

Risks and benefits from animal products and their substitutes - *vision from nutritional science*

ATF Seminar: BALANCE PRODUCTION / CONSUMPTION - Animal farming for Humans' well-being and planetary health

7 Nov 2018, Edith J.M. Feskens



About red, white and processed meat..



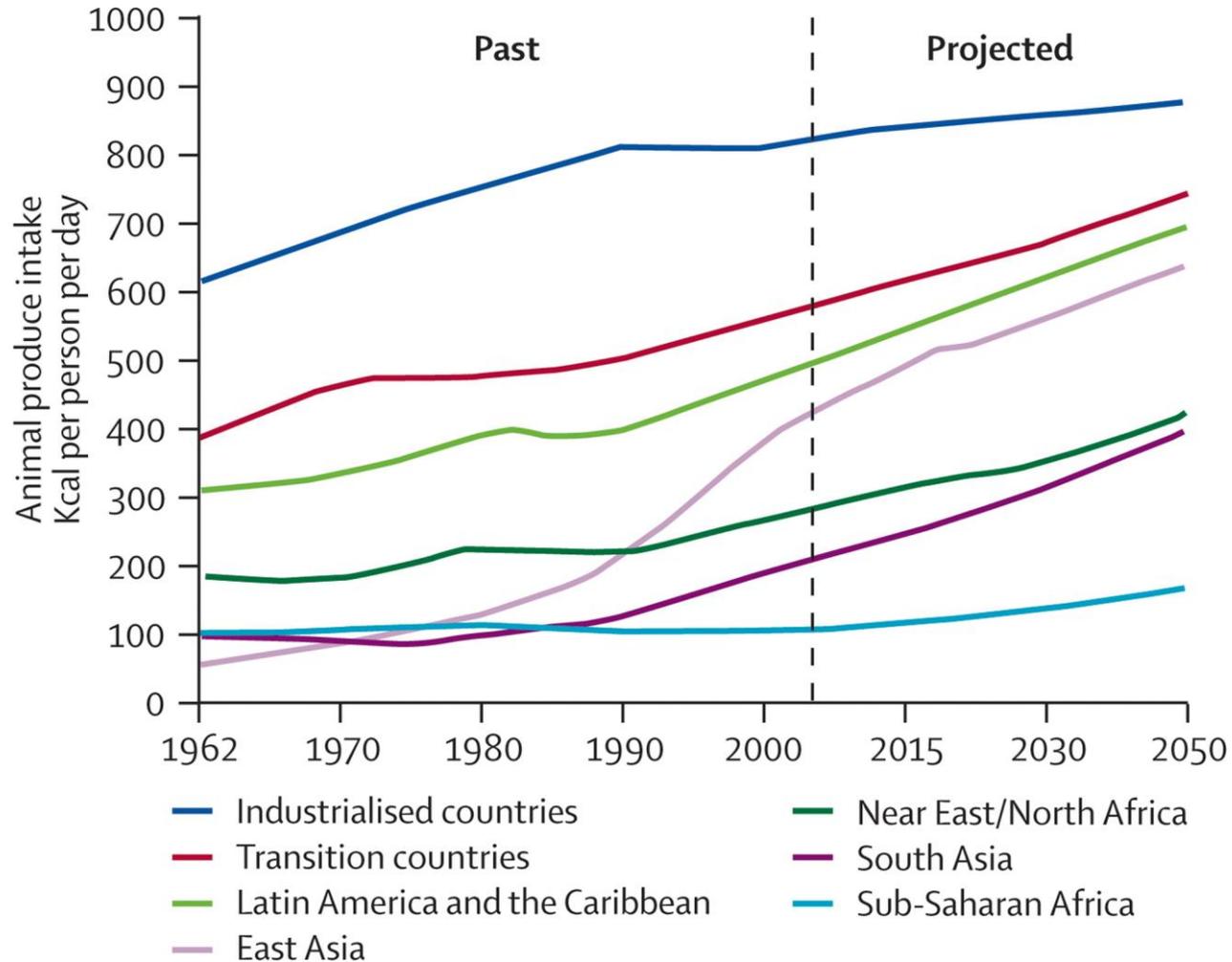
And fish and dairy and eggs..



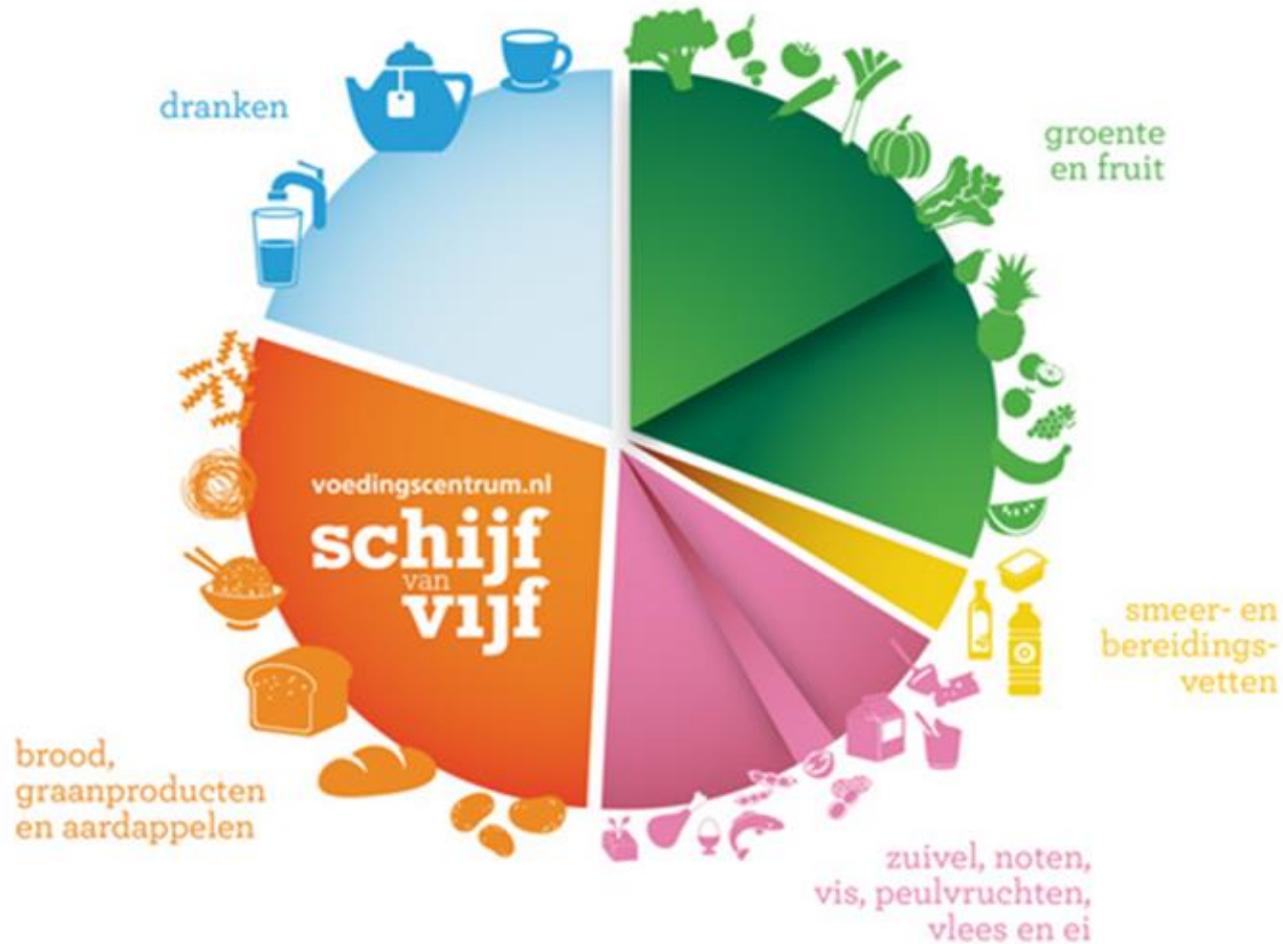
And the substitutes



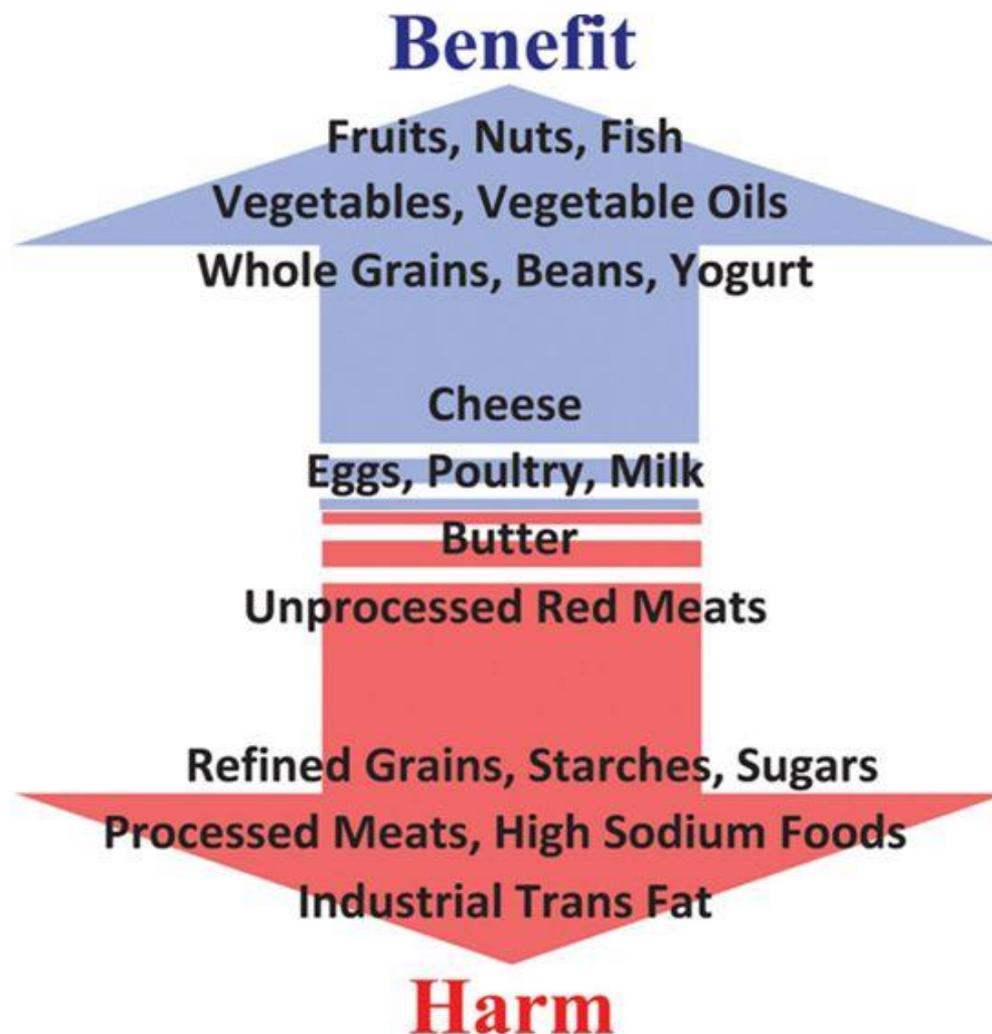
Animal produce intake worldwide



NL Wheel of Five - Now (2016)



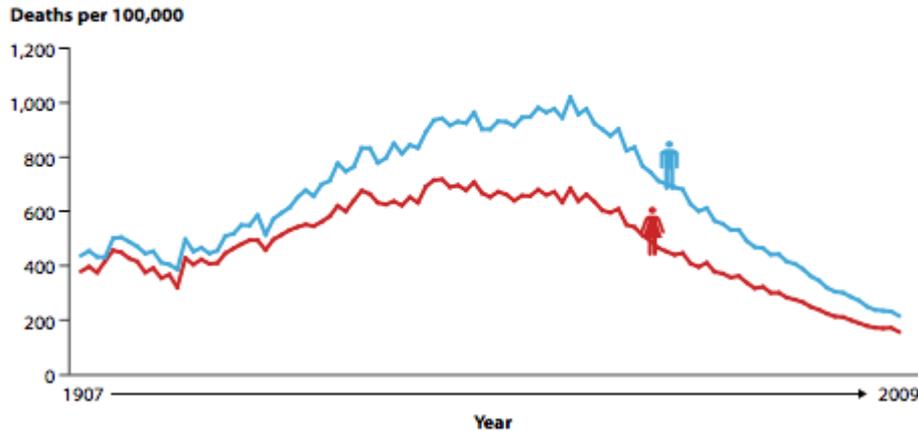
Evidence-based dietary priorities for cardiometabolic health.



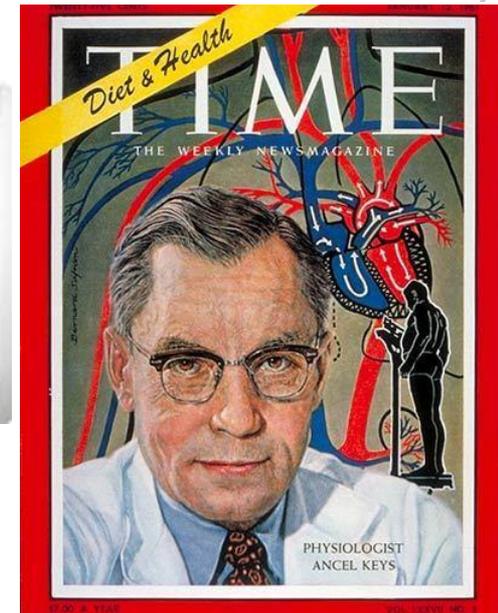
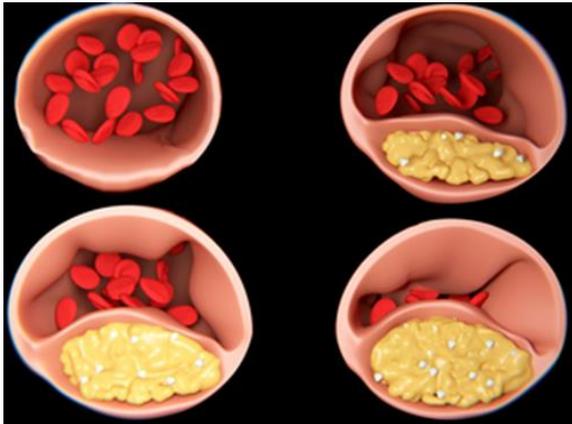
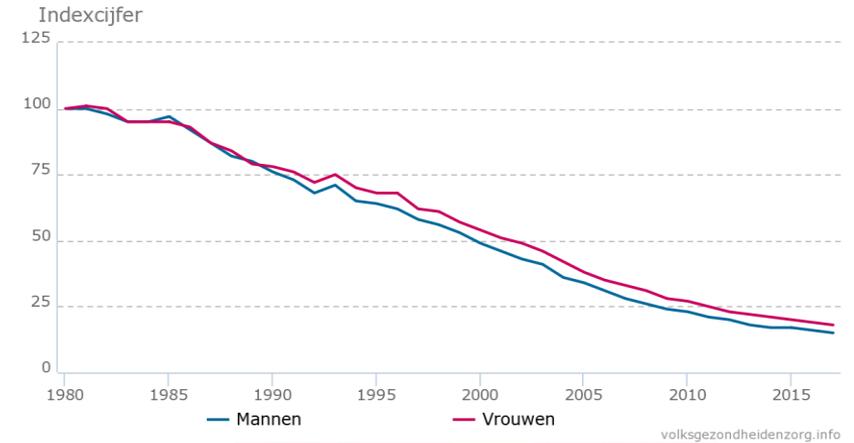
Dariush Mozaffarian *Circulation*. 2016;133:187-225

A piece of history and heart disease

Cardiovascular deaths: trends



Trend sterfte aan coronaire hartziekten 1980-2017



Paradigm for nutritional sciences

"focus on dietary patterns and nutritional status"

	Classical	Modern
Basis for RDA	Prevention of disease	Optimal health
RDA designed for	groups	Groups and individuals
Type of evidence	Clinical "depletion – repletion" model	Meta- analysis of RCT's, Nutrigenomics, system biology approach

Institute of Medicine USA 2006

18

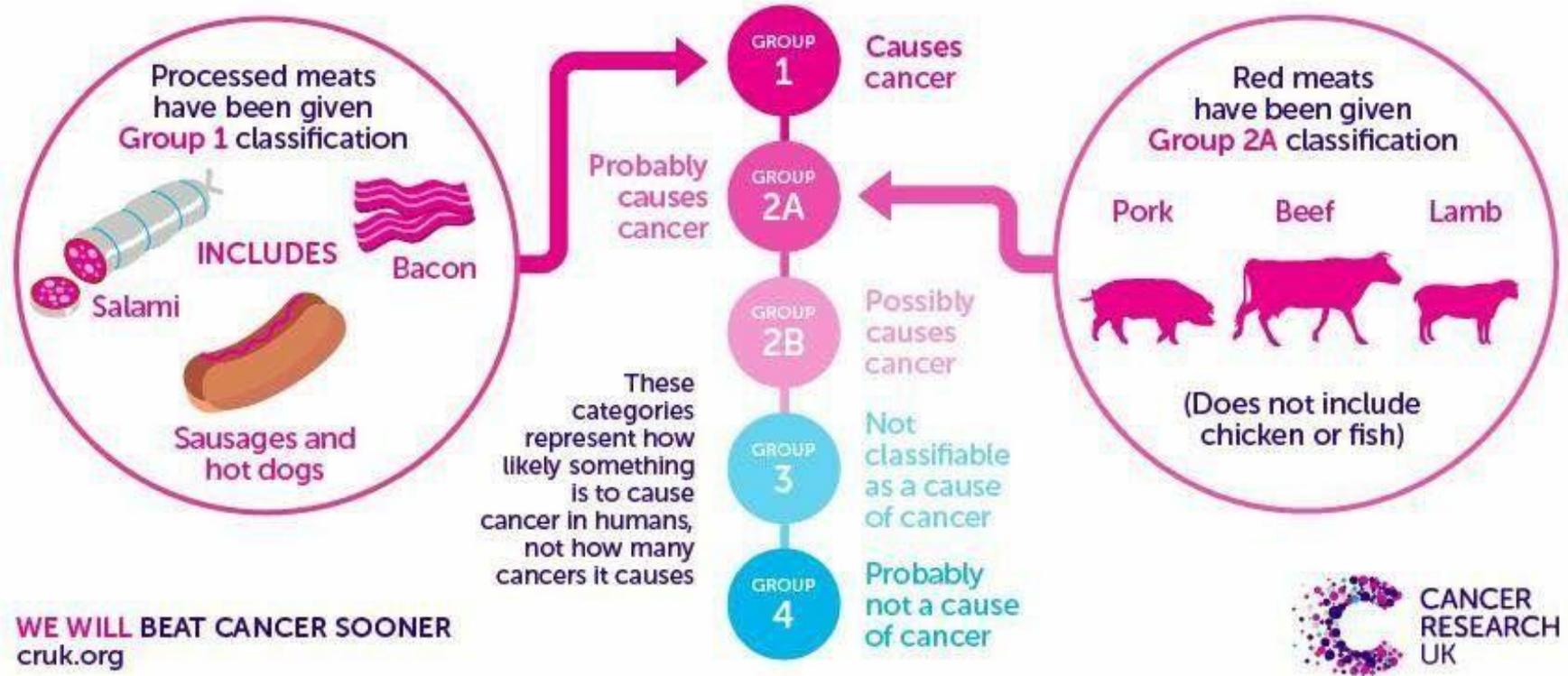
Meat and cancer

- WHO judged the amount evidence for carcinogenicity of processed meat to be similar to that for smoking, asbestos
- However, the effect of 50 gr/d meat is comparable to that of 1/4 cigarette; it is the amount which counts!



MEAT AND CANCER HOW STRONG IS THE EVIDENCE?

IARC CARCINOGENIC CLASSIFICATION GROUPS



Plant versus animal protein

All-cause

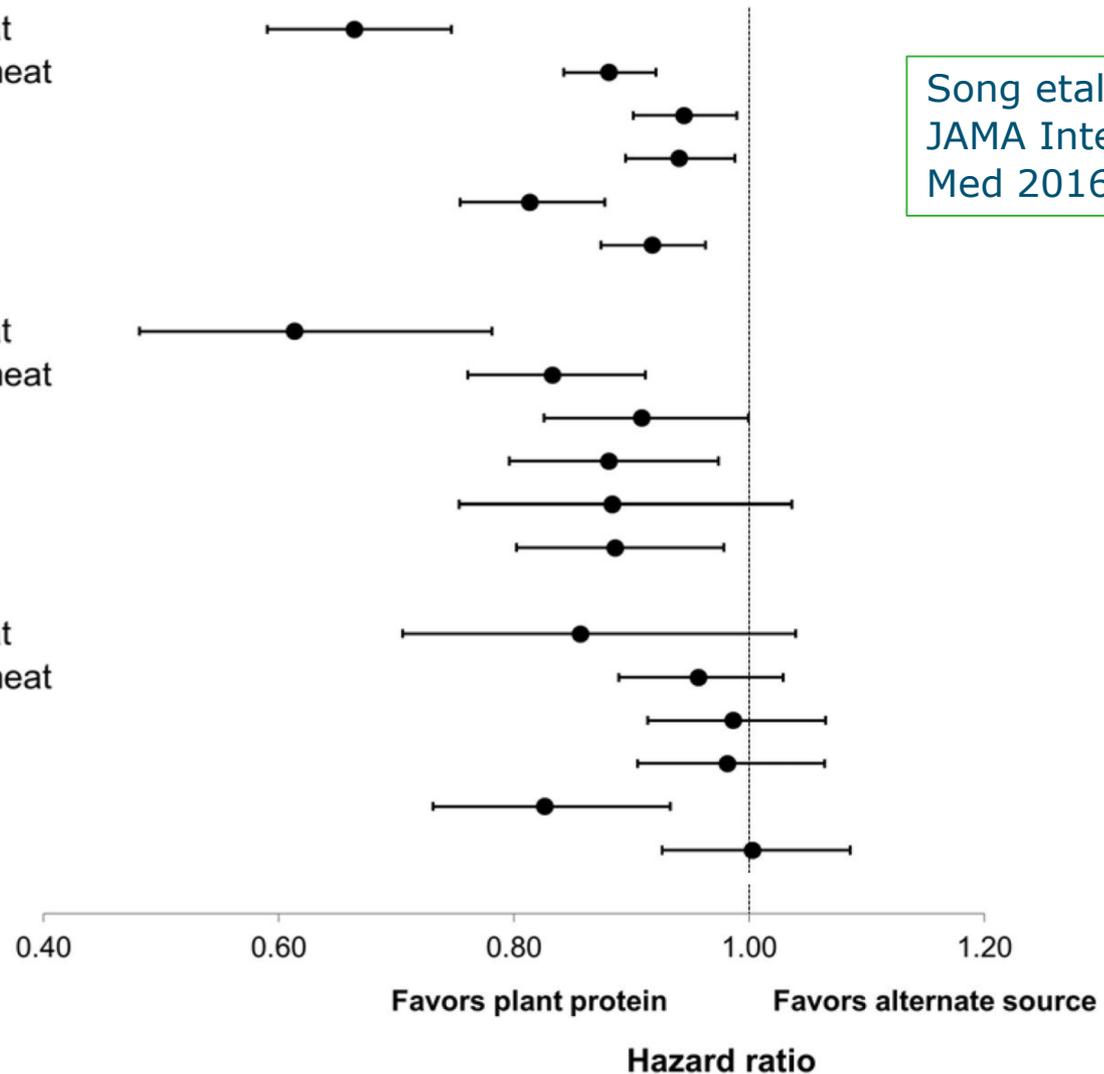
- Processed red meat
- Unprocessed red meat
- Poultry
- Fish
- Egg
- Dairy

CVD

- Processed red meat
- Unprocessed red meat
- Poultry
- Fish
- Egg
- Dairy

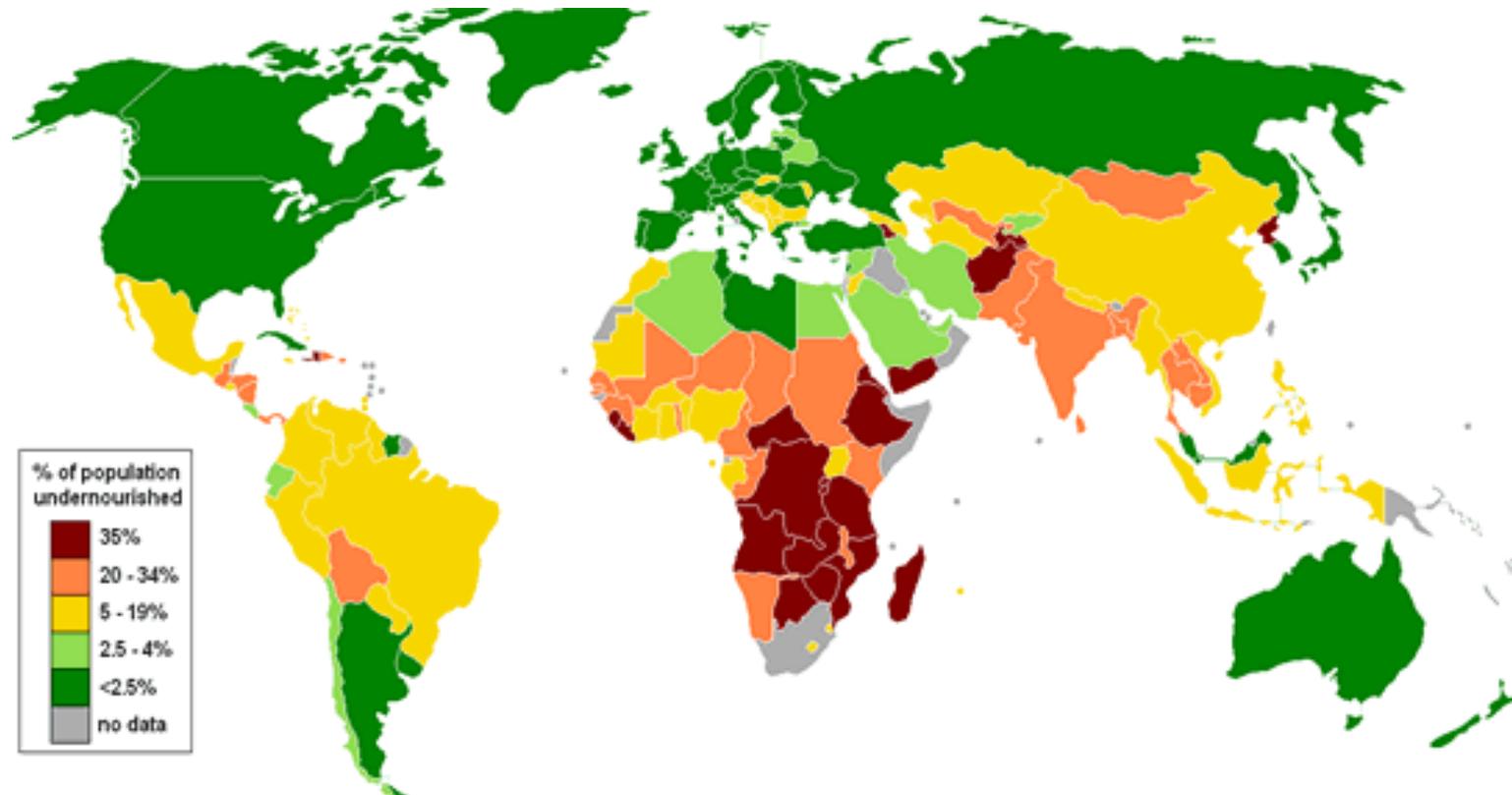
Cancer

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Song et al,
JAMA Intern
Med 2016

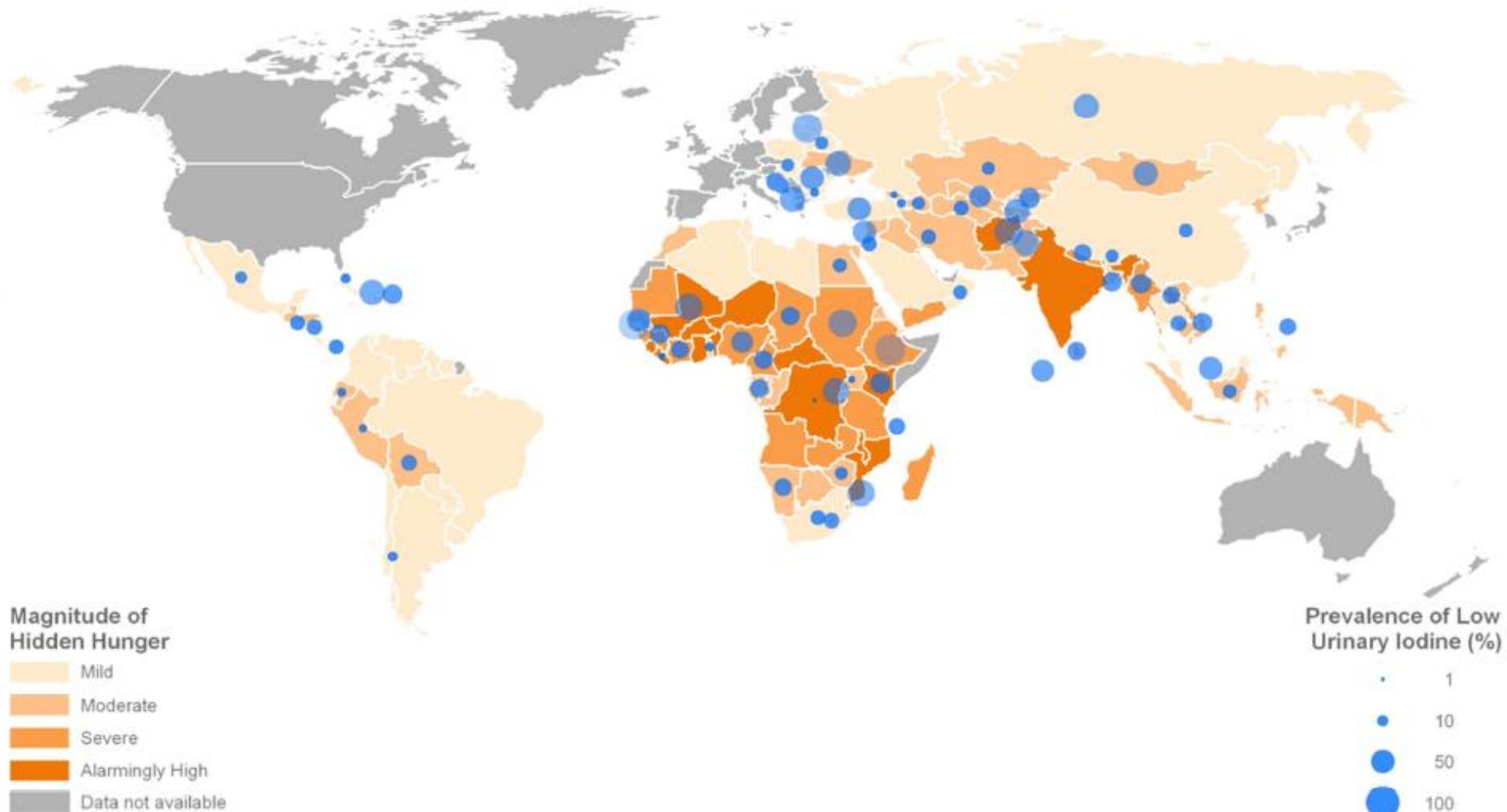
Protein Energy malnutrition



Micronutrient deficiencies

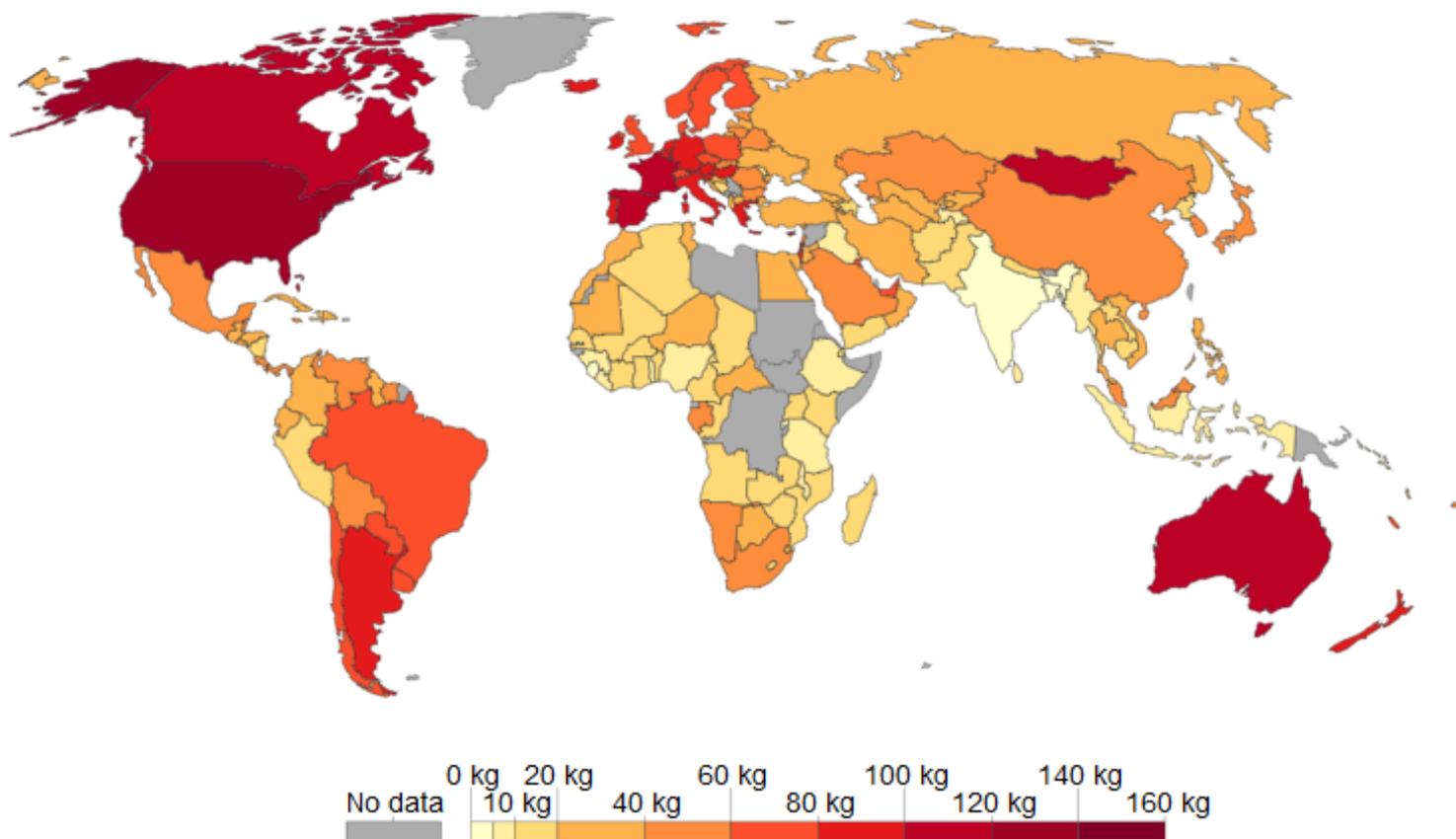
Deficiency	Population at risk	Geographical region	High risk groups
Iodine	1.5 billion (1990) 0.5 billion (2000)	Worldwide	Children, prenatally and up to 2 y post-natally
Iron	2 billion	Worldwide	All, but particularly children and pregnant women
Vitamin A	0.5 billion	Developing countries	Children aged <5 y, pregnant women
Zinc	2.9 billion	Developing countries	Children aged <5 y,

Prevalence of Hidden Hunger (Fe, Zn, I, vitA)



Meat supply per person, 2000

Average total meat supply per person measured in kilograms per year. Note that these figures do not correct for waste at the household/consumption level so may not directly reflect the quantity of food finally consumed by a given individual.



Source: FAOstats

Note: Data excludes fish and other seafood sources

OurWorldInData.org/meat-and-seafood-production-consumption/ • CC BY-SA

Protein Requirements (RDA)

Condition	Daily needs, g/kg/d
Normal	0.8
Elderly	1
Stress Response	1.5-2
Correct PEM	1.5
Presence of wound	1.2-1.5
Restore lost weight	1.5



Protein quality ranking

Protein Type	Protein Efficiency Ratio	Biological Value	Net Protein Utilization	Protein Digestibility Corrected Amino Acid Score
Beef	2.9	80	73	0.92
Black Beans	0		0	0.75
Casein	2.5	77	76	1.00
Egg	3.9	100	94	1.00
Milk	2.5	91	82	1.00
Peanuts	1.8			0.52
Soy protein	2.2	74	61	1.00
Wheat gluten	0.8	64	67	0.25
Whey protein	3.2	104	92	1.00

Adapted from: U.S Dairy Export Council, Reference Manual for U.S. Whey Products 2nd Edition, 1999 and Sarwar, 1997.

Benefits for weight loss?



- High protein diets (20-25 en%):
 - Thermogenic effect
 - Higher satiety
 - Easier to sustain weight loss?
- PreView cohort studies:
subjects with higher animal protein intake have higher BMI, and hence higher diabetes incidence
- So: conflicting data from interventions and epidemiology

Benefits of animal products



■ Meat

- High-quality and bioavailable protein
- Free and heme iron
- Zinc
- B vitamins (B12)

■ Fish

- Long-chain omega-3 fatty acids
- Selenium

■ Dairy

- Calcium
- B vitamins

■ Eggs

- B vitamins
- Vitamin A,D,E

General benefits of the substitutes

- Cereal based: dietary fibers
B vitamins (not B12)
non-heme iron
- Soy: good quality protein
- Legumes: dietary fibers
- Vegetables: dietary fibers, antioxidants
- Insects: ?

(be aware of sugar or salt in the meat or milk looking substitutes)



Protein intake PreView cohorts

Variable	Lifelines (75,778)	Nqplus (1316)	Young Finns Study (1502)
Age (yr)	46	54	38
Energy, kcal/day	2058	2056	2309
Total protein, en%	14.9	14.7	17.5
Total protein, g/d	75.3	74.5	100.2
Plant-based protein, g/d	23.8	34.4	21.8
Animal protein, g/d	37.5	40.2	71.2
Total protein, g/kg/d	0.98	1.0	1.4

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Total protein, en%	14.9 (2.2)	14.7 (2.1)	17.5 (2.4)
Total protein, g/d	75.3 (19.7)	74.5 (19.1)	100.2 (28.9)
Plant-based protein, g/d	23.8 (5.9)	34.4 (10.9)	21.8 (7.8)
Animal protein, g/d	37.5 (10.7)	40.2 (13.3)	71.2 (23.7)
Total protein, g/kg/d	0.98 (0.21)	1.0 (0.2)	1.4 (0.3)

In Short..

- Animal products are an important, and many cases, essential part of the diet
- In Europe we generally eat more than recommended, although intake in the elderly is usually less
- What is the optimal ratio of animal:vegetable protein?
 - Depends on the food source used!



Acknowledgement

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