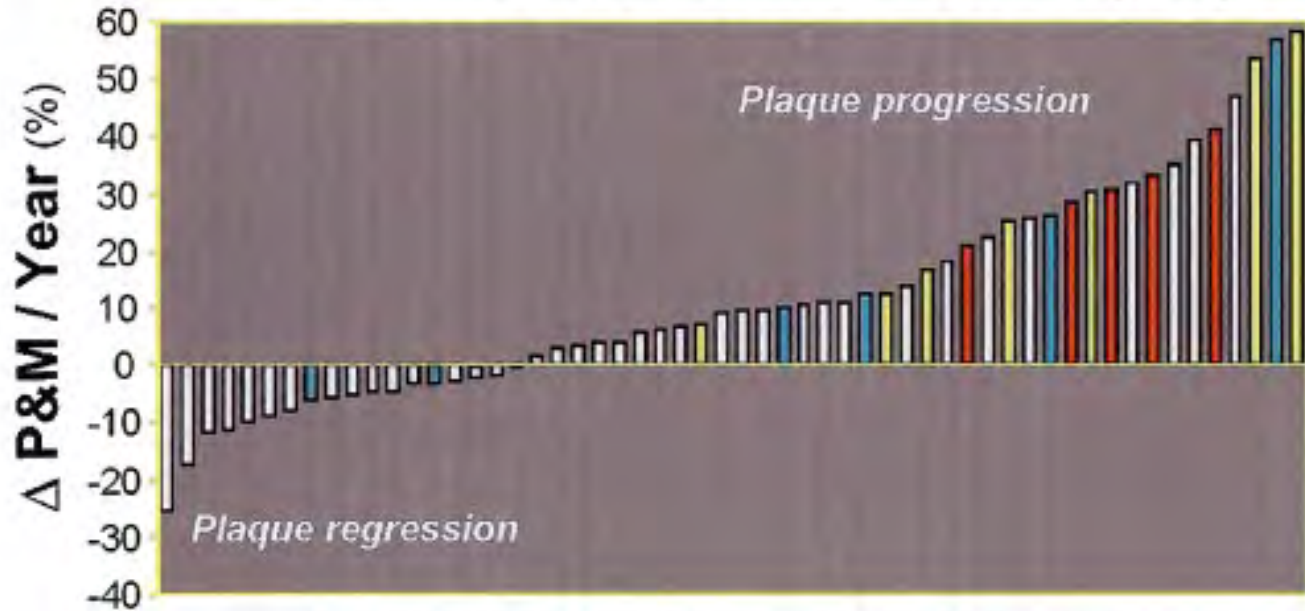
Brachial artery tourniquet test

- Indirect measure of Nitric oxide
- Impaired by single fatty meal
 - Stayed impaired for > 12 hours

Gut bacteria

- L-Carnitine
 - Non essential amino acid
 - Found in all meats & eggs
 - Red meat more than chicken & fish
 - Converted to TMA by gut bacteria
 - Converted to TMAO by liver
- TMAO
 - Marker of atherosclerosis in humans
 - Induces atherosclerosis in animals
 - Vegans and Vegetarians make **no** TMAO when fed L-Carnitine

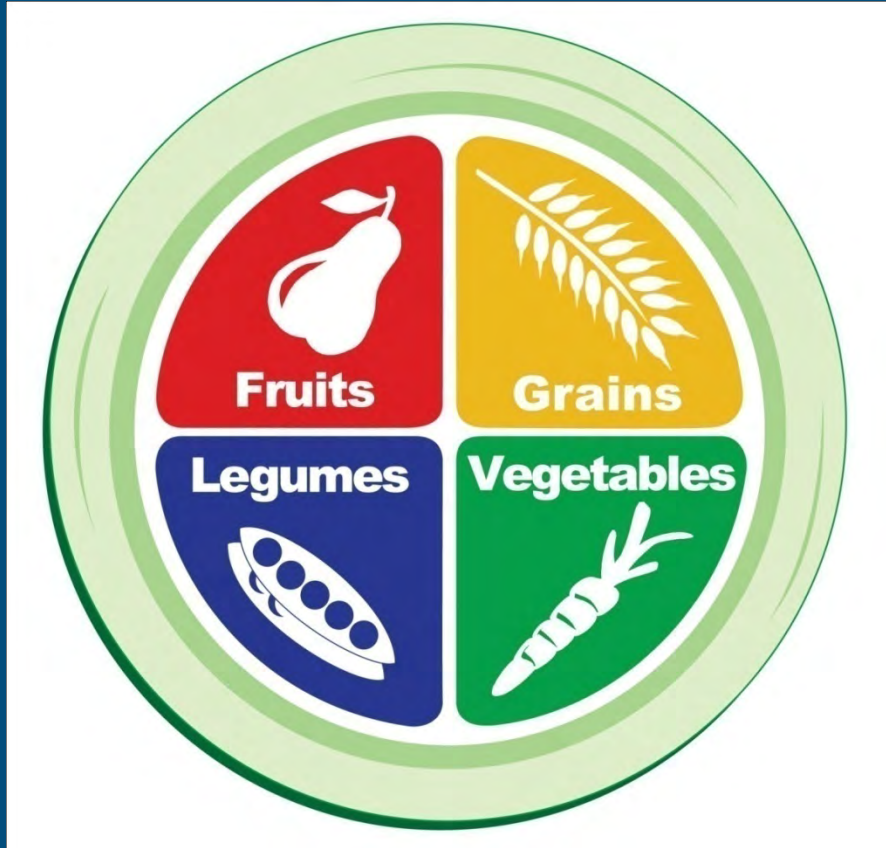
CV Events of Individual Patients (n=56)



Δ Plaque&Media versus Cardiovascular Events



Plant based basics



Whole food Plant based diet basics

- No Animal products (beef, chicken, fish, eggs)
- No dairy (milk, cheese, yogurt, butter)
- Whole food (minimally processed)
- Complex carbohydrates
 - Avoid sugar
 - Whole grains
- Vegetables
- Legumes
 - RDA Protein 0.8 mg/kg/day
 - No need to calculate
- Fruits
 - Several servings/day
- Fats
 - 10-15% of total calories

Plant based benefits

- Prevent, arrest & reverse heart disease
 - Leading cause of death
 - 80% diet related
- Reverse Type 2 Diabetes
 - 24 million Americans
 - Glucose intolerance—80 million Americans (40% high school)
- Cancer prevention
 - Second leading cause of death
 - 80% diet related
- Improve hypertension

Plant based benefits

- Weight reduction
- Decreased cholesterol
- Erectile dysfunction
- Reduced inflammation
- Reduce osteoporosis
- Cure constipation
- Gastrointestinal reflux
- Diverticular disease
- Kidney disease
- Improved performance
- Environmentally friendly

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.

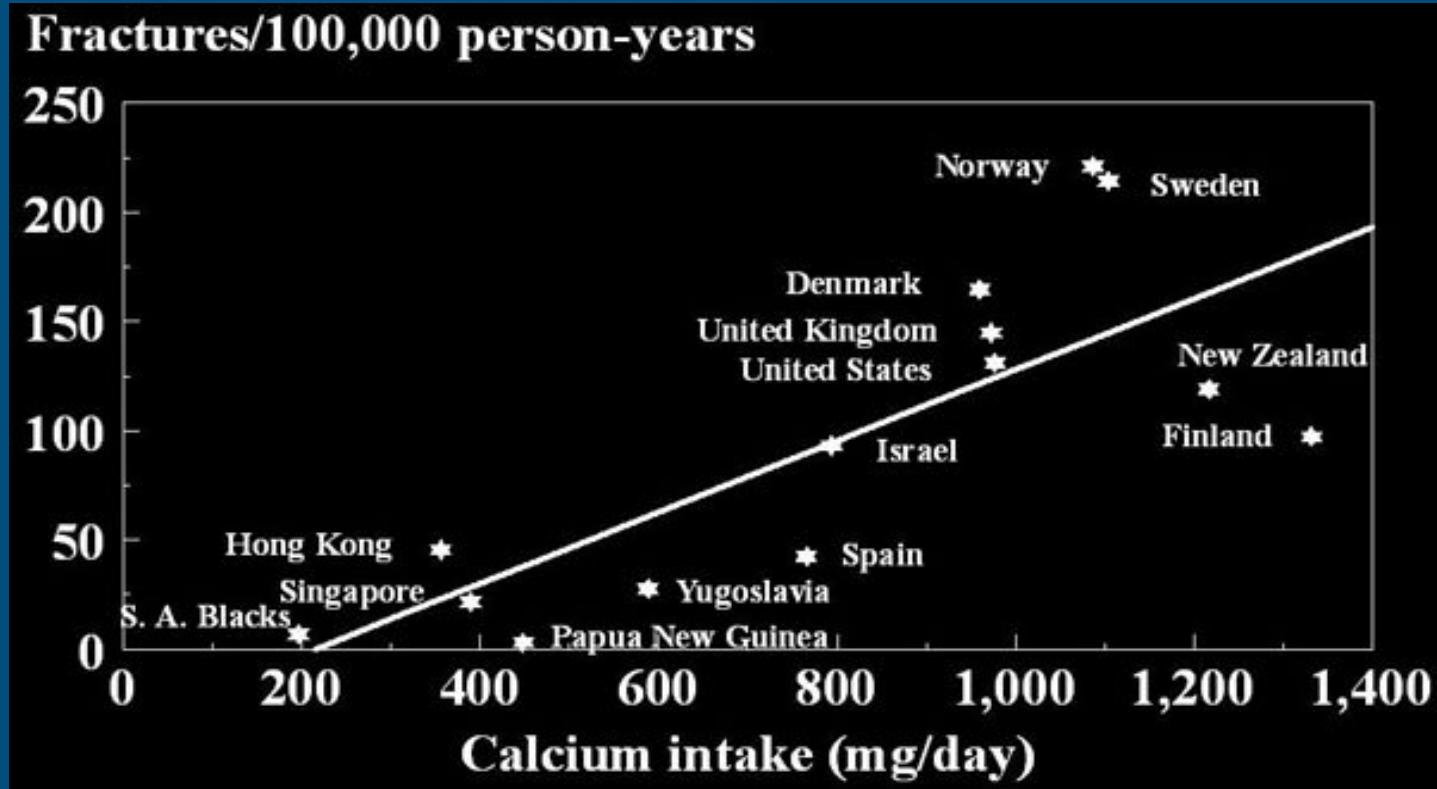
Or we could put you on a vegan diet.

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

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

VeganStreet.com

Myths--calcium

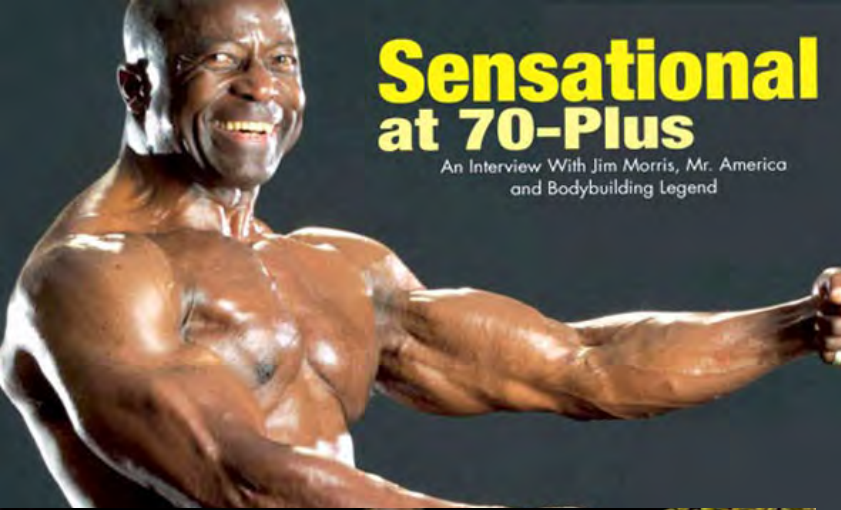


Myths--Milk

- D galactose—causes osteoporosis
- Milk in teen years –9% incidence of hip fractures later in life for each glass/day
- Women increased heart disease, cancer, & death with each glass/day
 - 3 glasses/day doubles mortality over 1 glass/day
- Men increased mortality and 141% increase in prostate cancer with 3 glasses/day

Protein: Horses --100% Plant Based





Sensational at 70-Plus

An Interview With Jim Morris, Mr. America and Bodybuilding Legend



VEGAN CHAMPION



Protein?



No meat.
No Problem.

Ed Bauer
Vegan Bodybuilder

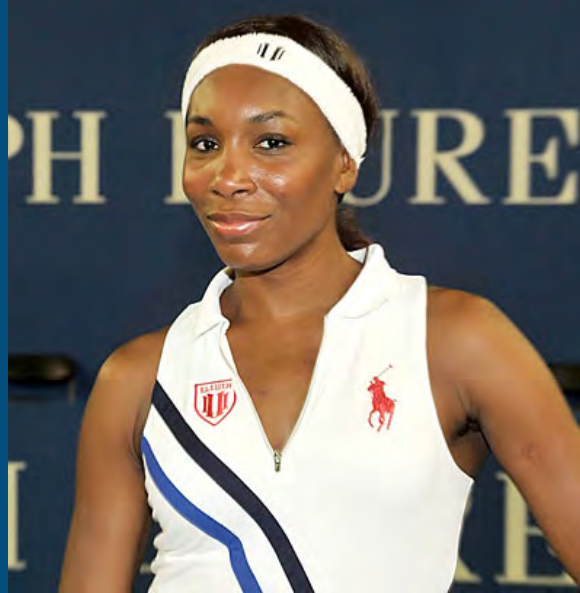


Vegan



Torre Washington
Vegan Bodybuilding

Vegan athletes



Long-term intake of animal flesh and risk of developing hypertension in three prospective cohort studies

Lea Borgi, MD^a, Gary C. Curhan, MD, ScD^{a,b}, Walter C. Willett, MD, Dr.P.H^c, Frank B. Hu, MD, MPH, PhD^{b,c}, Ambika Satija, BA^c, and John P. Forman, MD, ScD^{a,b}

^aRenal Division, Brigham and Women's Hospital, Boston

^bChanning Division of Network Medicine, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston

^cDepartments of Nutrition and Epidemiology, Harvard School of Public Health

Results—Compared with participants whose consumption was <1 serving/month, the pooled hazard ratios (HR) among those whose intake was ≥1 serving/day were 1.30 (95% CI: 1.23-1.39) for total meat (a combination of processed and unprocessed red meat), 1.22 (1.12-1.34) for poultry, and 1.05 (0.98-1.13) for seafood. Seafood was associated with an increased risk of hypertension in HPFS and NHS II, but not NHS I. Consumption of any animal flesh ≥1 serving/day was associated with an increased hypertension risk (pooled HR=1.30 [1.16-1.47]).

Conclusions—Long-term intake of meat and poultry were associated with increased risk of hypertension. In contrast to our hypothesis, we found a weak but significant trend towards an increased risk of hypertension with increasing seafood consumption.

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Vegetarian diets and incidence of diabetes in the Adventist Health Study-2

	BEEF	POULTRY/FISH	DAIRY/EGGS	Diet group	BMI ²	Diabetes ²	Hypertension ²
NON-VEGE				Nonvegetarian	28.26 (28.22, 28.30)	1.00	1.00
SEMI-VEGE				Semivegetarian	27.00 (26.96, 27.04)	0.72 (0.65, 0.79)	0.77 (0.72, 0.82)
PESCO-VEGE	NONE			Pescovegetarian	25.73 (25.69, 25.77)	0.49 (0.44, 0.55)	0.62 (0.59, 0.66)
LACTO-OVO	NONE	NONE		Lactoovo-vegetarian	25.48 (25.44, 25.52)	0.39 (0.36, 0.42)	0.45 (0.44, 0.47)
VEGAN	NONE	NONE	NONE	Vegan	23.13 (23.09, 23.16)	0.22 (0.18, 0.28)	0.25 (0.22, 0.28)
				<i>P</i> ⁴	0.0001	0.0001	0.0001
<i>n</i> = 89,224.							

KEYWORDS

Abstract *Aim:* To evaluate the relationship of diet to incident diabetes among non-Black and

there appeared to be an incremental protection as dietary pattern moved from non-vegetarian to semi-vegetarian to pesco vegetarian to lacto ovo vegetarian to vegan

1.29% of pesco vegetarians, 0.92% of semi-vegetarians and 2.12% of non-vegetarians. Blacks had an increased risk compared to non-Blacks (odds ratio [OR] 1.364; 95% confidence

Does a Vegetarian Diet Reduce the Occurrence of Diabetes?

TABLE 6—The Association of Meat Consumption with Diabetes Based on Logistic Regression Analyses

Outcome	Meat Consumption	Multivariate-Adjusted Relative Risk (95% CL) ^b	
		Male	Female
Self-Reported Diabetes Prevalence (1960)	<1 day/wk (vegetarian)	1.0	1.0
	1+ days/wk (non-vegetarian)	1.7(1.2,2.4)	1.4(1.1,1.8)
	<1 day/wk	1.0	1.0
	1-2 days/wk	1.4(0.9,2.3)	1.1(0.8,1.6)
	3-5 days/wk	1.5(0.9,2.5)	1.2(0.9,1.8)
	6+ days/wk	2.7(1.6,4.6)	2.3(1.6,3.3)

^bFor prevalence data, the regression model included age, per cent desirable weight, physical activity (for males only), and frequency of use of meat, eggs, and milk.

Abstract: We reduces the risk of ed this hypothesis Seventh-day Adve follow-up, the risk Adventists was app Within the male Ad ly lower risk than

Introduction

We studied a day Adventists id tive religious gro the consumption tobacco. Approx sume a lacto-ovo and fish but inclu of follow-up, the death in Adventists was only 45% of the rate for all US Whites (Table 1). This observation suggested to us that some characteristic(s) of the Adventist population, possibly the vegetarian diet advocated by the church, may explain the

the male and female reported diabetes also ns. The associations ion were apparently ight, other selected associations between r in males than in

5 per cent of the have non-insulin- probably maturity- are probably more to insulin-depen-

death certificates diabetes mellitus as a b. The underlying cause of death was determined by the state nosologist. All deaths in the Adventist cohort during 1960 to 1980 were identified by computer-assisted record linkage to the California death certificate file.^{4,5} The record-linkage procedure

Taiwanese Vegetarians and Omnivores: Dietary Composition, Prevalence of Diabetes and IFG

Polytomous logistic regression adjusting for age, body mass index, family history of diabetes, education, leisure time physical activity, smoking and alcohol, showed that this vegetarian diet was negatively associated with diabetes and IFG in men (OR for diabetes: 0.49, 95% CI: 0.28–0.89; OR for IFG: 0.66, 95% CI: 0.46–0.95); in pre-menopausal women (OR for diabetes: 0.26, 95% CI: 0.06–1.21; OR for IFG: 0.60, 95% CI: 0.35–1.04); and in menopausal women (OR for diabetes: 0.25, 95% CI: 0.15–0.42; OR for IFG: 0.73, 95% CI: 0.56–0.95).

Computer Science, University of British Columbia, Vancouver, Canada, ⁷Department of Family Medicine, College of Medicine, Tzu Chi University, Hualien, Taiwan, ⁸Department of Internal Medicine, Buddhist Hualien Tzu Chi Hospital, Hualien, Taiwan, ⁹Department of Internal Medicine, College of Medicine, Tzu Chi University, Hualien, Taiwan

Abstract

Introduction: Vegetarian diets have been shown to improve glucose metabolism and reduce risk for diabetes in Westerners but whether Chinese vegetarian diets have the same benefits is unknown.

Methods: We evaluated the association between diet and diabetes/impaired fasting glucose (IFG) among 4384 Taiwanese Buddhist volunteers and identified diabetes/IFG cases from a comprehensive review of medical history and fasting plasma glucose.

Results: Vegetarians had higher intakes of carbohydrates, fiber, calcium, magnesium, total and non-heme iron, folate, vitamin A, and lower intakes of saturated fat, cholesterol, and vitamin B12. Besides avoiding meat and fish, vegetarians had higher intakes of soy products, vegetables, whole grains, but similar intakes of dairy and fruits, compared with omnivores. The crude prevalence of diabetes in vegetarians versus omnivores is 0.6% versus 2.2% in pre-menopausal women, 2.0%

Taiwanese Vegetarians and Omnivores: Dietary Composition, Prevalence of Diabetes and IFG

We did not analyze subtypes of vegetarians (vegan, lacto-ovo-, or pesco-), as the AHS-2 did, since most of our vegetarians were of lacto-ovo type, with a small number of vegans ($n = 69$), and there were no cases of diabetes found within the vegan group.

Introduction: Vegetarian diets have been shown to improve glucose metabolism and reduce risk for diabetes in Westerners but whether Chinese vegetarian diets have the same benefits is unknown.

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Egg consumption and the risk of type 2 diabetes mellitus: a case-control study

Variable	Cases		Controls		OR*	95% CI	P
	n	%	n	%			
Egg consumption							
<1 egg/week	36	15.38	115	24.57	1.00	—	
1-1.9 eggs/week	78	33.33	161	34.40	1.76	1.04, 2.98	
2-2.9 eggs/week	64	27.35	114	24.36	1.97	1.12, 3.46	
3-4.9 eggs/week	40	17.09	60	12.82	2.56	1.35, 4.85	
≥5 eggs/week	16	6.84	18	3.85	3.38	1.35, 8.49	0.001

*OR adjusted for BMI, family history of diabetes, smoking and education level.
†OR adjusted for BMI, family history of diabetes, smoking, education level, morning exercise and plasma TAG level.

We found that consumers of ≥ 5 eggs/week had three times greater risk of type 2 diabetes mellitus than those eating <1 egg/week.

Calorie Density

The amount of calories in a given weight of food

- “high calorie density” has a lot more calories in a small amount of food
- “low calorie density” has a lot less calories for the same weight of food
- Foods with a low calorie density are more filling, and nutrient dense

Calorie Density



**One giant
cinnamon bun
480 calories**

**Multiple servings
of fruit and vegetables
480 calories**

800 calories



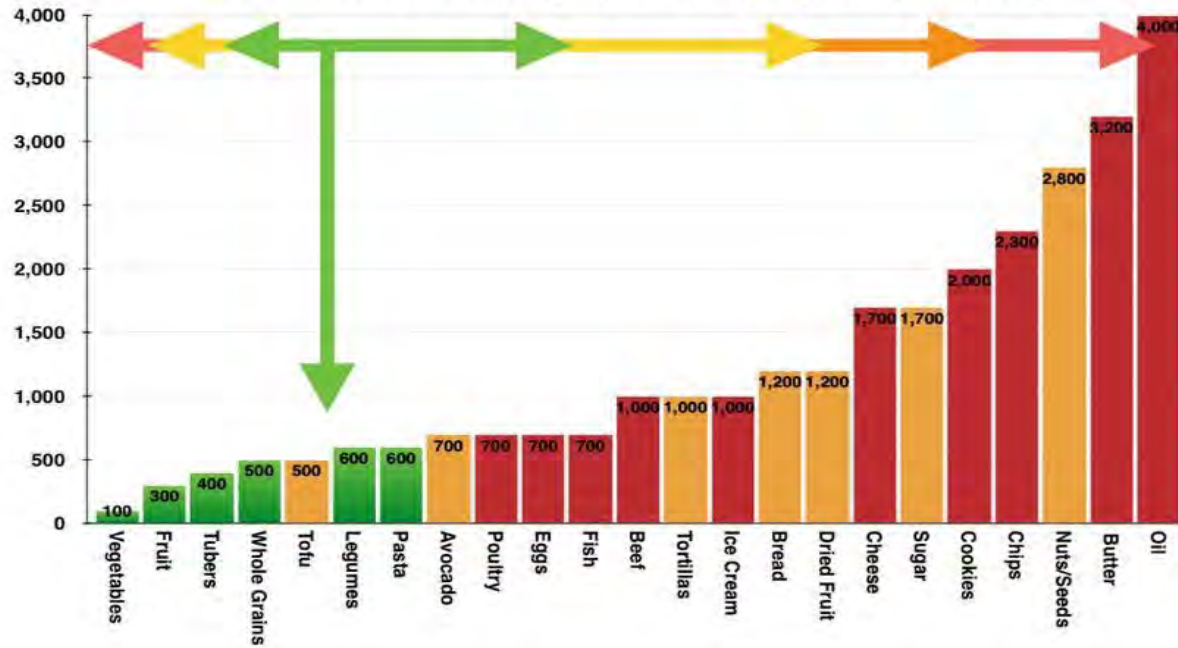
One cup cashews

=



6 baked potatoes

Calorie Density (Calories per pound)



Adapted from: *A Common Sense Approach to Sound Nutrition* by Jeff Novick MS, RD

CALORIE DENSITY

WHAT 500 CALORIES LOOK LIKE

OIL



CHEESE



MEAT



POTATOES,
RICE, BEANS



FRUITS &
VEGGIES



...and why whole plant-based foods will help keep you lean and satisfied.

forksoverknives.com

Why is Plant based nutrition not prescribed regularly?

- Knowledge
 - Only 25% of Medical schools offer a nutrition course
 - USDA—Nutritional guidelines
 - Conflicting studies (often sponsored by industry)
- Attitude
 - The majority of physicians surveyed
 - Did not discuss nutrition because they didn't want to deprive their patients
 - Did not trust their patients to change eating habits
- Time
- Reimbursement

Facing the Facelessness of Public Health: What's the Public Got to Do With It?

We have known, but we have not managed to care. At least not care deeply enough to turn what we know into what we routinely do.

Were we to do so, we could eliminate 80% of all heart disease and strokes, 90% of all diabetes, and as much as 60% of all cancer.⁶

Nor will we, until we face facts. The facts are that public health is faceless, and it is faces—and names—that evoke passion. Because passion is the one-word answer to how do we fix what is most badly broken in public health—the toll of lifestyle-related chronic disease—passion is indeed among our objectives. How do we get there from here?

backyard in Midland, Texas, in 1987.³

And from 1998 to 2005, we were substantially fixated on the drama of Terri Schiavo and her family. Just one family wrestling over irreparable brain injury and the fate of one woman. As surrogate evidence for the power of that drama, type “Terri Schiavo” into Google, and more than 400,000

Questions:

cturissini@partners.org

Eat2cure.org

BOOKS

Prevent and Reverse Heart Disease

By Caldwell Esselstyn, Jr

Dr. Neal Barnard's Program for Reversing Diabetes

By Neal Barnard

Food Rules

Omnivore's Dilemma

By Michael Pollan

Cookbooks

Forks over Knives—The Cookbook

By Del Sroufe

Prevent and Reverse Heart Disease Cookbook

By Ann Crile Esselstyn

Happy Herbivore

By Lindsay Nixon

The Plant Pure Kitchen

By Kim Campbell

EAT TO CURE RESOURCES

WEBSITES

Forks over knives

www.forksoverknives.com

The Engine 2 diet

<https://engine2diet.com/>

Caldwell Esselstyn, Jr.

www.heartattackproof.com

Physicians Committee for Responsible Medicine

www.pcrm.org

Fat Free Vegan

<http://fatfreevegan.com>

Happy Herbivore

<http://happyherbivore.com>

Jeff Novick RD

<http://jeffnovick.com>

Michael Greiger, MD

Nutritionfacts.org

The Plantrician Project

www.plantricianproject.org

Environmental Working Group

[Www.ewg.org](http://www.ewg.org)

DVDS

Forks over Knives

Fast Food (by Jeff Novick)

Engine 2 Kitchen Rescue

Food, Inc

APPS

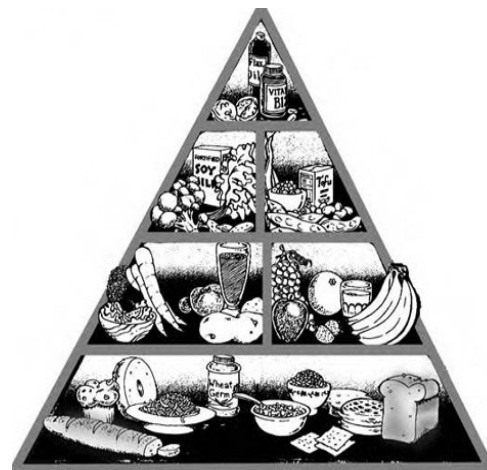
Fooducate

Forks over Knives

My Fitness Pal

Is it Vegan?

21-Day Vegan Kickstart (pcrm)



Plant based food pyramid

MAIN INSIDE HEADING



Caption describing picture or graphic.

Use this space to provide more detailed information about your products or services. You can also include a graphic of a product or service.

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BUSINESS

Primary Business Address

Your Address Line 2

Your Address Line 3

Your Address Line 4

Phone: 555-555-5555

Fax: 555-555-5555

E-mail: someone@example.com

Why Cover Expensive Medical Treatments That Don't Work?

Ken Beckman, ASA, ACAS, MAAA, CFA
October 17, 2017



What can Health Care Payers
(insurers, self-insured groups, Medicare, Medicaid)
do to encourage treatment using
Whole Food Plant-Based Nutrition?

Why Whole Food Plant-Based Nutrition is not being used as Medical Treatment

Non Sequitur by Wiley Miller



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November 19, 2014 from www.gocomics.com

<http://www.gocomics.com/nonsequitur/2014/11/19>

Issue #1 (patients):

Fact that most chronic conditions can be reversed is not widely known

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Fact that most chronic conditions can be reversed is not widely known

Solution:

- Require patients be advised of plant-based treatment option before non-emergency procedures such as bypass/stents/bariatric surgery
- Deliver a direct message to all insureds:
“Did you know that diabetes, heart disease, hypertension, obesity, rheumatoid arthritis, erectile dysfunction, etc. can be reversed without drugs and surgery and no negative side effects without counting calories?”

Examples in Practice

- Non-profit health plan/medical group¹

Kaiser Permanente journal article: "[p]hysicians should consider recommending a plant-based diet to all their patients, especially those with high blood pressure, diabetes, cardiovascular disease, or obesity."

- Traditional insurer
- Self-insured groups

¹Philip J. Tuso et al., "Nutritional Update for Physicians: Plant-Based Diets," *Permanente Journal* 17 (Spring 2013): 61-66.

"The Plant-Based Diet: A Healthier Way to Eat," Kaiser Permanente, <https://share.kaiserpermanente.org/wp-content/uploads/2015/10/The-Plant-Based-Diet-booklet.pdf>

Issue #2 (providers):

- Focus is on managing chronic conditions with medication compliance, procedures and preventative tests that do not address the underlying cause
- Lack of monetary incentives for providers to prevent & reverse chronic disease

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- Focus is on managing chronic conditions with medication compliance, procedures and preventative tests that do not address the underlying cause
- Lack of monetary incentives for providers to prevent & reverse chronic disease

Solution:

Incentives for physicians/others based on value patients receive (their health)

What about Current Value Based Initiatives?

Healthcare Effectiveness Data and Information Set (HEDIS) – used by 90% of health plans to “measure performance on important dimensions of care and service”

CMS uses HEDIS to improve “care quality” and assist in “making patients healthier”¹

Examples of HEDIS measures ² :	Normal Readings:
<i>Controlling High Blood Pressure:</i> % of Hypertensive patients with BP < 140/90	< 120/80
<i>Comprehensive Diabetes Care, HbA1c Poor Control:</i> % of Diabetics with A1c>9% or failed to have A1c recorded	<7%

These measures do not provide incentives to achieve optimal patient health.

¹ <http://www.ncqa.org/hedis-quality-measurement/what-is-hedis>; <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/MACRA-MIPS-and-APMs.html>

² <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/Downloads/ACO-and-PCMH-Primary-Care-Measures.pdf>; http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/KnowYourNumbers/Understanding-Blood-Pressure-Readings_UCM_301764_Article.jsp#.WUI2H2jyuUk; <http://www.diabetes.org/living-with-diabetes/treatment-and-care/blood-glucose-control/a1c/>

How to Measure Patient Value = Improvement in Health

(1) Use Change in Objective Clinical Measures

- BMI
- Cholesterol
- BP
- A1c
- CRP
- Endothelial function
- TMAO

(2) Relate Measures to Claim Costs

(e.g. 1% change in A1c = \$1000 of claim cost)

Actuarial Patient Value Model:

Financial Incentives Based on Improvement in Patient Health

	Treatment Year				
	1	2	3	4	5+
Diabetic Patient with HbA1c of:	9.0	6.5	6.5	6.5	6.5
Expected Total Health Spending:	\$15,000	\$7,500	\$7,500	\$7,500	\$7,500
PCP Share of Health Spending:	\$1,500	\$750	\$750	\$750	\$750
Incentive Payment to PCP:		\$2,000	\$2,000	\$2,000	\$2,000
Net Savings Relative to Year 1:		\$5,500	\$5,500	\$5,500	\$5,500

Ways for Providers to Educate Patients

- Integral part of entire primary care practice

Barnard Medical Center
Ethos Health

- Single Site Seminars

Cleveland Clinic Wellness Institute (Dr. Caldwell Esselstyn)
Montefiore Health System (Dr. Robert Ostfeld)

- Multi-Site Centers

Complete Health Improvement Program (CHIP)

- Online

Why Do Actuaries Need to Get Involved?

- Bring an unbiased perspective
- Experts in developing sustainable financial security systems
- Key role with payers; payers can facilitate large scale implementation

Nathan Pritikin:

“All I’m trying to do is wipe out heart disease, diabetes, hypertension, and obesity.”

<https://www.pritikin.com/home-the-basics/about-pritikin/38-nathan-pritikin.html>