

Food as Medicine: East Meets West

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Departments of Nutrition
Harvard T.H. Chan School of Public Health
Professor of Medicine
Harvard Medical School

Food as Medicine

- ***Let Food be thy medicine and medicine be thy food***
--- *Hippocrates circa 431 B.C.*
- ***Medicine and Food are of the Same Source***
--- *Neijing, The Yellow Emperor's Classic of Internal Medicine, China (300 B.C.)*

Food as Preventive Medicine

- **Superior doctors prevent disease. Mediocre doctors treat the disease before it is evident. Inferior doctors treat the full-blown disease.**

--- Neijing, The Yellow Emperor's Classic of Internal Medicine, China (300 B.C.)

THE BLUE ZONES



Sardinia, Italy
Okinawa, Japan
Nicoya, Costa Rica
Icaria, Greece
Loma Linda, California

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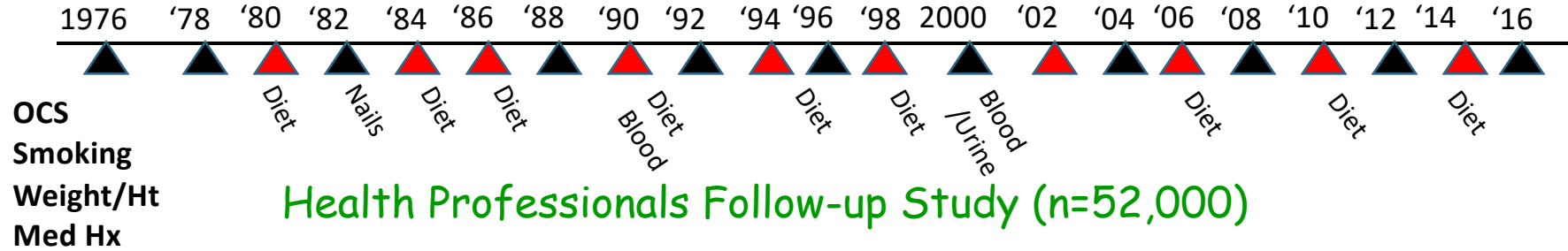
Travel around the world with author Dan Buettner to discover five unique communities where people live extraordinarily long and vibrant lives.



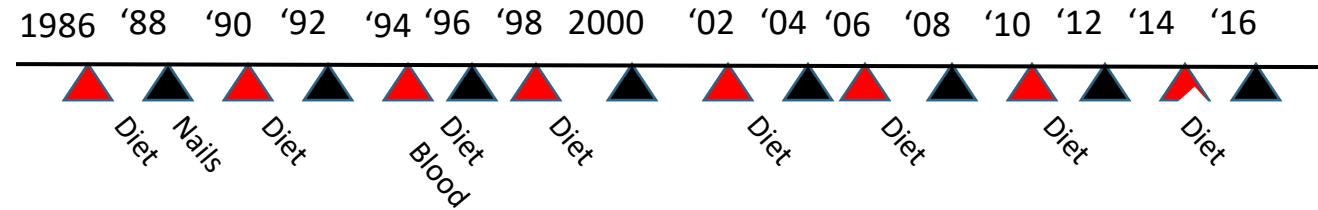
Dietary Strategies for Chronic Disease Prevention and Longevity

- Calorie restriction (including fasting)
 - Protein and amino acid restriction
 - Ketogenic/low carb diets
 - Vegetarian/vegan diet
 - Mediterranean diet
 - Okinawa diet
- 

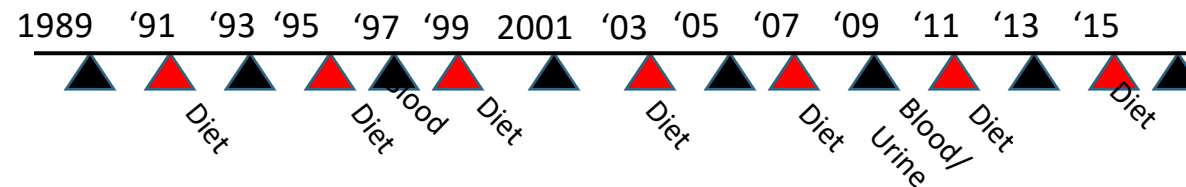
Nurses' Health Study (n=121,700)



Health Professionals Follow-up Study (n=52,000)



Nurses' Health Study II (n=116,000)



Biorepository: Blood, DNA, urine, stool, saliva, toenails, tumor tissues

Investigators: Frank Speizer, Bernie Rosner, Meir Stampfer, Graham Colditz, David Hunter, JoAnn Manson, Sue Hankinson, Eric Rimm, Edward Giovannucci, Alberto Ascherio, Gary Curhan, Charles Fuchs, Fran Grodstein, Michelle Holmes, Donna Spiegelman, Frank Hu, Heather Eliassen, Lorelei Mucci

Trajectories of body shape by age in women (top) and men (bottom)

Mortality risk among non-smokers:

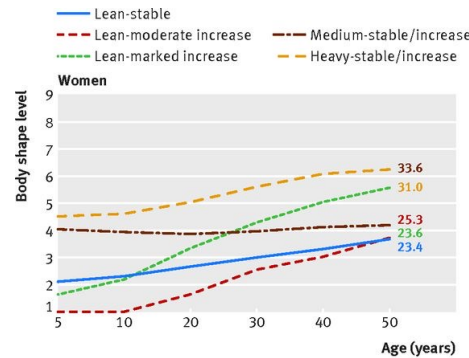
Lifelong lean group: 1.00

Lean moderate increase: 1.08
(95% CI 1.02-1.14)

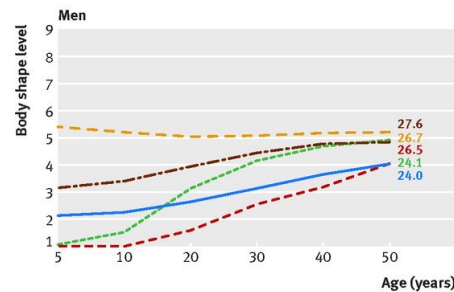
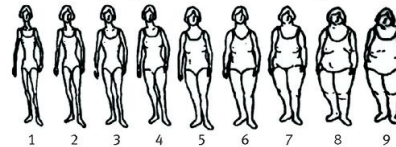
Lean marked increase: 1.43
(1.33-1.54)

Medium stable: 1.04 (0.97-1.12)

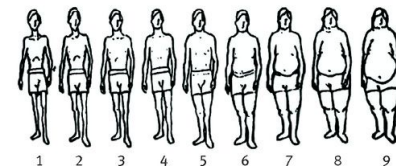
Heavy stable/increase: 1.64
(1.49-1.81)



Stunkard body diagram in women (reference 19)

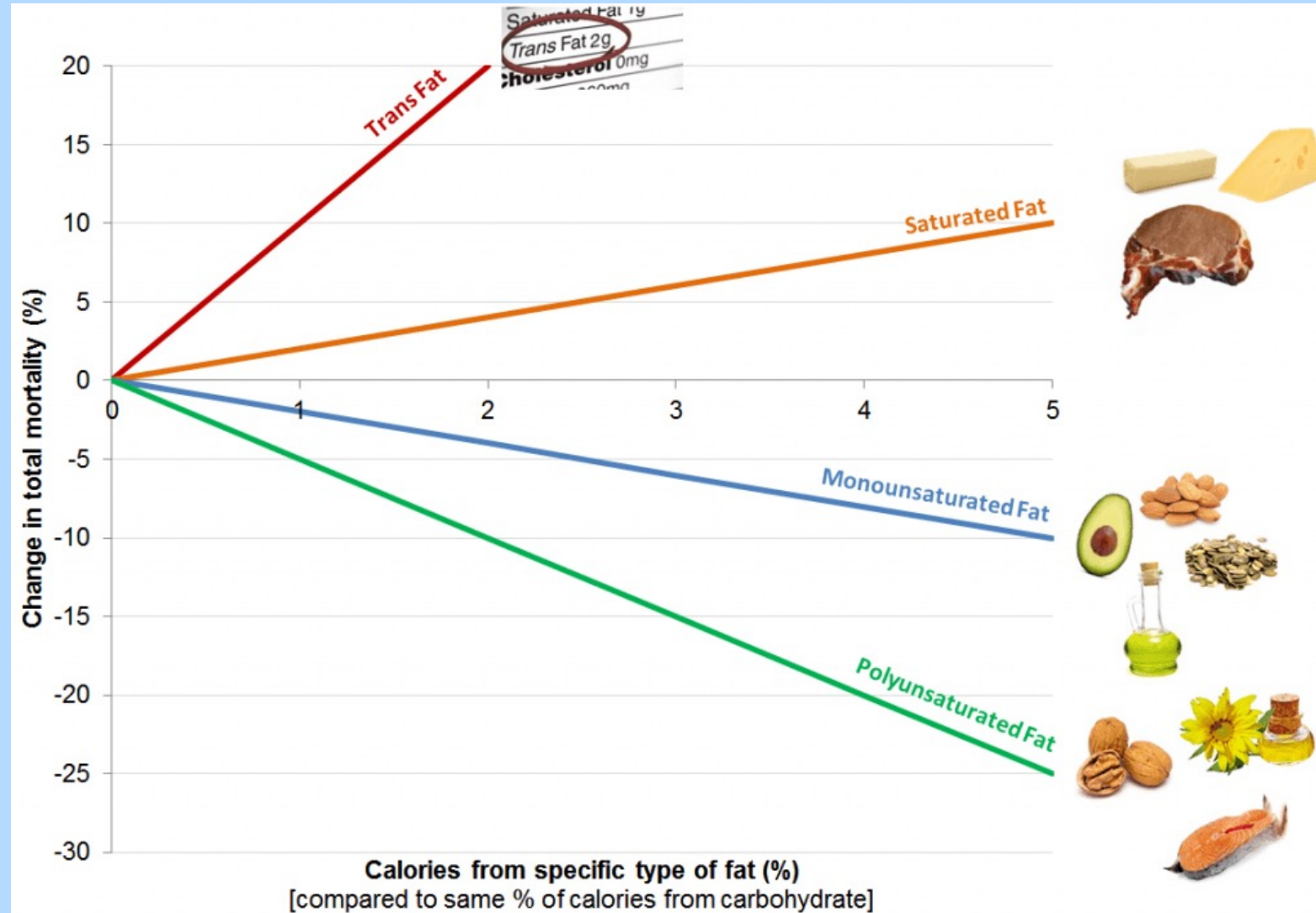


Stunkard body diagram in men (reference 19)

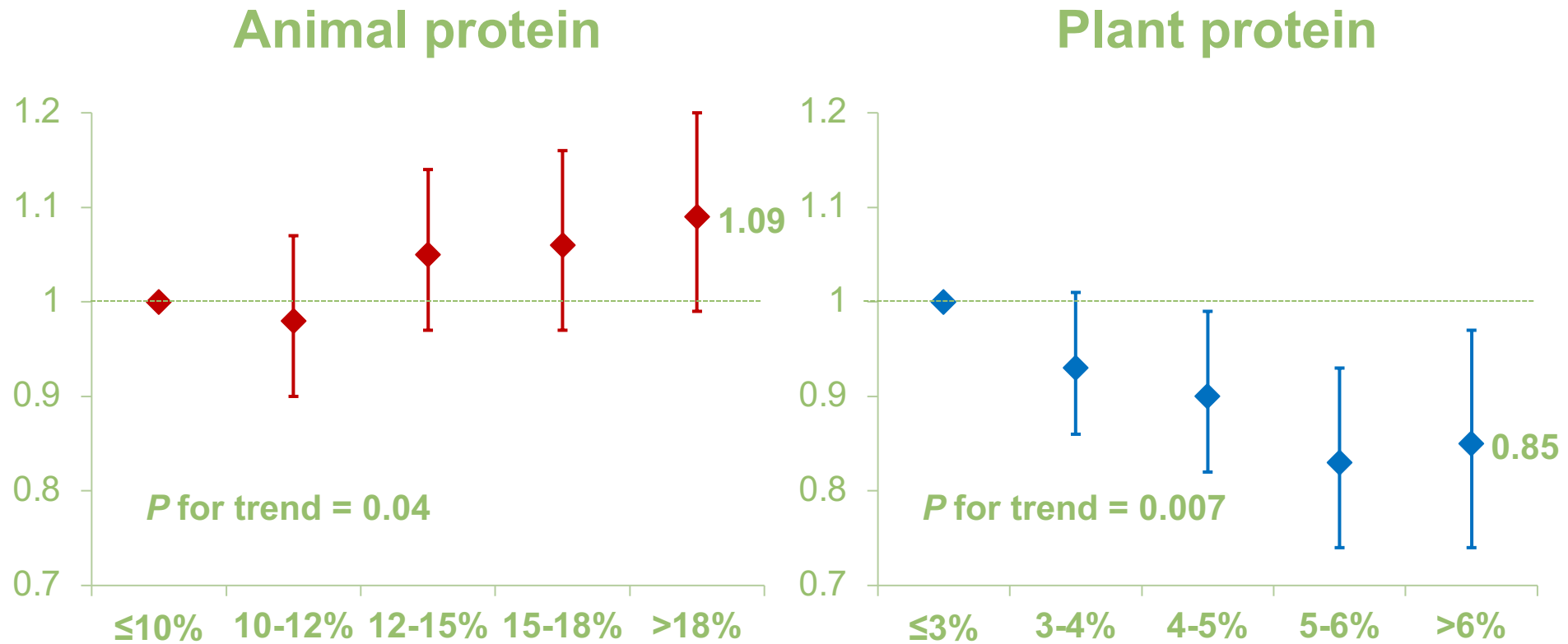


This study provides indirect evidence that mild lifelong caloric restriction may contribute to longevity

Types of dietary fat and total mortality



Association of animal and plant protein with cardiovascular mortality (n=8,851)





PERSPECTIVE

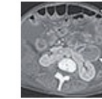
Sexual and Gender Minority Refugees — Preparing Clinicians for the International...

NEJM GROUP PODCASTS



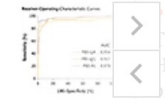
CASE RECORDS OF THE MGH

Case 27-2023: A 53-Year-Old Woman with Celiac Disease and Upper Gastrointestinal...



ORIGINAL ARTICLE

Anti-Epstein-Barr Virus BNLF2b for Mass Screening for Nasopharyngeal Cancer



ORIGINAL ARTICLE

Low-Carbohydrate-Diet Score and the Risk of Coronary Heart Disease in Women

Thomas L. Halton, Sc.D., Walter C. Willett, M.D., Dr.P.H., Simin Liu, M.D., Sc.D., JoAnn E. Manson, M.D., Dr.P.H., Christine M. Albert, M.D., M.P.H., Kathryn Rexrode, M.D., and Frank B. Hu, M.D., Ph.D.

Articles | 7 September 2010

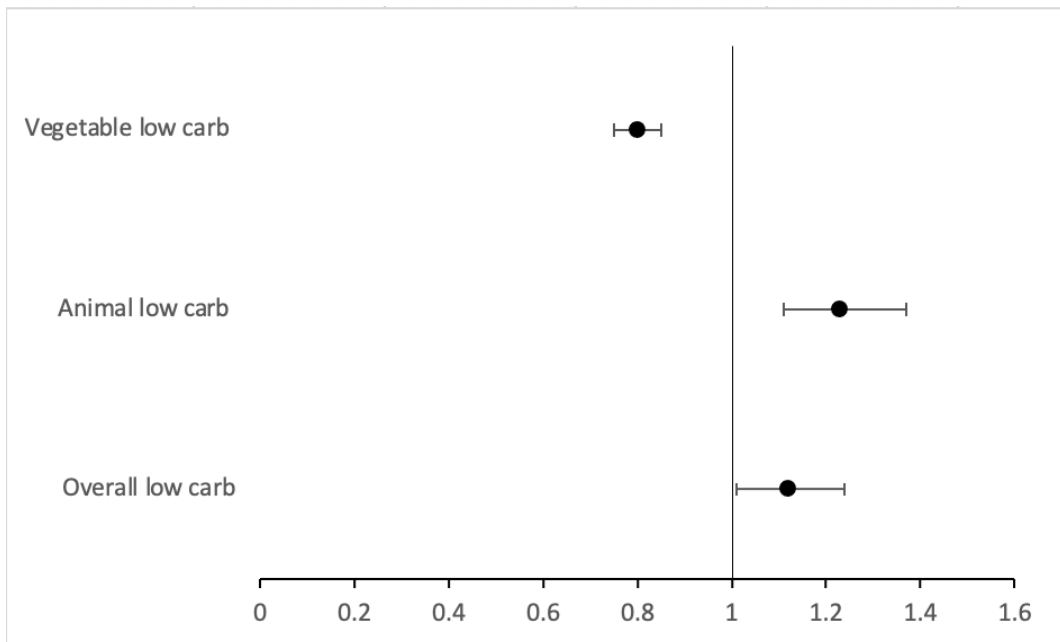
Low-Carbohydrate Diets and All-Cause and Cause-Specific Mortality

Two Cohort Studies

Teresa T. Fung, ScD, Rob M. van Dam, PhD, Susan E. Hankinson, ScD, Meir Stampfer, MD, DrPH,

Walter C. Willett, MD, DrPH, and Frank B. Hu, MD, PhD [View fewer authors](#)

[Author, Article, and Disclosure Information](#)



Western-style fast food intake and diabetes



- Singapore Chinese Health Study
 - Consumption greater than 2 times per week had a 27% increased diabetes risk
 - 56% increased risk of dying from heart disease
- Nurses Health Study
 - Frequent consumption of French fries
- Black Women's Health Study
 - Frequent burger and fried chicken meals

Sugar-Sweetened Beverages



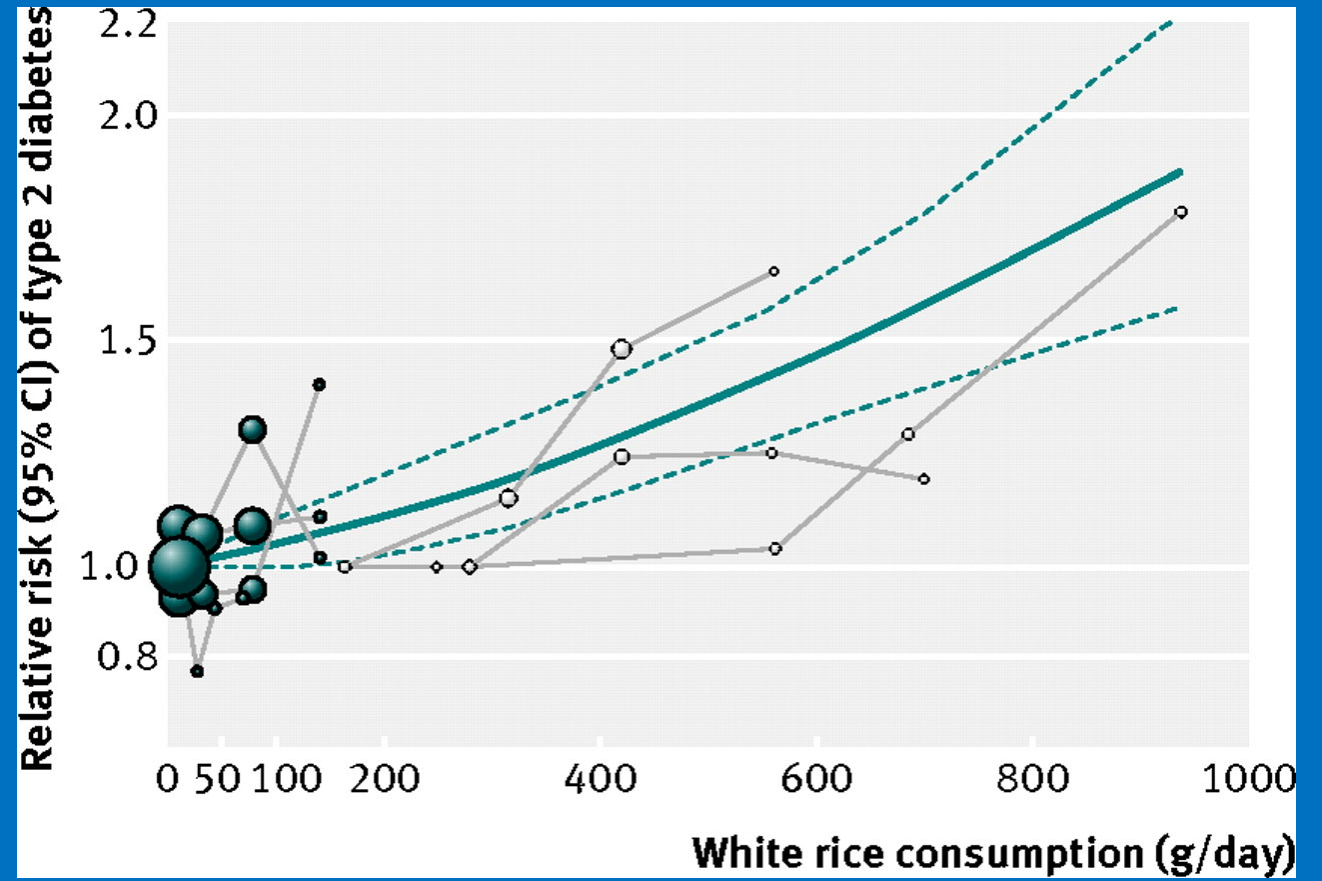
- 1 can of soda contains 10 teaspoons of sugar (140 calories)
- Linked to weight gain
 - Added calories with low satiety
- Type 2 diabetes
 - Raise blood glucose and insulin rapidly

Refined Grains

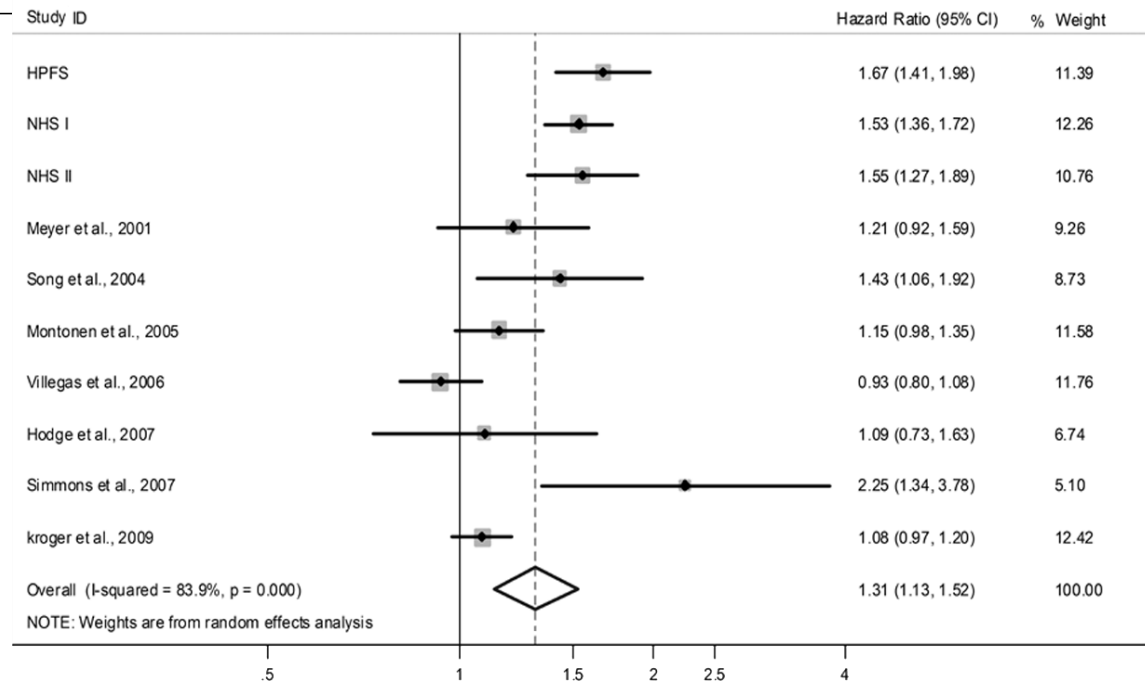
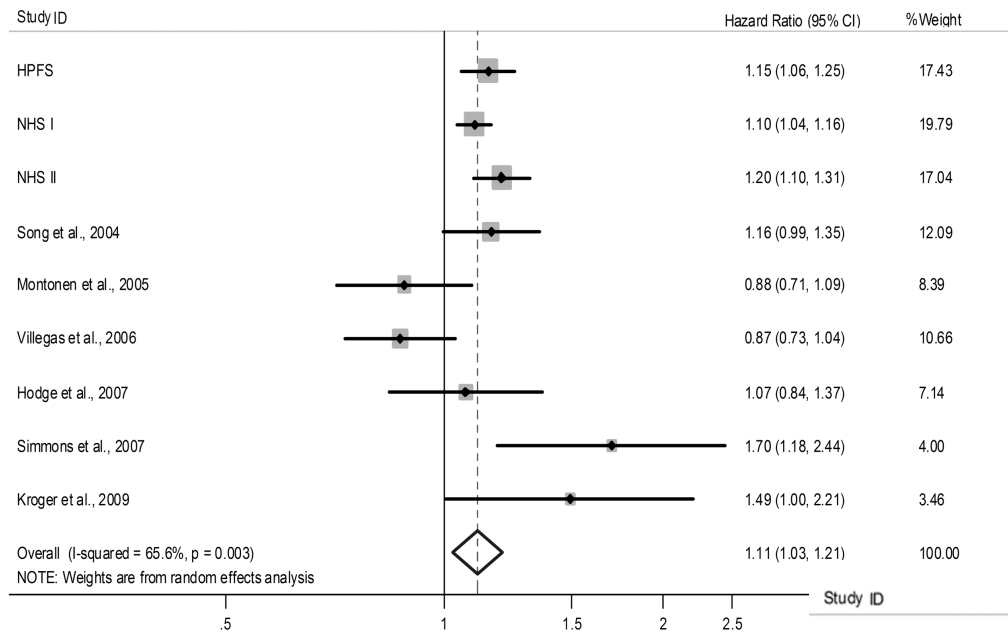


White rice consumption and risk of type 2 diabetes: a meta analysis

- Each serving per day associated with 11% increased risk
- Association stronger for Asian populations
- Higher glycemic index and load

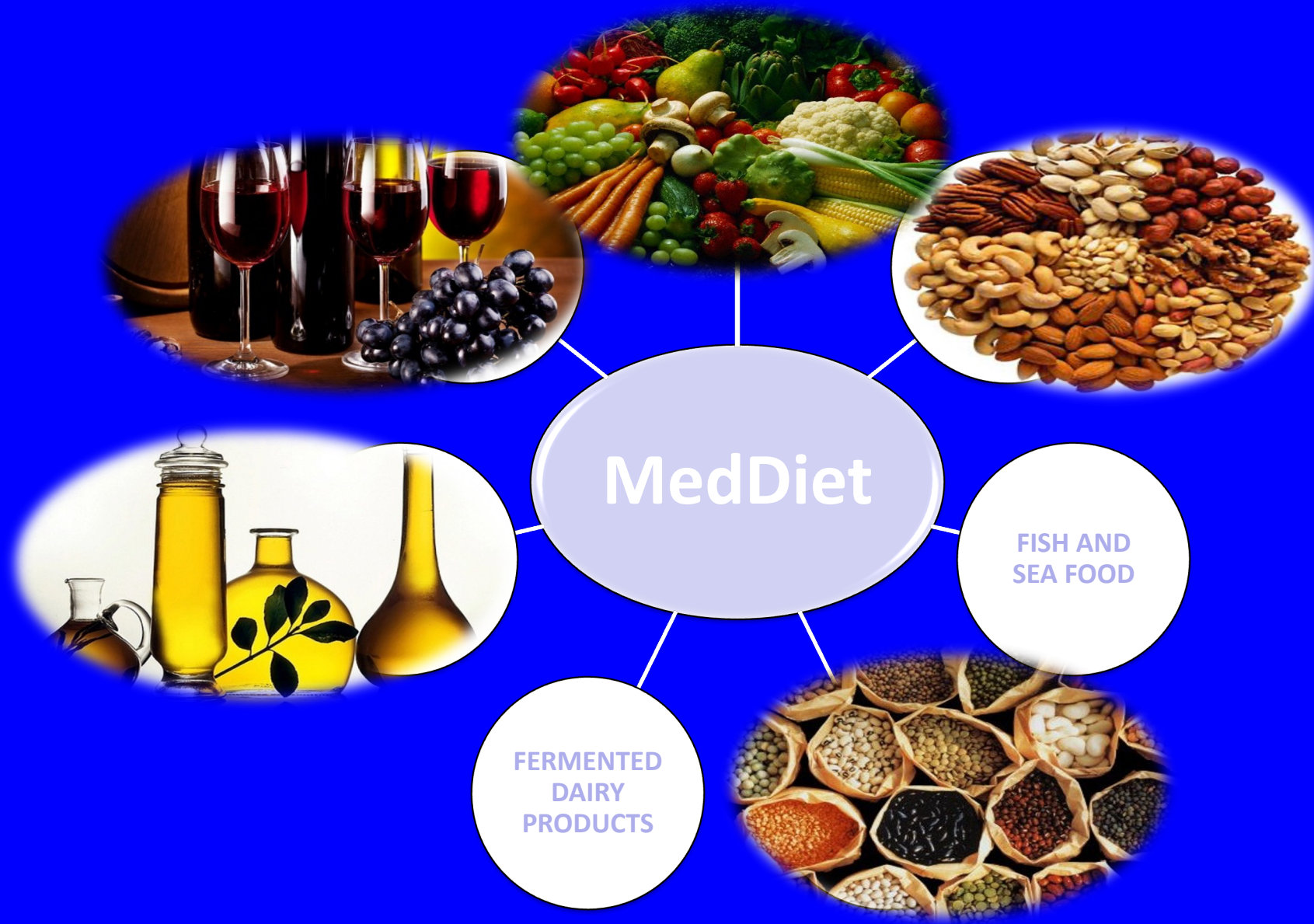


Meta-analysis of red meat intake and T2 diabetes



Pan et al., AJCN 2011

Components of the Mediterranean Diet high in plant-based foods



ORIGINAL ARTICLE

Association of Nut Consumption with Total and Cause-Specific Mortality

Ying Bao, M.D., Sc.D., Jiali Han, Ph.D., Frank B. Hu, M.D., Ph.D., Edward L. Giovannucci, M.D., Sc.D., Meir J. Stampfer, M.D., Dr.P.H., Walter C. Willett, M.D., Dr.P.H., and Charles S. Fuchs, M.D., M.P.H.

JAHA

Journal of the American Heart Association

AHA Journals Journal Information All Issues Subjects Features Resourc

Home > Journal of the American Heart Association > Vol. 11, No. 7 > Avocado Consumption and Risk of Cardiovascula...

6 OPEN ACCESS RESEARCH ARTICLE

Avocado Consumption and Risk of Cardiovascular Disease in US Adults

Lorena S. Pacheco, Yanping Li, Eric B. Rimm, JoAnn E. Manson, Qi Sun, Kathryn Rexrode, Frank B. Hu and Marta Guasch-Ferré

PDF/EPUB

Originally published 30 Mar 2022 | <https://doi.org/10.1161/JAHA.121.024014> | Journal of the American Heart Association. 2022;11:e024014

Tools Share

Circulation

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
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VOL. 75, NO. 15, 2020

ORIGINAL INVESTIGATIONS

AHA Journals Journal Information All Issues Subjects Features Resourc

Home > Circulation > Vol. 143, No. 17 > Fruit and Vegetable Intake and Mortality

FREE ACCESS RESEARCH ARTICLE

Fruit and Vegetable Intake and Mortality

Results From 2 Prospective Cohort Studies of US Men and Women and a Meta-Analysis of 26 Cohort Studies

Dong D. Wang, Yanping Li, Shilpa N. Bhupathiraju, Bernard A. Rosner, Qi Sun, Edward L. Giovannucci, Eric B. Rimm, JoAnn E. Manson, Walter C. Willett, Meir J. Stampfer and Frank B. Hu

Tools Share

Olive Oil Consumption and Cardiovascular Risk in U.S. Adults

Marta Guasch-Ferré, PhD, Gang Liu, PhD, Yanping Li, PhD, Laura Sampson, RD, JoAnn E. Manson, MD, DrPH, Jordi Salas-Salvadó, MD, PhD, Miguel A. Martínez-González, MD, PhD, Meir J. Stampfer, MD, PhD, Walter C. Willett, MD, DrPH, Qi Sun, MD, PhD, Frank B. Hu, MD, PhD



Circulation

AHA Journals Journal Information All Issues Subjects Features Resourc

Home > Circulation > Vol. 133, No. 24 > Whole Grain Intake and Mortality From All Causes, Cardiovascular Disease, an...

FREE ACCESS RESEARCH ARTICLE

Whole Grain Intake and Mortality From All Causes, Cardiovascular Disease, and Cancer A Meta-Analysis of Prospective Cohort Studies

Geng Zong, Alisa Gao, Frank B. Hu and Qi Sun

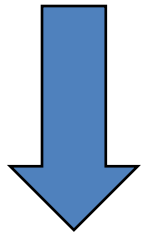
Originally published 14 Jun 2016 | <https://doi.org/10.1161/CIRCULATIONAHA.115.021101> | Circulation. 2016;133:2370-2380

Tools Share

Blueberries (rich in anthocyanins) and Health

Approximately 2-4 servings a week (Average portion blueberries/blackcurrants exceed 500mg)

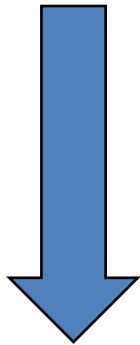
Hypertension



10%

Am J Clin Nutr, 2011

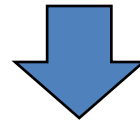
Diabetes



23%

Am J Clin Nutr, 2012

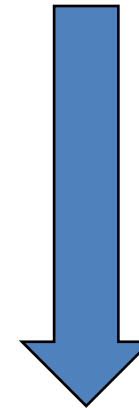
Stroke



5%

Stroke, 2012

Heart Disease



34%

Circulation, 2013



Systems Epidemiology of Coffee and Health Outcomes



Type 2 diabetes

CVD

Gallstone disease

Gout

Parkinson's Disease

Depression

Suicide

Some cancers

Cognitive function

Premature death

Mediterranean diet as a healthy dietary pattern

High intake of plant-based foods (fruits and vegetables, legumes, nuts, and OLIVE OIL)

Moderate intake of dairy, fish, poultry

Low in red meat, sweets and highly processed food

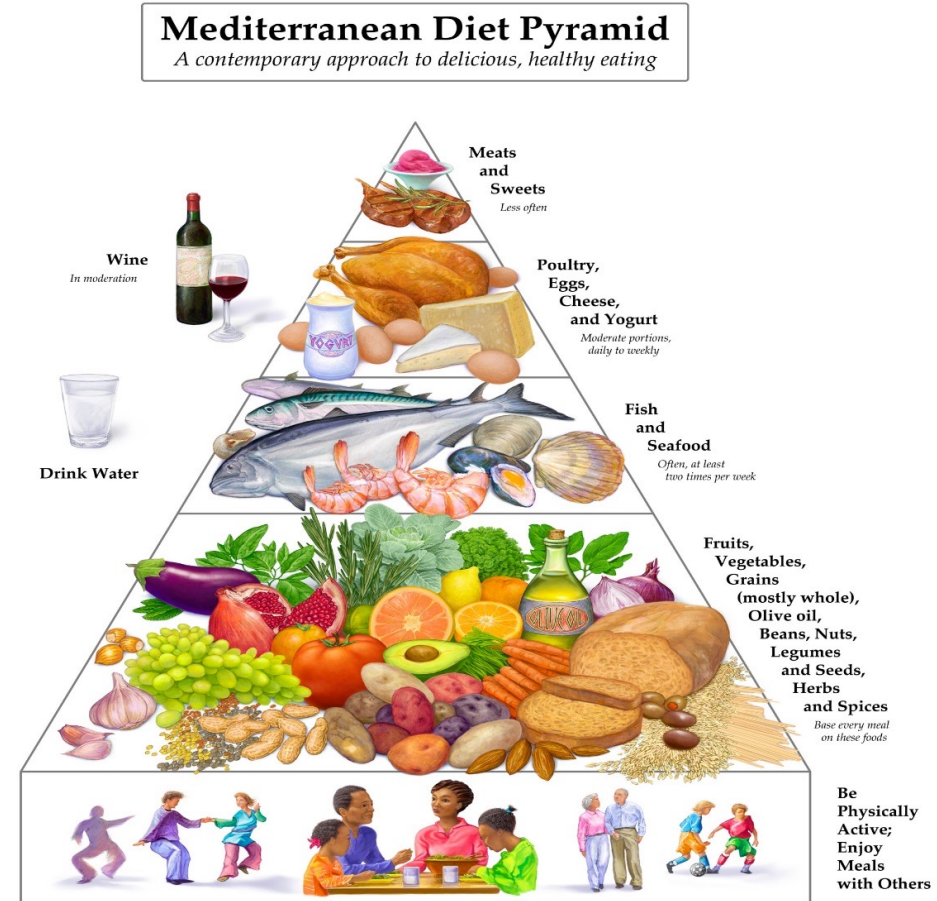


Illustration by George Middleton

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Crete: The birthplace of the MedDiet

- In the Seven Countries Study, Crete had among the lowest rates of CHD and some cancers, as well as one of the highest adult life expectancies
- Dietary patterns of Cretans capture the essence of the MedDiet: abundant plant-based foods and olive oil, moderate amount of dairy and fish, a variety of herbs & spices, limited red meat, and moderate wine.
- Cultural and historical context: one of the earliest ancient civilizations; long-standing tradition of using olive oil



Olive Oil

A hallmark of traditional Mediterranean diet

Known as the liquid gold since the ancient times





Original Investigation

Consumption of Olive Oil and Risk of Total and Cause-Specific Mortality Among U.S. Adults

Marta Guasch-Ferré PhD^{a, b}   , Yanping Li PhD^a, Walter C. Willett MD, DrPH^{a, b, c}, Qi Sun MD, ScD^{a, b, c, d}, Laura Sampson RD^a, Jordi Salas-Salvadó MD^{e, f}, Miguel A. Martínez-González MD^{a, e, g}, Meir J. Stampfer MD, DrPH^{a, b, c}, Frank B. Hu MD, PhD^{a, b, c}  

> [JAMA Netw Open](#). 2024 May 1;7(5):e2410021. doi: 10.1001/jamanetworkopen.2024.10021.

Consumption of Olive Oil and Diet Quality and Risk of Dementia-Related Death

Anne-Julie Tessier¹, Marianna Cortese¹, Changzheng Yuan^{1 2}, Kjetil Bjornevik^{1 3},
Alberto Ascherio^{3 4}, Daniel D Wang^{1 3}, Jorge E Chavarro^{1 3 4}, Meir J Stampfer^{1 3 4},
Frank B Hu^{1 3 4}, Walter C Willett^{1 3 4}, Marta Guasch-Ferré^{1 5}

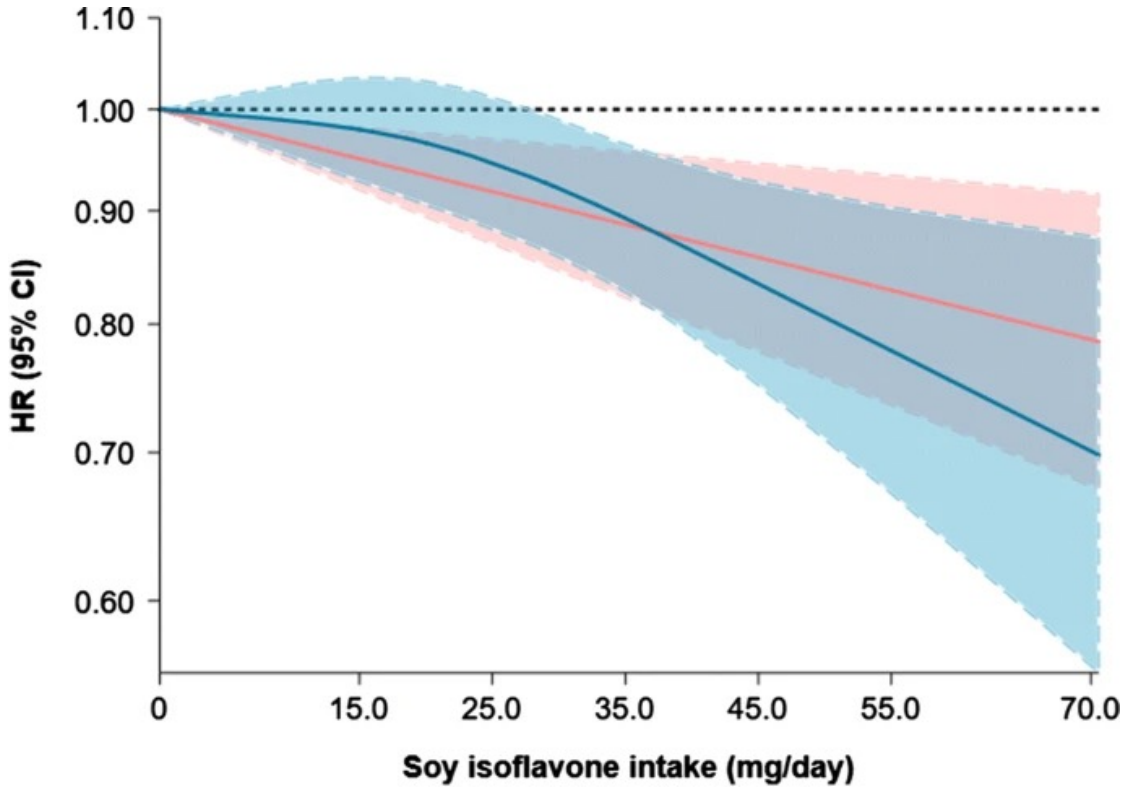
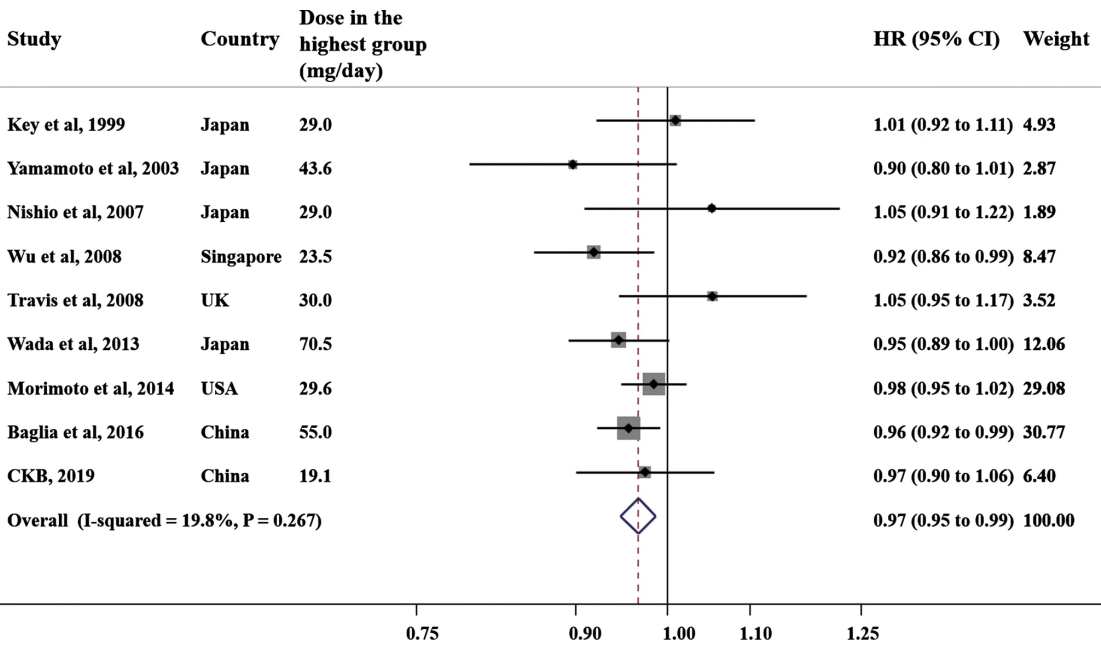
Many beneficial aspects of the traditional Asian diets:

- High intake of green leafy vegetables
- Beans, lentils, soy foods
- Nuts/peanuts and seeds
- Healthy cooking oils
- Phytochemical-rich herbs and spices
- Healthy beverages such as green/red tea
- Fermented vegetables rich in probiotics (eg. miso, tempeh, kimchi)

The Traditional Healthy Asian Diet Pyramid



Soy intake and breast cancer risk: a prospective study of 300,000 Chinese women and a dose–response meta-analysis



Wei et al. Europe J Epidemiology 2019



ORIGINAL RESEARCH ARTICLE

**Isoflavone Intake and the Risk of Coronary Heart Disease
in US Men and Women**

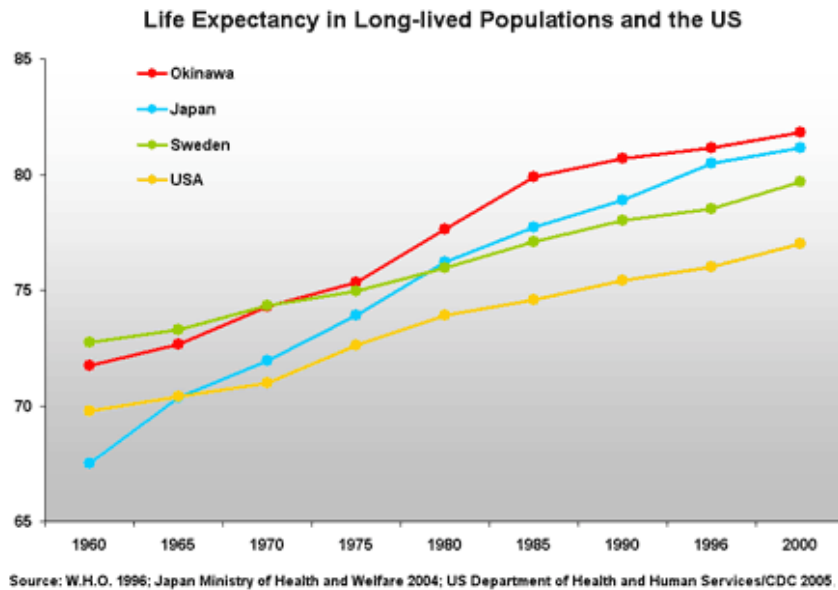
Results From 3 Prospective Cohort Studies

- Soy is rich in isoflavones -- phytoestrogens (plant-derived compounds with weak estrogenic action and antioxidant activity)
- Increased intake of soy protein has been shown to reduce blood pressure and LDL cholesterol in RCTs.
- We found that intake of isoflavones and tofu was associated with a lower coronary heart disease risk in 3 large prospective cohorts of US men and women (N=200,000; CHD cases 8,400; 28 years of follow-up).
- Soy products such as tofu can be integrated into healthy plant-based diets as an important source of plant proteins and aid in the prevention of heart disease.



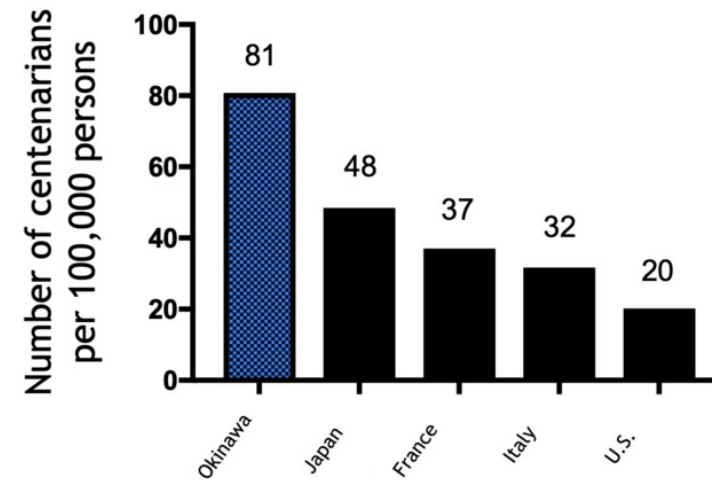
Okinawa Diet Pyramid

<https://secretsofhealthyeating.com/the-okinawa-diet.html>



<https://www.bluezones.com/2018/08/moai-this-tradition-is-why-okinawan-people-live-longer-better/>

2015 Centenarian Prevalence (per 100,000 persons)

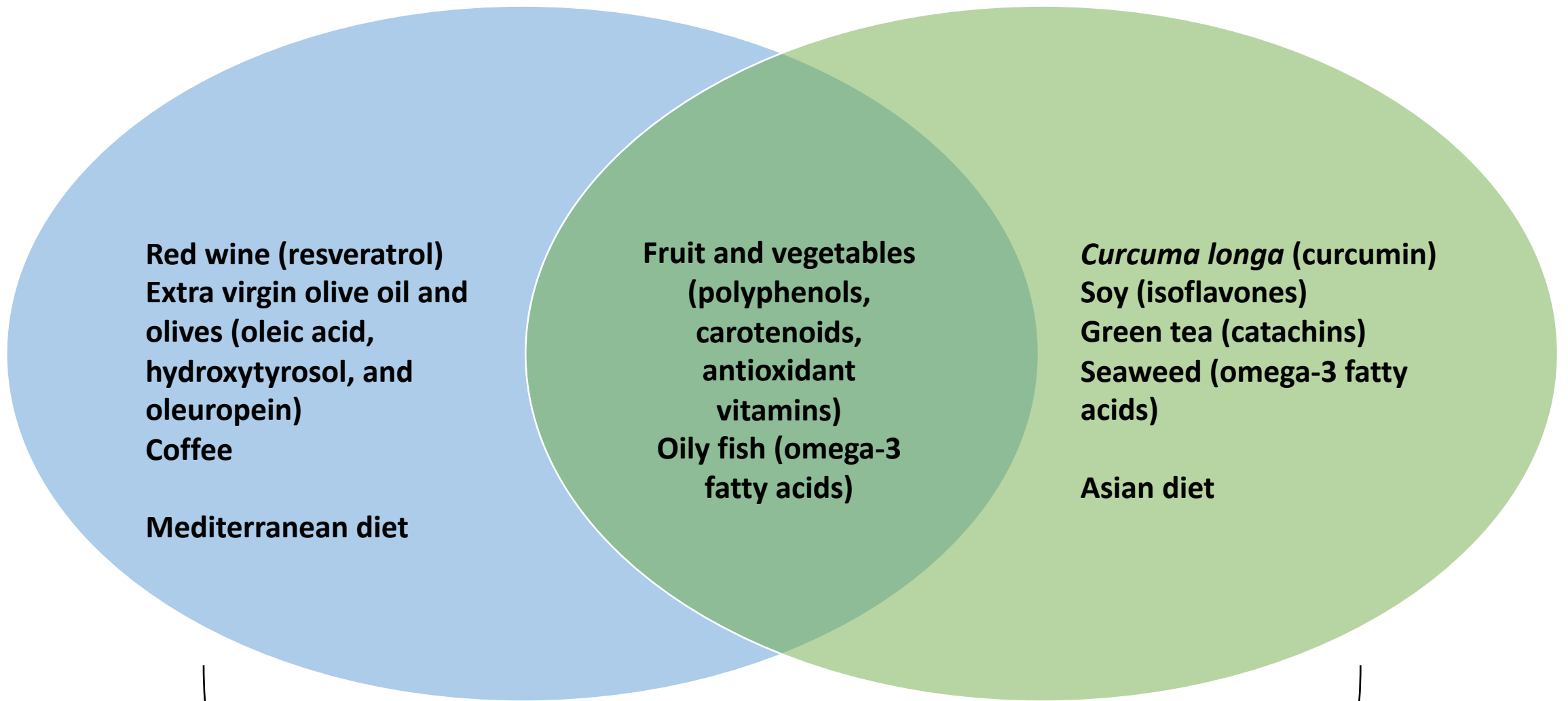


<https://www.weforum.org/agenda/2021/09/japan-okinawa-secret-to-longevity-good-health/>

Caloric Restriction, CR Mimetics, and Healthy Aging in Okinawa

- Older Okinawans consumed a diet consistent with mild caloric restriction (i.e. stopping eating when one is 80% full, known as Hara Hachi Bu)
- Polyphenol/carotenoid-rich foods with CR-mimetic properties, especially sweet potatoes, bitter melon, seaweed, turmeric, green tea
- Older cohorts of Okinawans exhibit CR-like phenotypes (physically smaller, physiologically healthier, less age-related disease, longer healthspan and lifespan).
- Potential biological pathways include reduced insulin and Insulin Growth Factor-1 (IGF-1) signaling, inhibiting the mechanistic target of rapamycin (mTOR) signaling, activation of AMPK and sirtuin 1 (SIRT1), upregulation of the NAD⁺ pathway, and reducing inflammation and oxidative stress.





Because of their sirtuin-activating properties, these polyphenol-rich foods are referred to as "sirtfoods".

MediterrAsian diet

[Oxid Med Cell Longev.](#) 2013

The Changing Food Environment in Naha, Okinawa



alamy

Image ID: 2FK66Y5
www.alamy.com

<https://www.alamy.com/colourful-shop-and-restaurant-signage-for-kfc-fast-food-restaurant-in-naha-okinawa-japan-image424864473.html>

DIRECT PLUS trial (PI: Iris Shai)

(AJCN 2022)



Physical Activity
Healthy Diet

Healthy dietary guidelines



Physical Activity
MED Diet
28 g/day walnuts

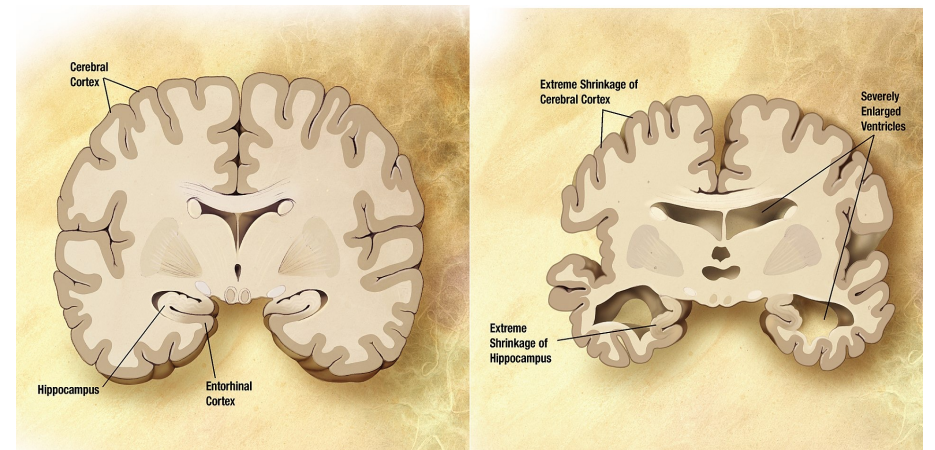
- Median high polyphenol diet
- MED diet +28g/day walnuts
+440 mg/day PP



Physical Activity
MED Diet
28 g/day walnuts
3-4 cups green tea
Mankai shake
Avoid red and processed meat

- High polyphenol MED diet + 28g/day walnuts, 3-4 cups/day green tea, Mankai (Duckweed) shake
+1240 mg/day PP

The MED diet supplemented with walnuts, green tea, and Mankai shake significantly attenuated age-related brain atrophy measured by Hippocampal volume shrinkages.





Mankai: Rich in plant protein, fiber, folate and other B vitamins, and polyphenols; Improve glycemic control, reduce inflammation, and promote healthy gut microbiome

Global Use of Herbs and Spices

- - Widely used in global cuisines
- - Contribute to:
 - - Diversity of flavor
 - - Potential health benefits
- Examples:
 - - Indian cuisine: Turmeric, coriander, cumin
 - - Mediterranean cuisine: Basil, rosemary, oregano, black pepper
 - - East Asian cuisine: Ginger, garlic, cloves, scallions, chili pepper

Health Benefits of Herbs and Spices

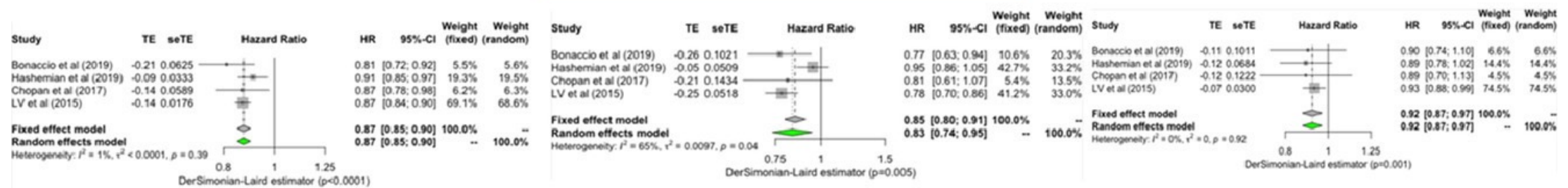
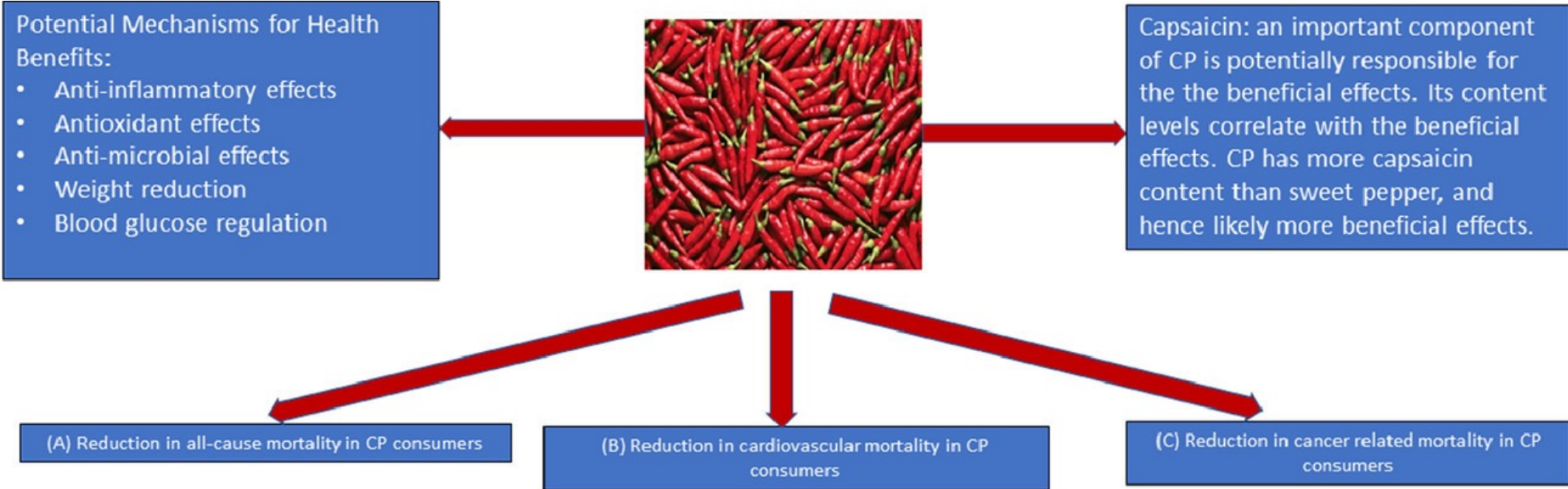
- Rich in Bioactive Compounds:
 - - Polyphenols and other bioactives
- Health Properties: - Antimicrobial; Antioxidant; Anti-tumorigenic; Anti-inflammatory
- Beyond its culinary use, turmeric, ginger, and etc. have been historically used in Indian and Chinese traditional medicine for treating various diseases and conditions

> J Am Heart Assoc. 2019 Sep 17;8(18):e012240. doi: 10.1161/JAHA.119.012240. Epub 2019 Sep 5.

Turmeric, Pepper, Cinnamon, and Saffron Consumption and Mortality

Maryam Hashemian ^{1 2 3}, Hossein Poustchi ⁴, Gwen Murphy ², Arash Etemadi ^{1 2},
Farin Kamangar ^{1 5}, Akram Pourshams ⁶, Masoud Khoshnia ^{6 7}, Abdolsamad Gharavi ^{6 7},
Paul J Brennan ⁸, Paolo Boffetta ^{9 10}, Sanford M Dawsey ^{4 2}, Christian C Abnet ^{4 2},
Reza Malekzadeh ⁶

Association of chili pepper intake with all-cause and specific cause mortality (Kaur et al. 2022)



> [J Am Coll Cardiol](#). 2019 Dec 24;74(25):3139-3149. doi: 10.1016/j.jacc.2019.09.068.

Chili Pepper Consumption and Mortality in Italian Adults

Marialaura Bonaccio ¹, Augusto Di Castelnuovo ², Simona Costanzo ³, Emilia Ruggiero ³, Amalia De Curtis ³, Mariarosaria Persichillo ³, Claudio Tabolacci ⁴, Francesco Facchiano ⁴, Chiara Cerletti ³, Maria Benedetta Donati ³, Giovanni de Gaetano ³, Licia Iacoviello ⁵; Moli-sani Study Investigators

[BMJ](#). 2015; 351: h3942.

Published online 2015 Aug 4. doi: [10.1136/bmj.h3942](#)

PMCID: PMC4525189

PMID: [26242395](#)

Consumption of spicy foods and total and cause specific mortality: population based cohort study

[Jun Lv](#), associate professor,¹ [Lu Qi](#), associate professor,^{2,3} [Canqing Yu](#), assistant professor,¹ [Ling Yang](#), senior epidemiologist,⁴ [Yu Guo](#), director, CKB national coordinating center,⁵ [Yiping Chen](#), senior research fellow,⁴ [Zheng Bian](#), senior coordinator, CKB national coordinating center,⁵ [Dianjianyi Sun](#), PhD candidate,¹ [Jianwei Du](#), director,⁶ [Pengfei Ge](#), vice director,⁷ [Zhenzhu Tang](#), director,⁸ [Wei Hou](#), chief,⁹ [Yanjie Li](#), investigator,¹⁰ [Junshi Chen](#), professor,¹¹ [Zhengming Chen](#), professor,⁴ and [Liming Li](#), professor^{1,5}, on behalf of the China Kadoorie Biobank collaborative group

> [PLoS One](#). 2017 Jan 9;12(1):e0169876. doi: 10.1371/journal.pone.0169876. eCollection 2017.

The Association of Hot Red Chili Pepper Consumption and Mortality: A Large Population-Based Cohort Study

Mustafa Chopan ¹, Benjamin Littenberg ¹

Impact of Healthy Lifestyle Factors on Life Expectancies in the US Population

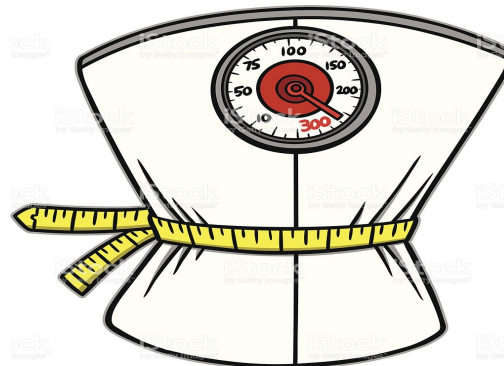
Physical activity (≥ 3.5 h/week)



Alternative healthy eating index (top 40%)



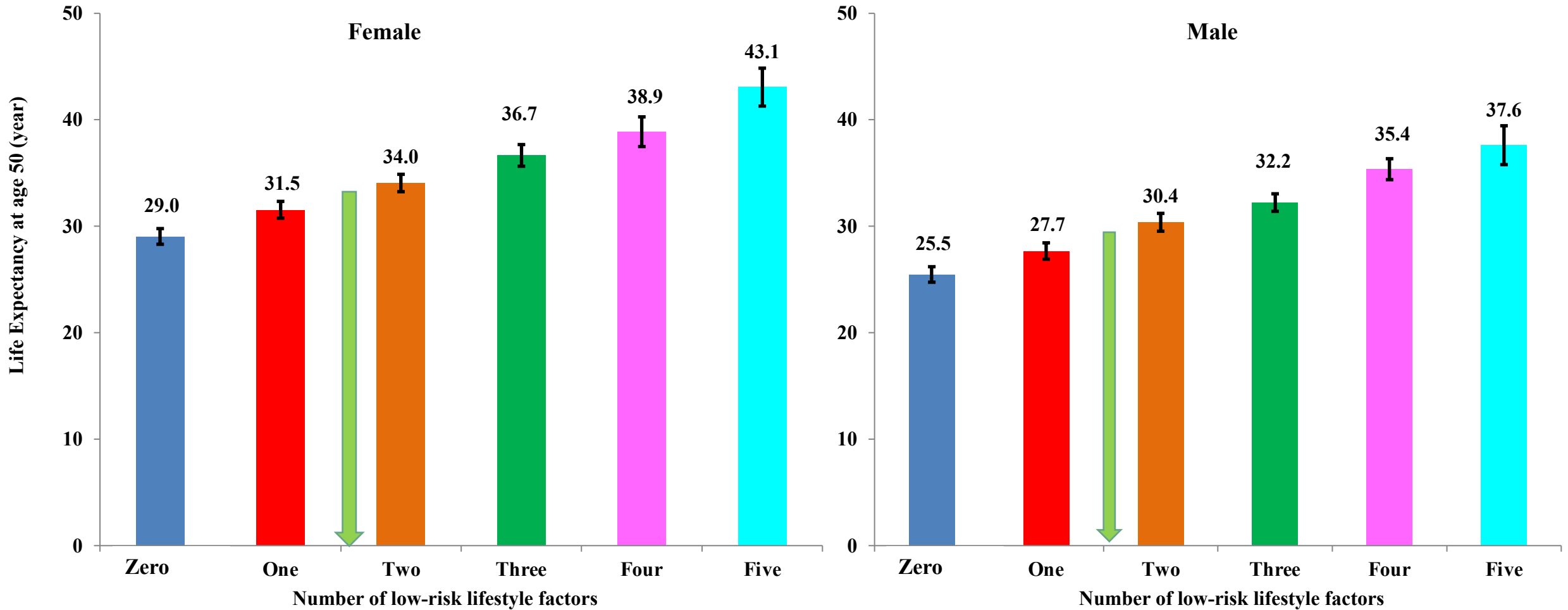
Body-mass index (18.5-24.9 kg/m²)



Light/Moderate alcohol Drinking



Estimated life expectancy at age 50 according to the number of low-risk lifestyle factors



Expect to live to age: **79.0** **81.5** **84.0** **86.7** **88.9** **93.1** **75.5** **77.7** **80.4** **82.3** **85.4** **87.6**

US average life expectancy at age 50: Female: 33.6; Male: 29.8 based on CDC mortality rate of 2014

Take home messages

- Maintaining a healthy weight throughout life is important for living longer and aging well
- The types of fats, protein, and carbs you eat matter more for disease risk and mortality than how much you eat
- Traditional diets like the Mediterranean and Okinawa diets, rich in plant foods, coffee, tea, and omega-3s, are linked to longer, healthier lives.
- Herbs and spices add flavor and health benefits due to their bioactive compounds.
- A fusion diet that combines elements of East and West cultural traditions can improve healthy aging and be more widely accepted.
- A healthy diet, no smoking, regular exercise, a healthy weight, and moderate alcohol drinking can add 8-10 years of disease free life.

Acknowledgements



Nurses'
Health Study

HARVARD
T.H. CHAN
SCHOOL OF PUBLIC HEALTH

**HEALTH PROFESSIONALS
FOLLOW-UP STUDY**

Predimed

Prevención con Dieta Mediterránea

