Dr. C. Tom Kouroukis

Nutritional advice from a non-nutritionist

Hamilton
Living Well with Lymphoma

Nutrition advice from a non-nutritionist

Dr. Tom Kouroukis

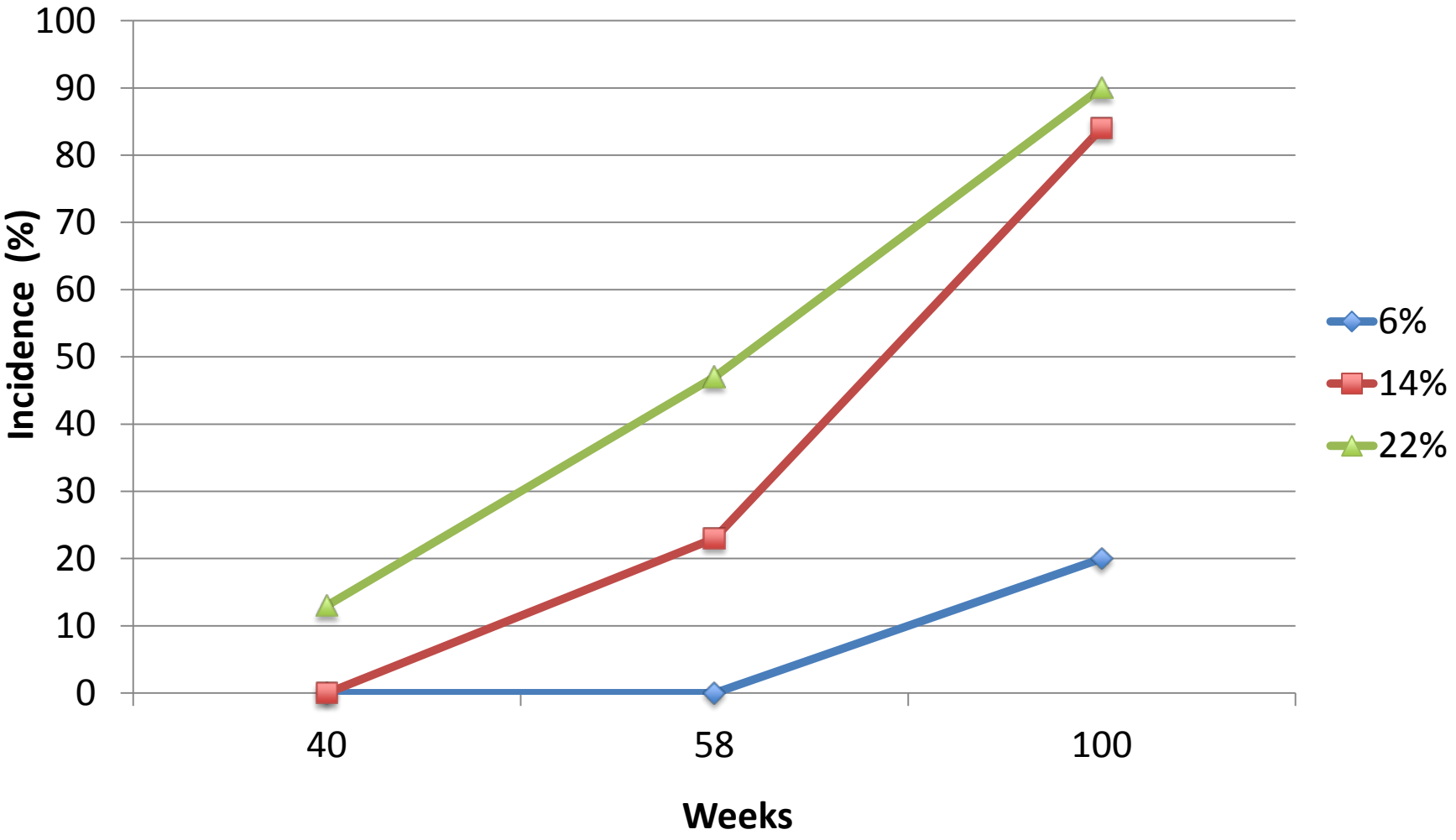
Hamilton Convention Centre

November 23, 2013

Overview

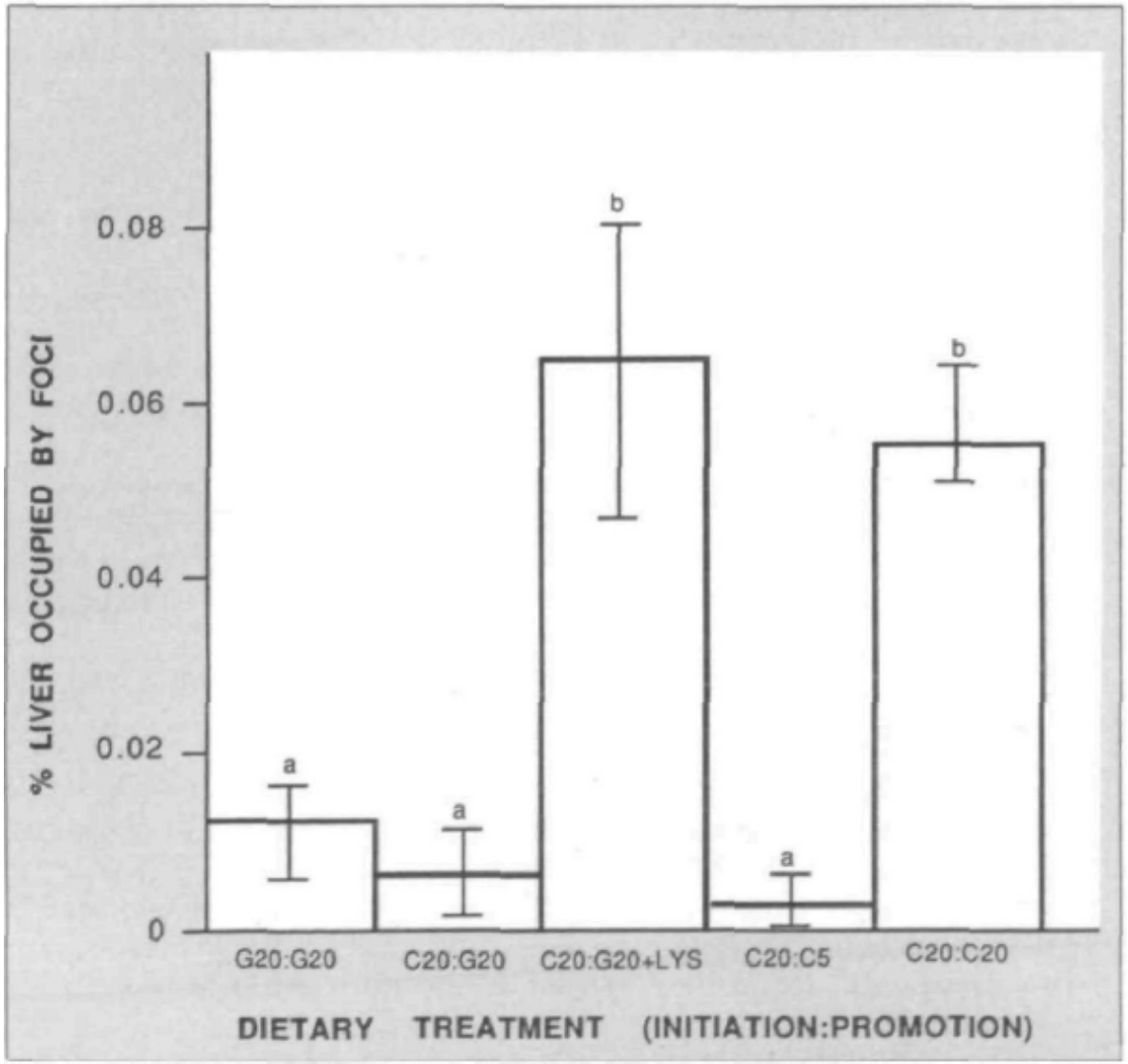
- Background
- General principles of nutrition as it relates to cancer
- Vitamin D
- Examples of healthy eating guidelines

Aflatoxin induced liver cancer



Carcinogenesis 1992

Precancerous liver lesions
Aflatoxin-induced



JNCI 1989

Background

- Most cancers are not related to genetics
  - Lack of Exercise
  - Tobacco
  - Excess alcohol
  - Diet
  - Occupational exposure
- We could prevent 40% of cancers by changes in lifestyle

My own opinions

- A diet built around whole plant based food is best
- Meat, refined grains, dairy should be minimal
- Avoid sugary drinks and fruit juices
- Pasta is not a health food
- Don’t worry about getting enough protein
- Certain fats are good for us
- Vitamins (except D) cannot compensate for a poor diet

Background

- Physicians know very little about nutrition or food
- Intake of processed food has risen dramatically in past few decades
  - Meats, boxed products, refined grains, added sugars
  - Nitrates and other known carcinogens
  - High fructose corn syrup
- People eat out more often than before and cook less at home (bigger portions, high calorie meals)

Trends

Table 2-1

In 2000, Americans consumed an average 57 pounds more meat than they did annually in the 1950s, and a third fewer eggs

	Annual averages					
Item	**1950-59**	**1960-69**	**1970-79**	**1980-89**	**1990-99**	**2000**
	Pounds per capita, boneless-trimmed weight					
Total meats	138.2	161.7	177.2	182.2	189.0	195.2
Red meats	106.7	122.34	129.5	121.8	112.4	113.5
Beef	52.8	69.2	80.9	71.7	63.2	64.4
Pork	45.4	46.9	45.0	47.7	47.6	47.7
Veal and lamb	8.5	6.2	3.5	2.4	1.7	1.4
Poultry	20.5	28.7	35.2	46.2	61.9	66.5
Chicken	16.4	22.7	28.4	36.3	47.9	52.9
Turkey	4.1	6.0	6.8	9.9	13.9	13.6
Fish and shellfish	10.9	10.7	12.5	14.2	14.7	15.2
	Number per capita					
Eggs	374	320	285	257	236	250

Note: Totals may not add due to rounding.
Source: USDA's Economic Research Service.

USDA

Trends

Table 2-2
Americans are drinking less milk, eating more cheese

		Per capita annual averages					
Item	**Unit**	**1950-59**	**1960-69**	**1970-79**	**1980-89**	**1990-99**	**2000**
All dairy products[1]	lb	703	619	548	573	571	593
Cheese[2]	lb	7.7	9.5	14.4	21.5	26.7	29.8
Cottage cheese	lb	3.9	4.6	4.9	4.1	2.9	2.6
Frozen dairy products	lb	23.0	27.5	27.8	27.4	28.8	27.8
Ice cream	lb	18.1	18.3	17.7	17.7	16.0	16.5
Lowfat ice cream	lb	2.7	6.2	7.6	7.2	7.5	7.3
Sherbet	lb	1.3	1.5	1.5	1.3	1.3	1.2
Other (including frozen yogurt)	lb	1.0	1.5	1.0	1.2	4.0	3.1
Nonfat dry milk	lb	4.9	5.9	4.1	2.4	3.1	3.4
Dry whey	lb	.2	.6	2.1	3.2	3.5	3.4
Condensed and evaporated milks	lb	21.6	15.7	9.4	7.5	7.3	5.8
Cream products	1/2 pt	18.1	13.3	10.1	12.8	15.7	18.6
Yogurt	1/2 pt	0.2	0.7	3.2	6.5	8.5	9.9
Beverage milk	gal	36.4	32.6	29.8	26.5	24.3	22.6
Whole	gal	33.5	28.8	21.7	14.3	9.1	8.1
Lower fat	gal	2.9	3.7	8.1	12.2	15.3	14.5

Note: Totals may not add due to rounding.
[1]Milk-equivalent, milkfat basis; includes butter. Individual items are on a product-weight basis.
[2]Natural equivalent of cheese and cheese products; excludes full-skim American, cottage, pot, and baker's cheese. Source: USDA's Economic Research Service.

USDA

Trends

Table 2-6

America's sweet tooth increased 39 percent between 1950–59 and 2000 as use of corn sweeteners octupled

	Annual averages					
Item	**1950–59**	**1960–69**	**1970–79**	**1980–89**	**1990–99**	**2000**
	Pounds per capita, dry weight					
Total caloric sweeteners	109.6	114.4	123.7	126.5	145.9	152.4
Cane and beet sugar	96.7	98.0	96.0	68.4	64.7	65.6
Corn sweeteners	11.0	14.9	26.3	56.8	79.9	85.3
High fructose corn syrup	.0	.0	5.5	37.3	56.8	63.8
Glucose	7.4	10.9	16.6	16.0	19.3	18.1
Dextrose	3.5	4.1	4.3	3.5	3.8	3.4
Other caloric sweeteners	2.0	1.5	1.4	1.3	1.3	1.5

Note: Totals may not add due to rounding.
1Edible syrups (sugarcane, sorgo, maple, and refiner's), edible molasses, and honey.
Source: USDA's Economic Research Service.

USDA

Table 2-4

Per capita consumption of fruit and vegetables increased by one-fifth between 1970–79 and 2000

Item	Annual averages			
	1970–79	1980–89	1990–99	2000
	Pounds per capita, fresh-weight equivalent			
Total fruit and vegetables	587.5	622.1	688.3	707.7
Total fruit	248.7	269.0	280.1	279.4
Fresh fruit	99.4	113.1	123.7	126.8
Citrus	27.2	24.2	23.7	23.4
Noncitrus	72.2	88.9	100.0	103.3
Processed fruit	149.3	155.9	156.5	152.7
Frozen fruit, noncitrus	3.4	3.4	3.8	3.7
Dried fruit, noncitrus	9.9	12.2	11.7	10.5
Canned fruit, noncitrus	24.7	21.3	19.7	17.4
Fruit juices	110.7	118.6	120.8	120.6
Total vegetables	338.8	353.1	408.2	428.3
Fresh vegetables	147.9	157.2	181.9	201.7
Potatoes	52.5	48.5	48.8	47.2
Other	95.4	108.7	133.1	154.5
Processing vegetables	190.9	195.9	226.3	226.6
Vegetables for canning	101.1	98.9	109.4	104.7
Tomatoes	62.9	63.5	74.4	69.9
Other	38.2	35.4	35.0	34.8
Vegetables for freezing	52.1	61.0	76.8	79.7
Potatoes	36.1	42.8	54.9	57.8
Other	16.0	18.2	21.9	21.9
Dehydrated vegetables and chips	30.8	29.4	32.0	33.7
Pulses	7.0	6.5	8.1	8.6

Note: Totals may not add due to rounding.
Source: USDA's Economic Research Service.

USDA

Incidence of various cancers in meat, fish eaters and vegetarians

Table 2 Numbers of incident malignant cancers (*N*) and relative risks (RRs) and their 95% confidence intervals (95% CIs) by diet group among 33 697 meat eaters, 8901 fish eaters and 21 810 vegetarians[a]

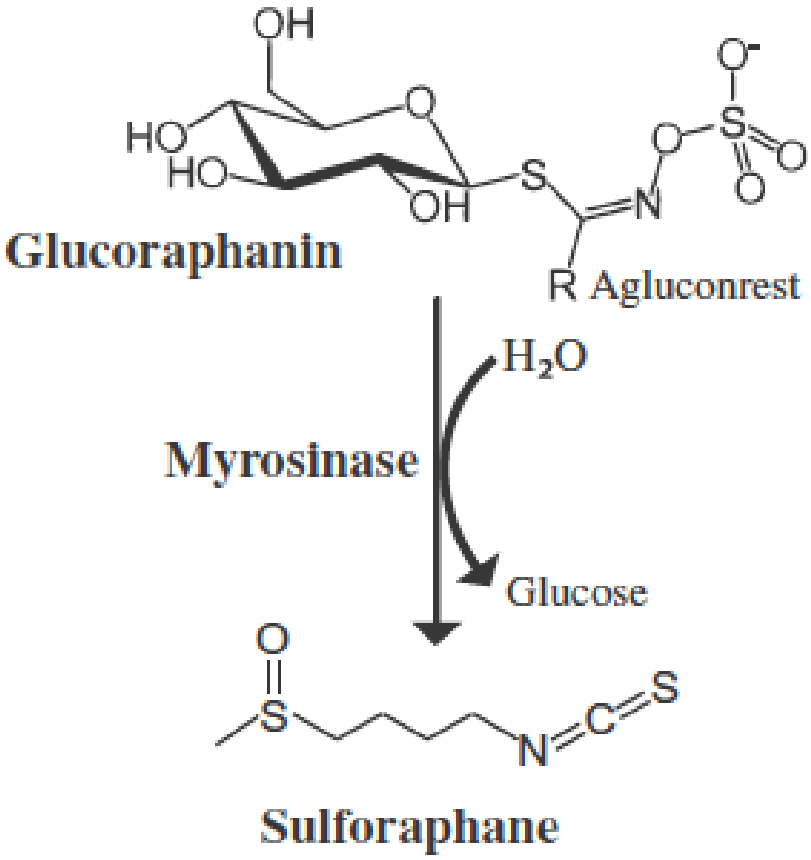
Cancer site (ICD-10 codes)	Meat eater		Fish eater		Vegetarian		*P* for heterogeneity
	N	RR	*N*	RR (95% CI)	*N*	RR (95% CI)	
Upper GI tract (C00-10, 13, 15)	56	1.00	4	0.44 (0.16–1.25)	18	0.81 (0.45–1.46)	0.218
Stomach (C16)	38	1.00	2	0.29 (0.07–1.20)	9	0.36 (0.16–0.78)	0.007
Colorectum (C18–20)	243	1.00	31	0.77 (0.53–1.13)	110	1.12 (0.87–1.44)	0.177
Colon (C18)	156	1.00	17	0.68 (0.41–1.14)	66	1.12 (0.81–1.54)	0.173
Rectum (C19–20)	87	1.00	14	0.92 (0.51–1.64)	44	1.12 (0.75–1.67)	0.776
Pancreas (C25)	46	1.00	6	0.82 (0.34–1.96)	19	0.94 (0.52–1.71)	0.898
Lung (C34)	114	1.00	8	0.59 (0.29–1.23)	43	1.11 (0.75–1.65)	0.225
Melanoma (C43)	115	1.00	21	0.90 (0.55–1.47)	49	0.89 (0.61–1.29)	0.799
Female breast (C50)	654	1.00	133	1.05 (0.86–1.28)	237	0.91 (0.77–1.08)	0.383
Cervix (C53)	17	1.00	10	2.05 (0.91–4.63)	23	2.08 (1.05–4.12)	0.069
Endometrium (C54)	71	1.00	8	0.61 (0.29–1.30)	22	0.75 (0.45–1.28)	0.304
Ovary (C56)	98	1.00	8	0.37 (0.18–0.77)	34	0.69 (0.45–1.07)	0.007
Prostate (C61)	207	1.00	14	0.57 (0.33–0.99)	70	0.87 (0.64–1.18)	0.092
Kidney (C64)	37	1.00	2	0.36 (0.09–1.52)	11	0.76 (0.36–1.58)	0.252
Bladder (C67)	65	1.00	7	0.81 (0.36–1.81)	13	0.47 (0.25–0.89)	0.050
Brain (C71)	44	1.00	11	1.39 (0.69–2.80)	26	1.25 (0.72–2.16)	0.581
Lymphatic/haematopoietic tissue (C81–96)	180	1.00	28	0.85 (0.56–1.29)	49	0.55 (0.39–0.78)	0.002
Non-Hodgkin's lymphoma (C82–85)	81	1.00	13	0.86 (0.47–1.58)	23	0.57 (0.35–0.95)	0.079
Multiple myeloma (C90)	34	1.00	4	0.72 (0.25–2.10)	4	0.25 (0.08–0.73)	0.015
Leukaemia (C91–95)	51	1.00	10	1.18 (0.58–2.40)	17	0.78 (0.43–1.43)	0.565
All sites (C00–97)	2204	1.00	317	0.82 (0.73–0.93)	829	0.88 (0.81–0.96)	0.001

ICD = International Classification of Diseases; GI = gastrointestinal. [a]Estimated by Cox proportional hazards regression with age as the underlying time variable, adjusted for smoking (never smoker, former smoker, light smoker (<15 cigarettes per day, or cigar or pipe smokers only), heavy smoker (≥15 cigarettes per day)), alcohol consumption (<1, 1–7, 8–15, 16+ g ethanol per day, unknown), body mass index (<20.0, 20.0–22.4, 22.5–24.9, 25.0–27.4, 27.5+ kg m^{-2}, unknown), physical activity level (low, high, unknown) and, for the women-only cancers, parity (none, 1–2, 3+, unknown) and oral contraceptive use (ever, never, unknown), and stratified by sex (where appropriate) and study/method of recruitment, using separate models for each end point.

Key et al., Br J Cancer 2009

Cruciferous vegetables

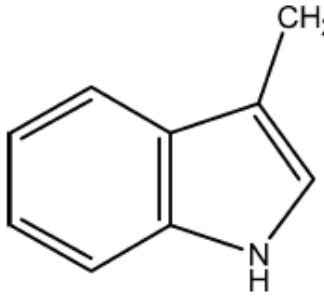
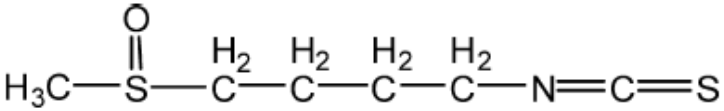
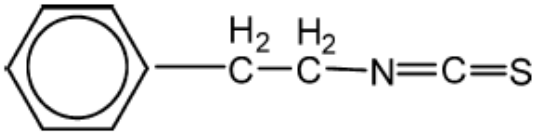
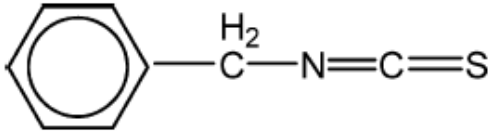
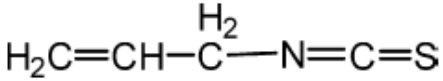
- Broccoli
- Brussels sprouts
- Cabbage
- Cauliflower
- Collard greens
- Kale
- Radish



Lightly cooked and thoroughly chewed

Herr and Buchler, Cancer Treatment Rev, 2010

Some food sources of selected isothiocyanates and their glucosinolate precursors that are under investigation for their cancer chemopreventive properties

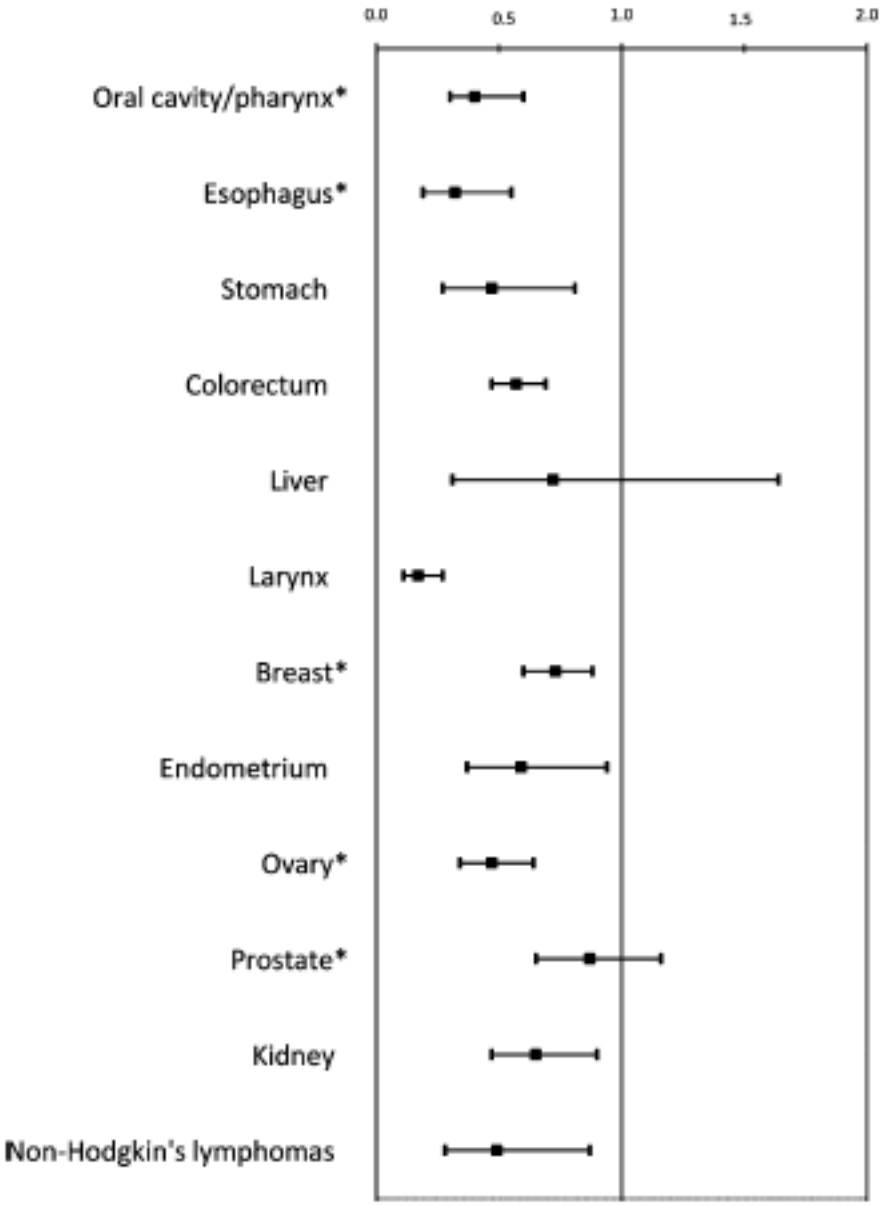
Glucosinolate (precursor)	Indole or isothiocyanate	Food sources
Glucobrassicin	Indole-3-Carbinol 	Broccoli, Brussels sprouts, cabbage, cauliflower
Glucoraphanin	Sulforaphane 	Broccoli sprouts, broccoli, Brussels sprouts, cabbage
Gluconasturtiin	Phenethyl-Isothiocyanate 	Watercress
Glucotropaeolin	Benzyl-Isothiocyanate 	Cabbage, garden cress, Indian cress
Sinigrin	Allyl-Isothiocyanate 	Cabbage, horseradish, mustard

The *Allium* Group

- Another important group of vegetables with anticancer properties
- Garlic, onions, leeks, shallots, chives
- When garlic is crushed/chewed or chopped the cell walls release allinase which converts alliin to allicin which imparts the strong smell, then become sulfur compounds quickly

Vegetable consumption Italy 1991-2007

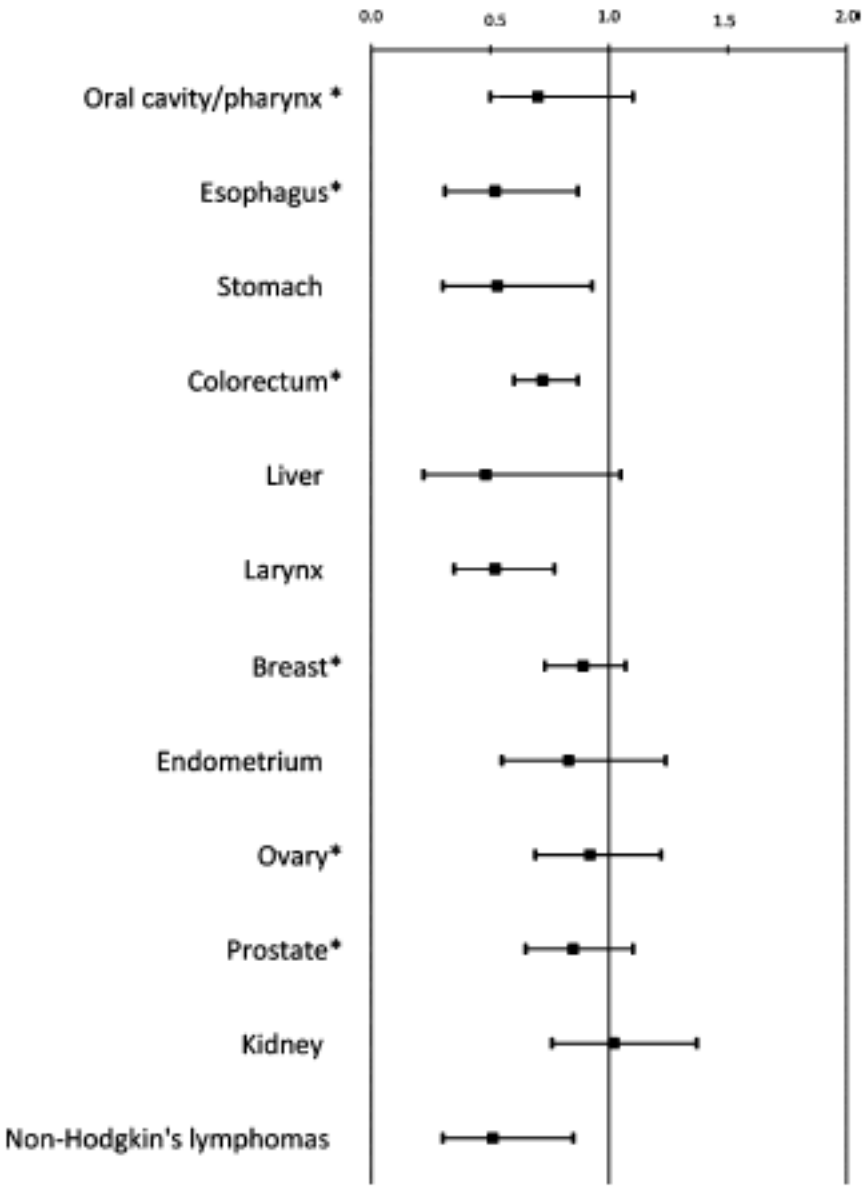
Highest versus lowest quartile



Pelucchi et al, Nutr Cancer 2009

Fruit consumption: Italy 1991-2007

Highest versus lowest quartile

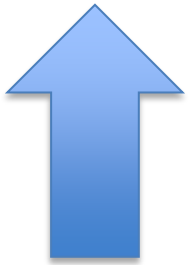


Pelucchi et al, Nutr Cancer 2009

Lymphoma and Meat

Table 4. Association between consumption of foods of animal origin and risk of B-cell lymphoma subentities in EPIC

	DLBCL		FL		BCLL		MM	
	N	HR (95% CI)	N	HR (95% CI)	N	HR (95% CI)	N	HR (95% CI)
Poultry								
<10 g/d	52	1.00	46	1.00	86	1.00	122	1.00
10–<20 g/d	44	1.15 (0.75–1.75)	34	1.03 (0.65–1.64)	58	1.00 (0.70–1.43)	87	1.30 (0.97–1.75)
20–<30 g/d	22	1.19 (0.69–2.05)	16	1.07 (0.59–1.95)	33	1.24 (0.81–1.91)	29	1.01 (0.66–1.56)
30–<40 g/d	19	1.99 (1.11–3.55)	15	1.60 (0.86–3.01)	19	1.11 (0.65–1.88)	19	1.02 (0.61–1.71)
40 g/d	22	1.15 (0.66–1.99)	29	1.80 (1.07–3.04)	38	1.36 (0.89–2.09)	35	1.03 (0.68–1.57)
p-trend		0.24		0.01		0.14		0.92



EPIC study
N=411,097
Dietary questionnaires

Rohrmann et al., Int J Cancer 2011

Nuts

- Nutrient dense
- Fatty acids, fiber, vitamins, minerals, antioxidants, phytosterols
- Studies have show benefits for heart disease, cholesterol levels
- Large study just published looking at overall and cause-specific mortality

Mortality and nut consumption

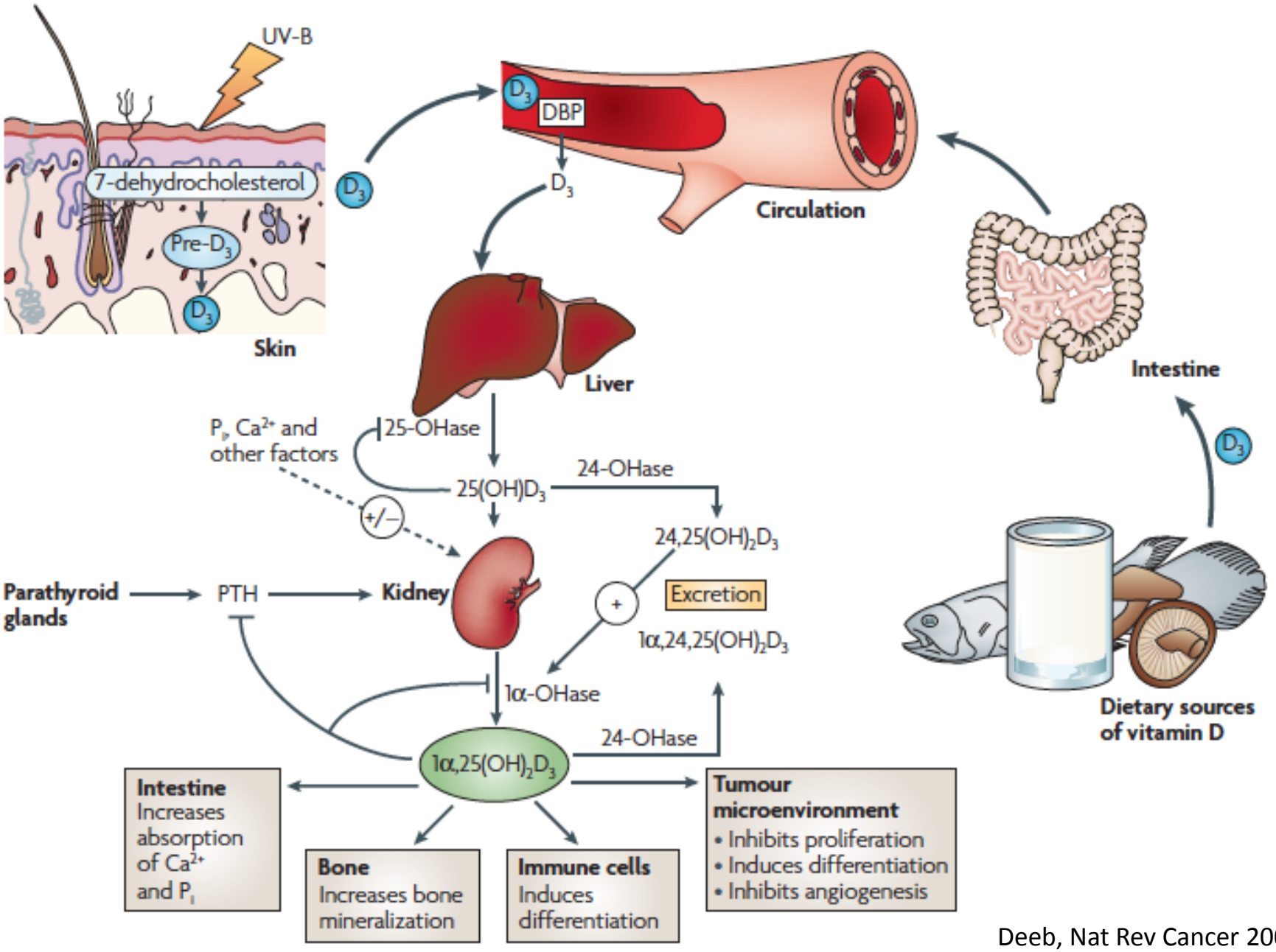
N = 76, 464 women
N = 42,498 men

Bao et al., NEJM, 2013

Vitamin D

- Technically a pro-hormone, not a vitamin
- Has a wide variety of effects of many different cells/organs in the body, not just for the bones
- Two forms
  - D3 = cholecalciferol, made by skin upon exposure to sunlight (UVB rays)
  - D2 = ergocalciferol, from plants, less potent than D3
- Mid-summer exposure can generate 10,000 units

Vitamin D metabolism is COMPLEX



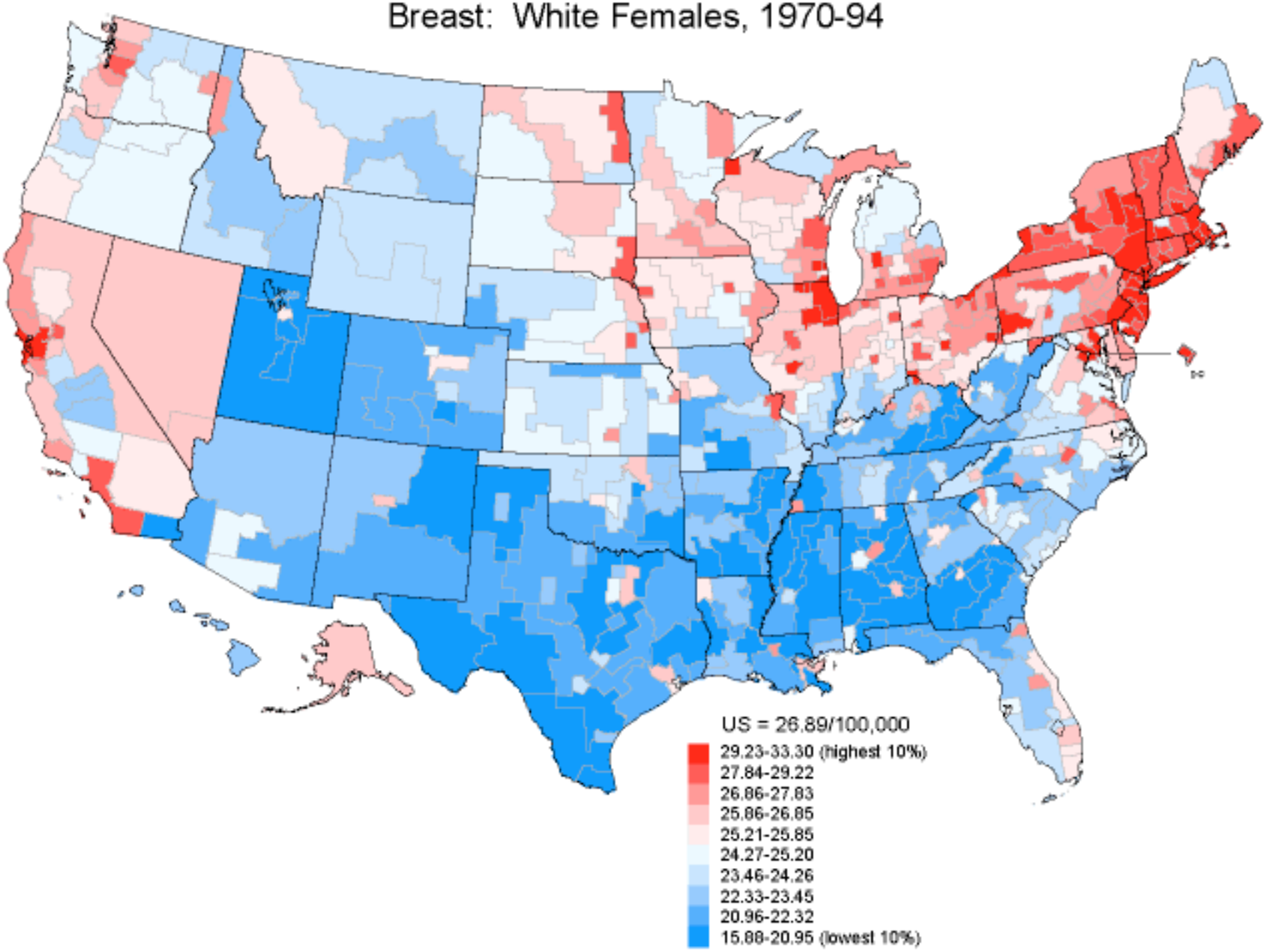
Deeb, Nat Rev Cancer 2007

Benefits of Vitamin D

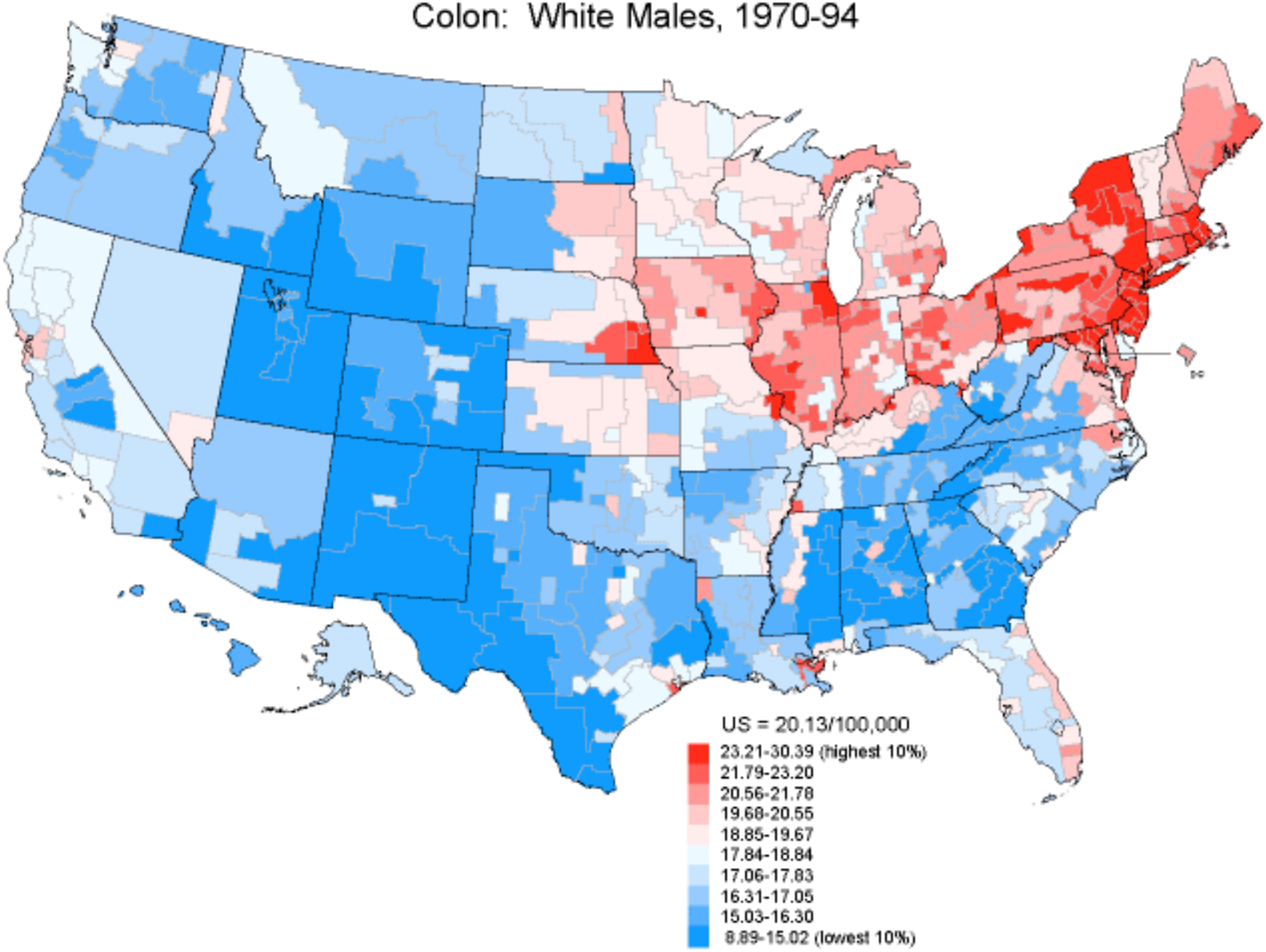
- Bone health
- Prevention of certain cancers (prostate, pancreas, breast, ovary, colon)
- Lung health: infections, asthma, wheezing
- Cardiovascular disease, hypertension
- Type II diabetes
- Muscle strength
- Autoimmune diseases (MS, RA, IBD)
- Mood disorders (depression, schizophrenia, dementia)

Cancer Mortality Rates by State Economic Area

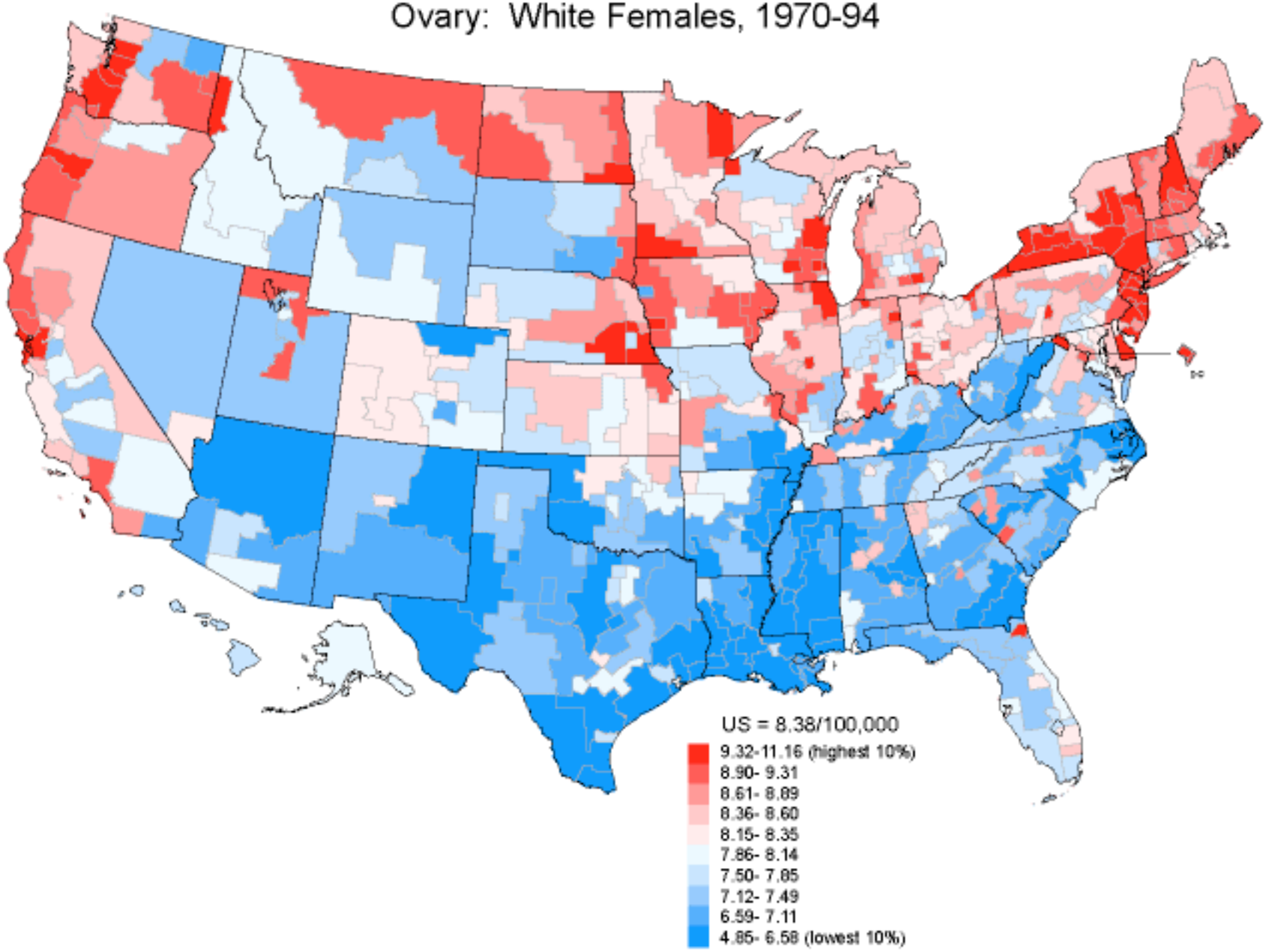
Breast: White Females, 1970-94



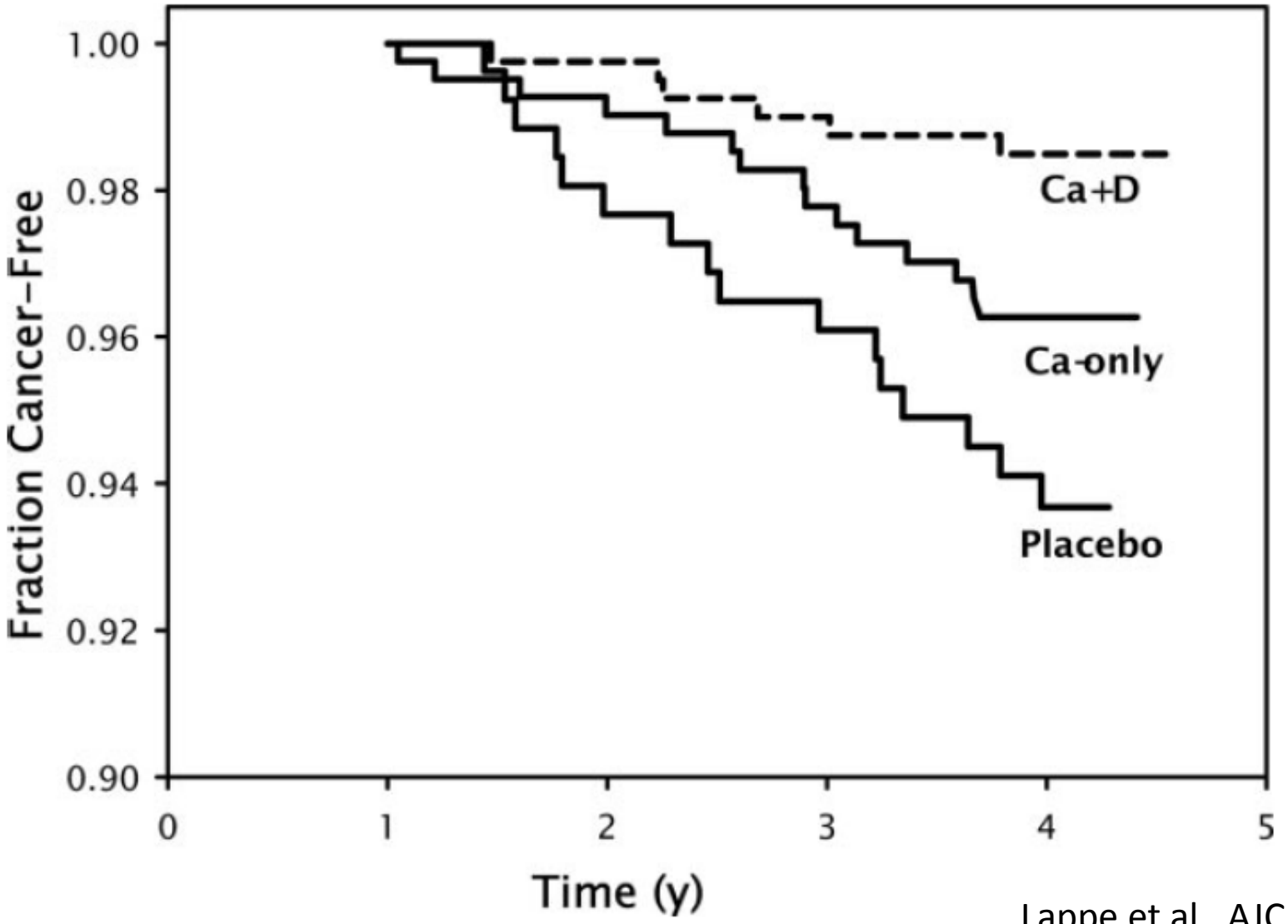
Cancer Mortality Rates by State Economic Area
Colon: White Males, 1970-94



Cancer Mortality Rates by State Economic Area
Ovary: White Females, 1970-94

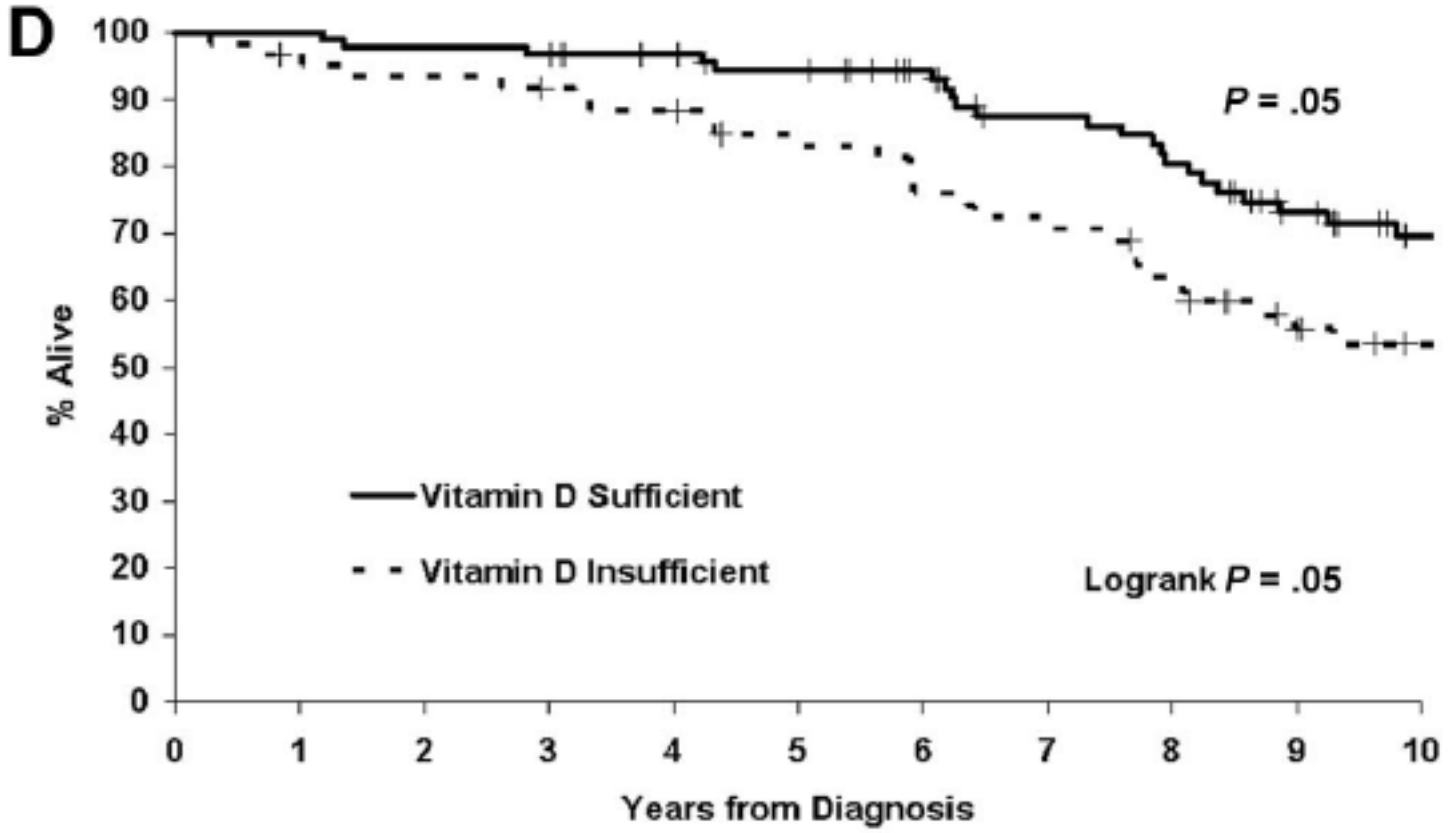


Vitamin D and Cancer Prevention



Lappe et al., AJCN 2007

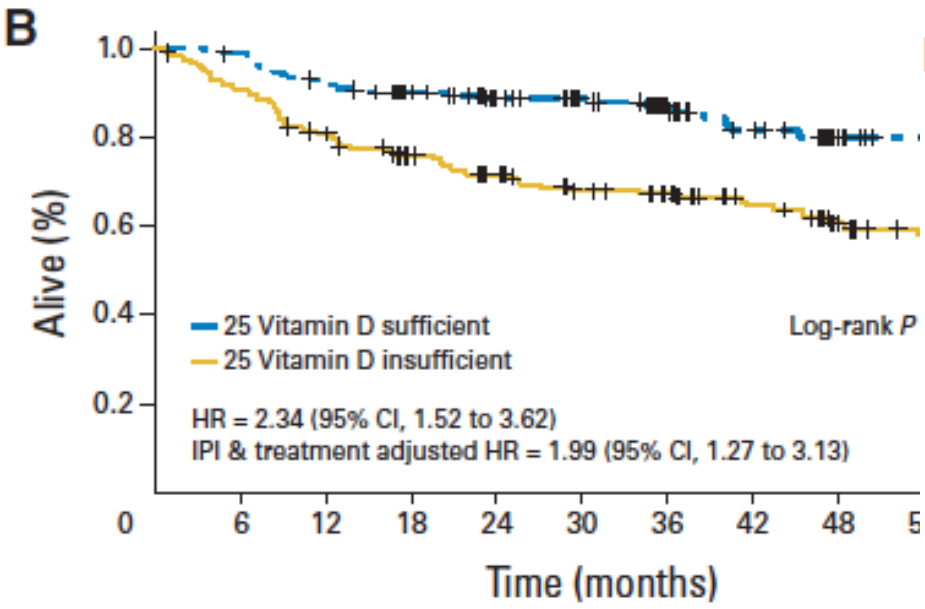
Vitamin D and Survival in CLL



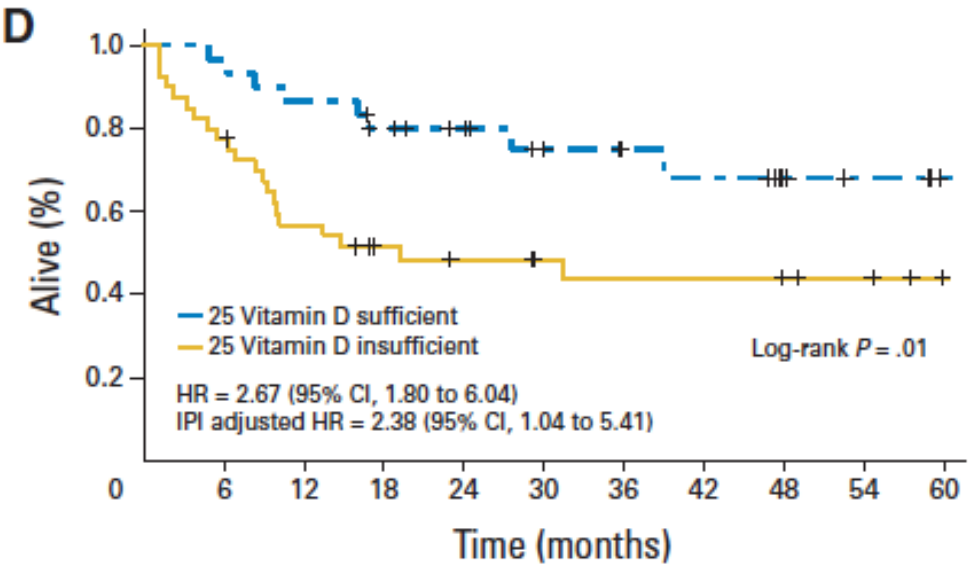
Shananfelt et al., Blood 2011

Lymphoma survival and Vitamin D

DLBCL



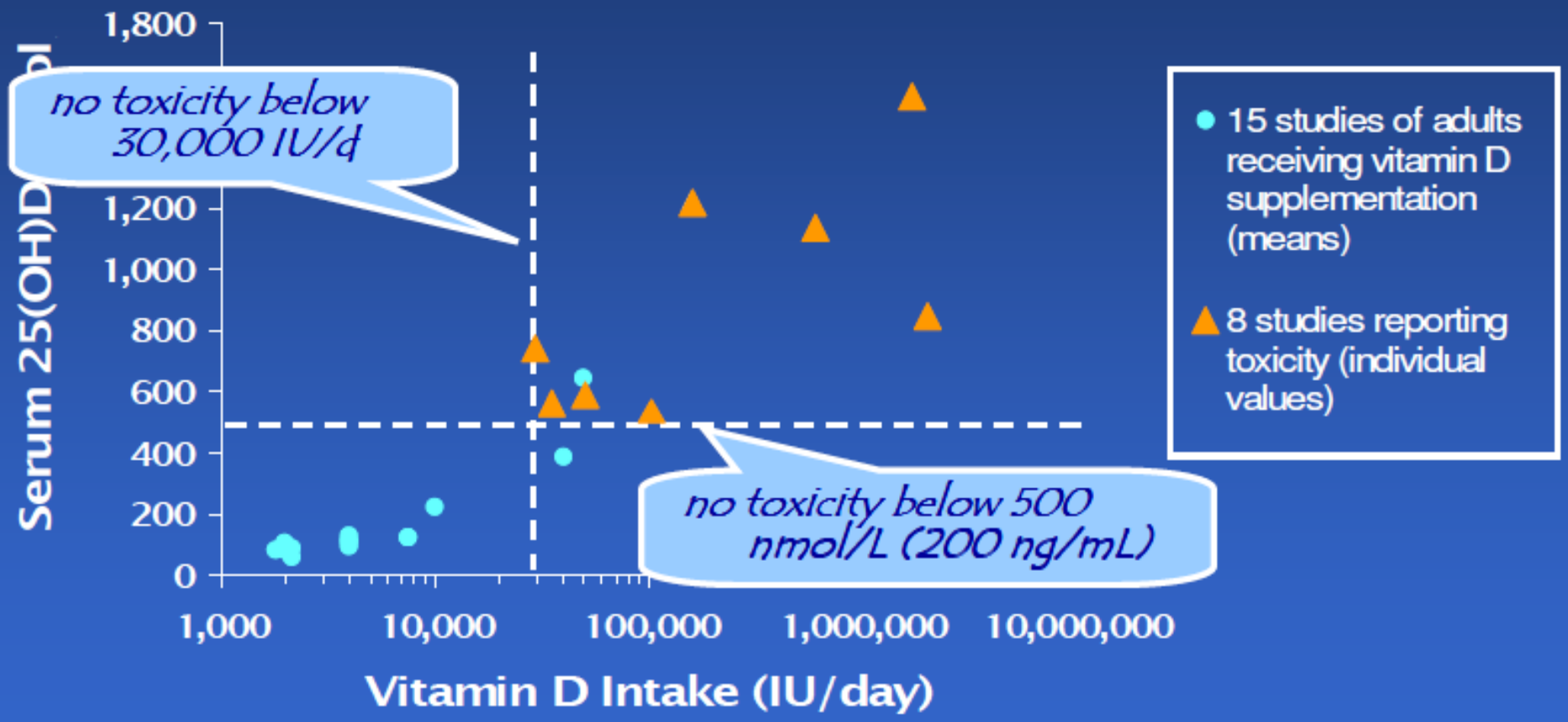
T cell lymphoma



N=983

Drake et al., J Clin Oncol 2010

VITAMIN D INTAKE & TOXICITY*



* Hathcock JN et al. *Am J Clin Nutr*. 2007;85:6–18.

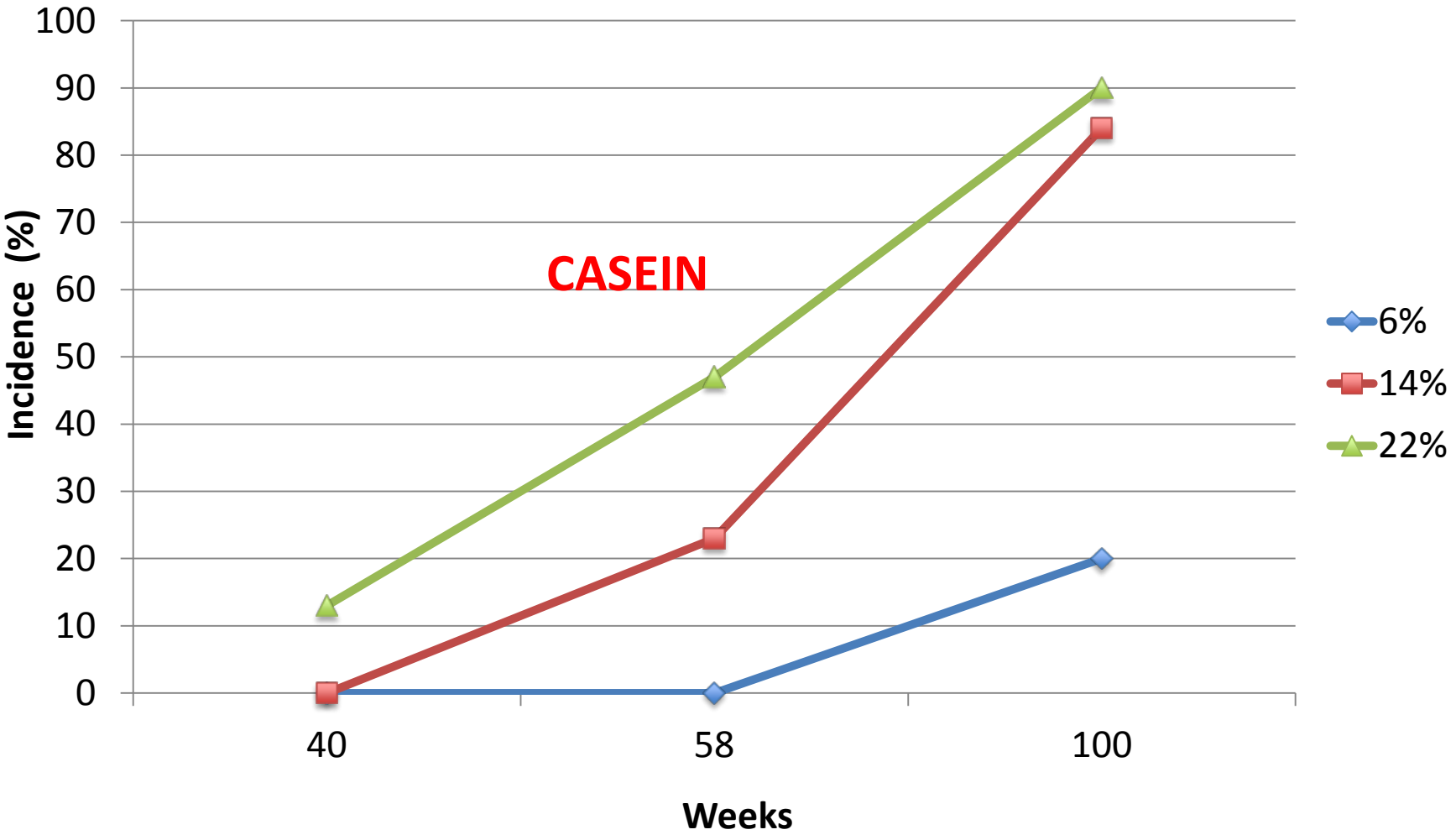
Courtesy Dr. Robert Heaney

How much Vitamin D to take?

- Response to oral doses varies widely
- Minimal levels around 70-80 nmol/L
  - Bones, calcium absorption
- Optimal levels maybe at least 100-125 nmol/L
- Most adults will need 1000 to 3000 IU D3 per day to reach those targets
- Checking blood levels of 25-OH(D) is most accurate

Adapted from Dr. Robert Heaney

Aflatoxin induced liver cancer



Carcinogenesis 1992

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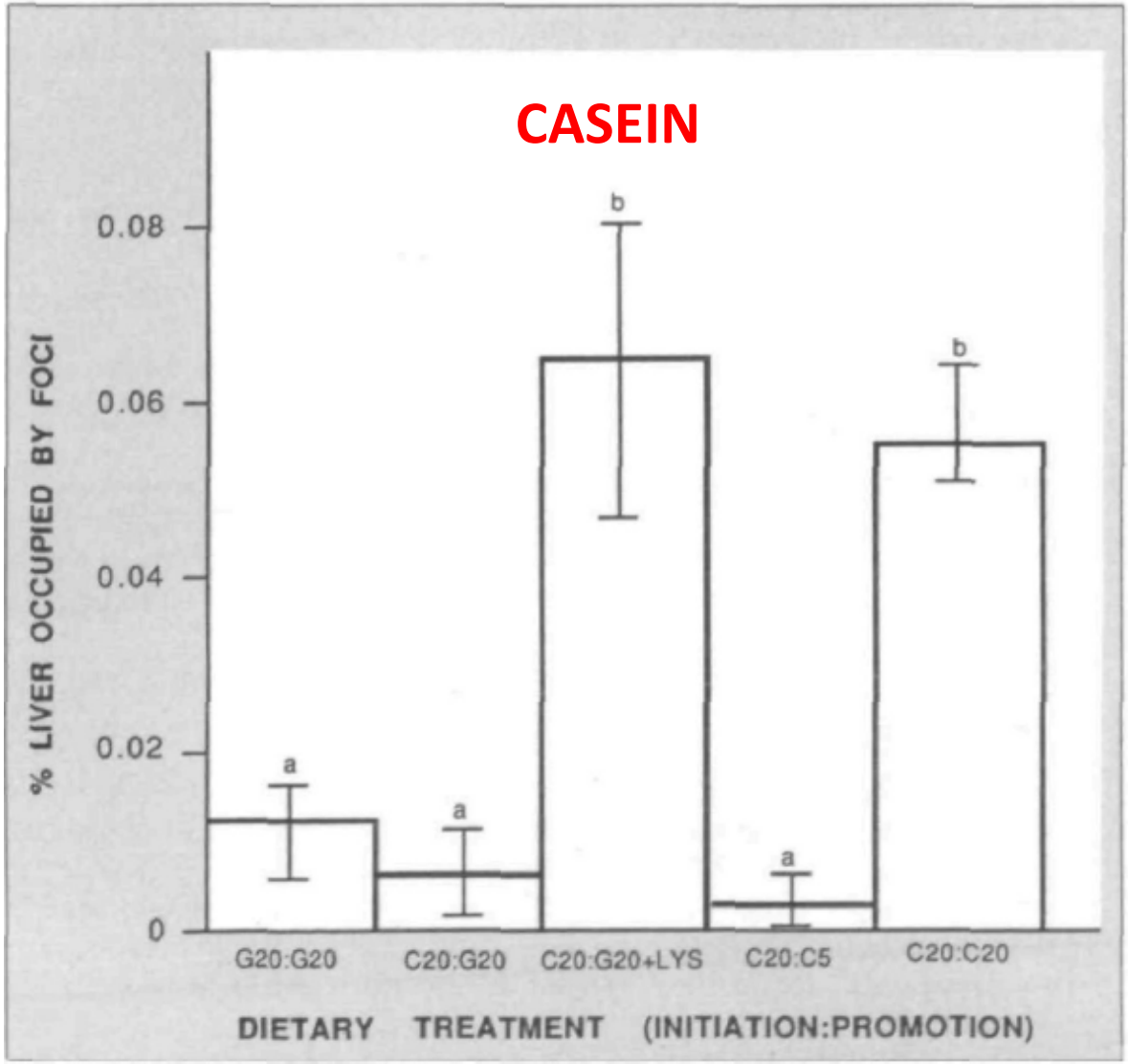


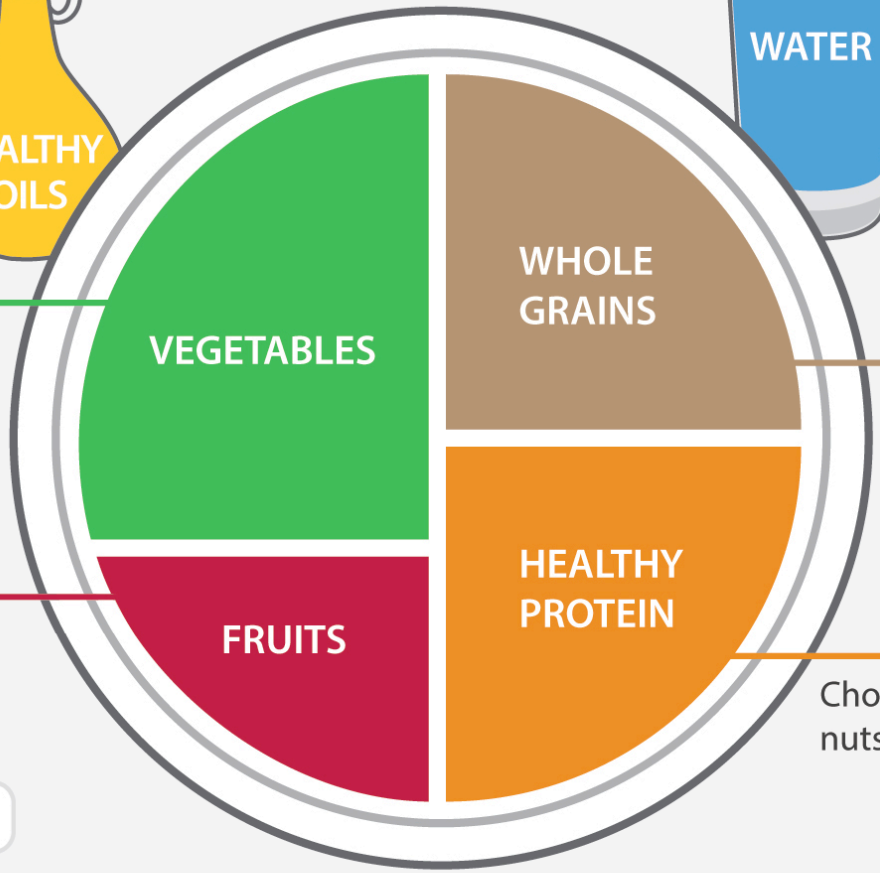
JNCI 1989

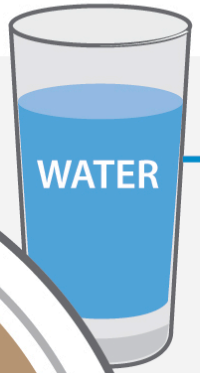
HEALTHY EATING PLATE

Use healthy oils (like olive and canola oil) for cooking, on salad, and at the table. Limit butter. Avoid trans fat.

The more veggies – and the greater the variety – the better. Potatoes and French fries don't count.

Eat plenty of fruits of all colors.





Drink water, tea, or coffee (with little or no sugar). Limit milk/dairy (1-2 servings/day) and juice (1 small glass/day). Avoid sugary drinks.

Eat a variety of whole grains (like whole-wheat bread, whole-grain pasta, and brown rice). Limit refined grains (like white rice and white bread).

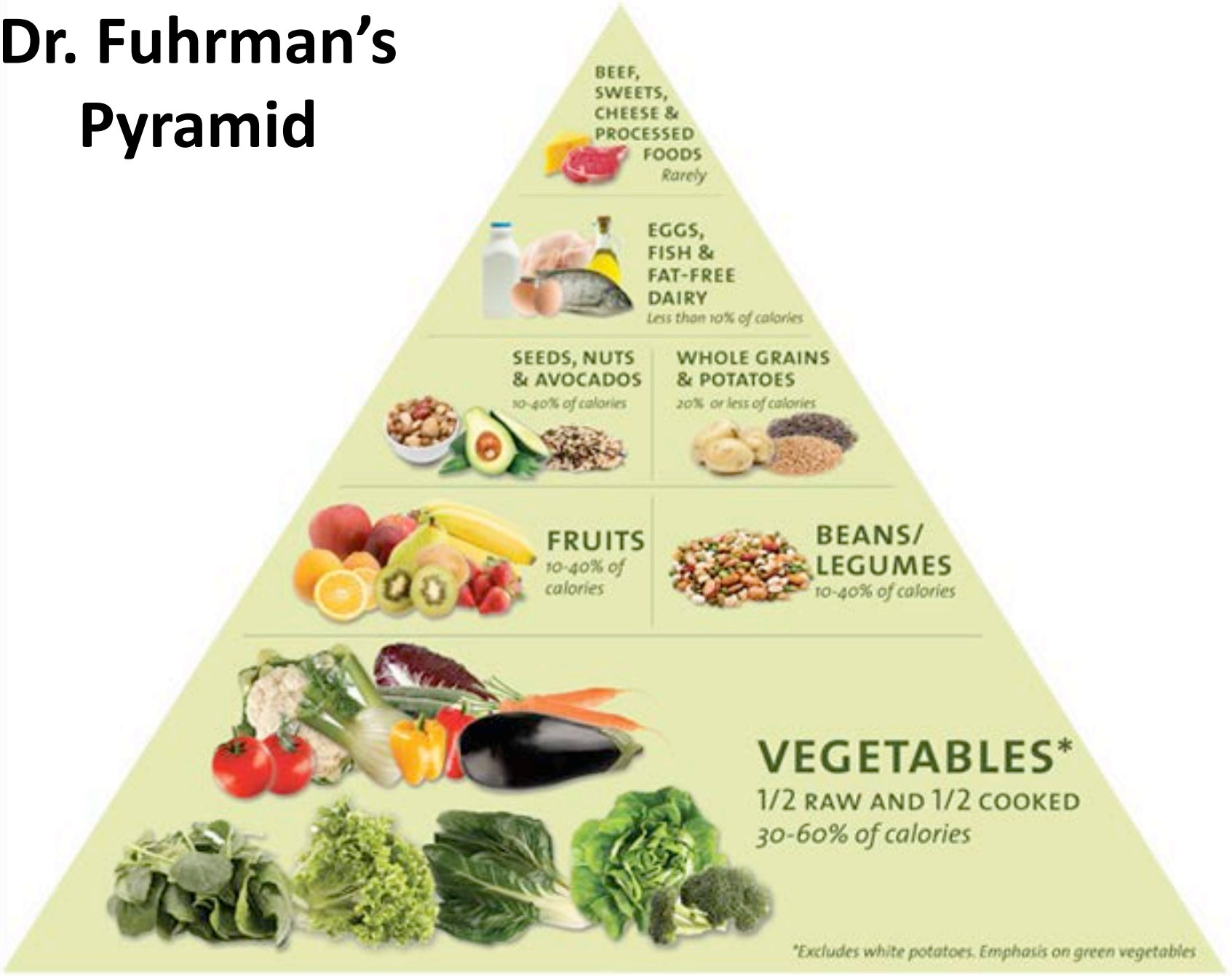
Choose fish, poultry, beans, and nuts; limit red meat and cheese; avoid bacon, cold cuts, and other processed meats.

STAY ACTIVE!

Harvard School of Public Health
The Nutrition Source
www.hsph.harvard.edu/nutritionsource

Harvard Medical School
Harvard Health Publications
www.health.harvard.edu

Dr. Fuhrman's Pyramid



Resource

www.nutritionfacts.org

The China Study. Author: T. Colin Campbell. Ben Bella Books, 2005.

Wheat Belly: Lose the Wheat, Lose the Weight, and Find Your Path Back to Health. Author: William Davis, Harper Collins, 2012.

Thank you !