FOOD AS MEDICINE:

The Evidential Power of Whole Food, Plant-Predominant Nutrition for Chronic Disease Prevention and Environmental Sustainability

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Chair Employee Wellbeing
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Objectives

- Describe the overall dietary pattern for disease prevention and longevity.
- Discuss the current challenges in nutrition research and the challenges of disseminating accurate nutrition information to the public.
- Explain national and global nutrition recommendations and basic nutrition principles.
- Distinguish differences between health-promoting and health-harming foods.
- Apply the concept of the nutritional density and dietary spectrum when making nutrition recommendations.
- Examine the benefits of a whole food, plant-based eating pattern beyond human health.

World Health Organization

- Noncommunicable diseases (NCDs) are responsible for 74% of all deaths globally

90% of type 2 diabetes
80-90% of heart disease
40-70% of cancers

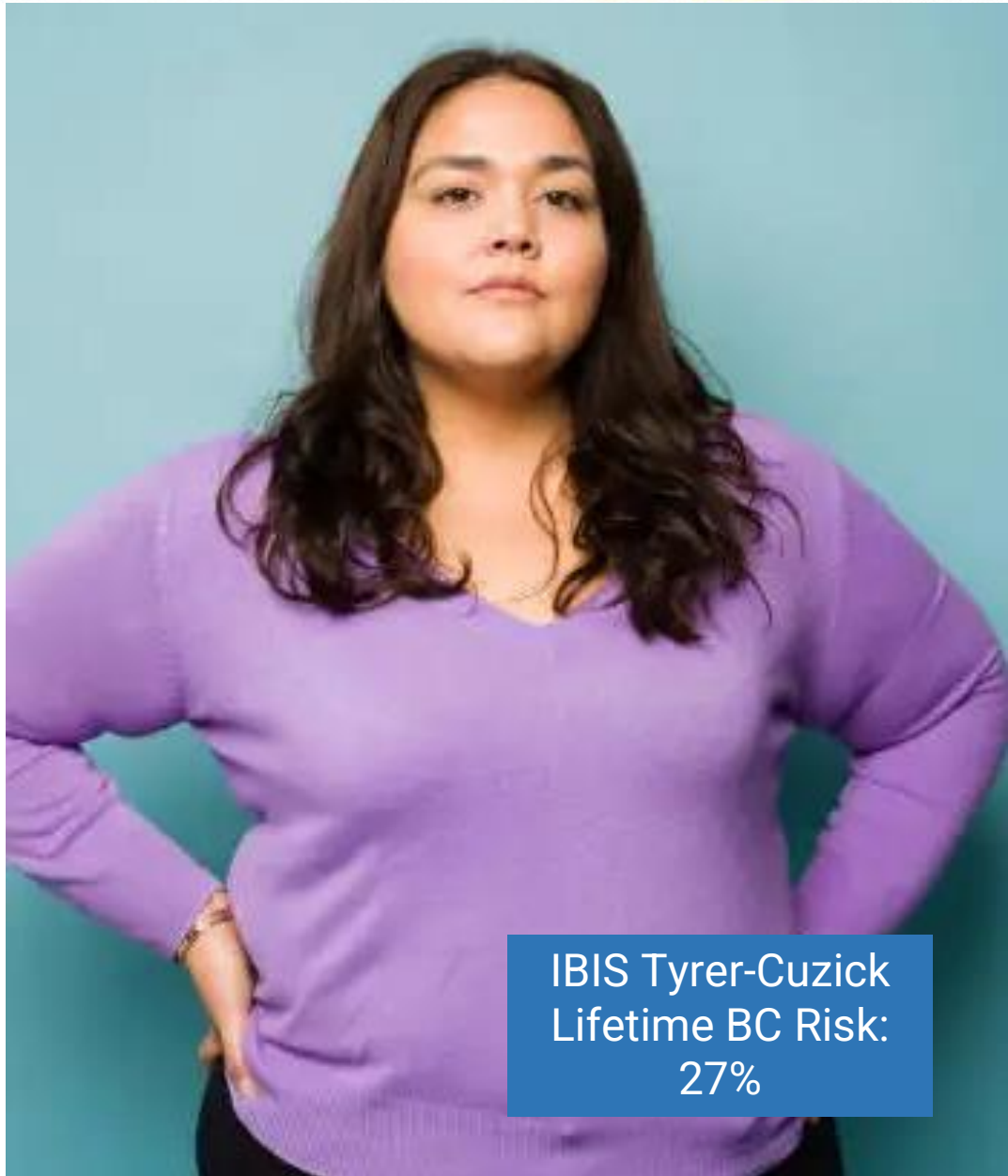
→ PREVENTABLE

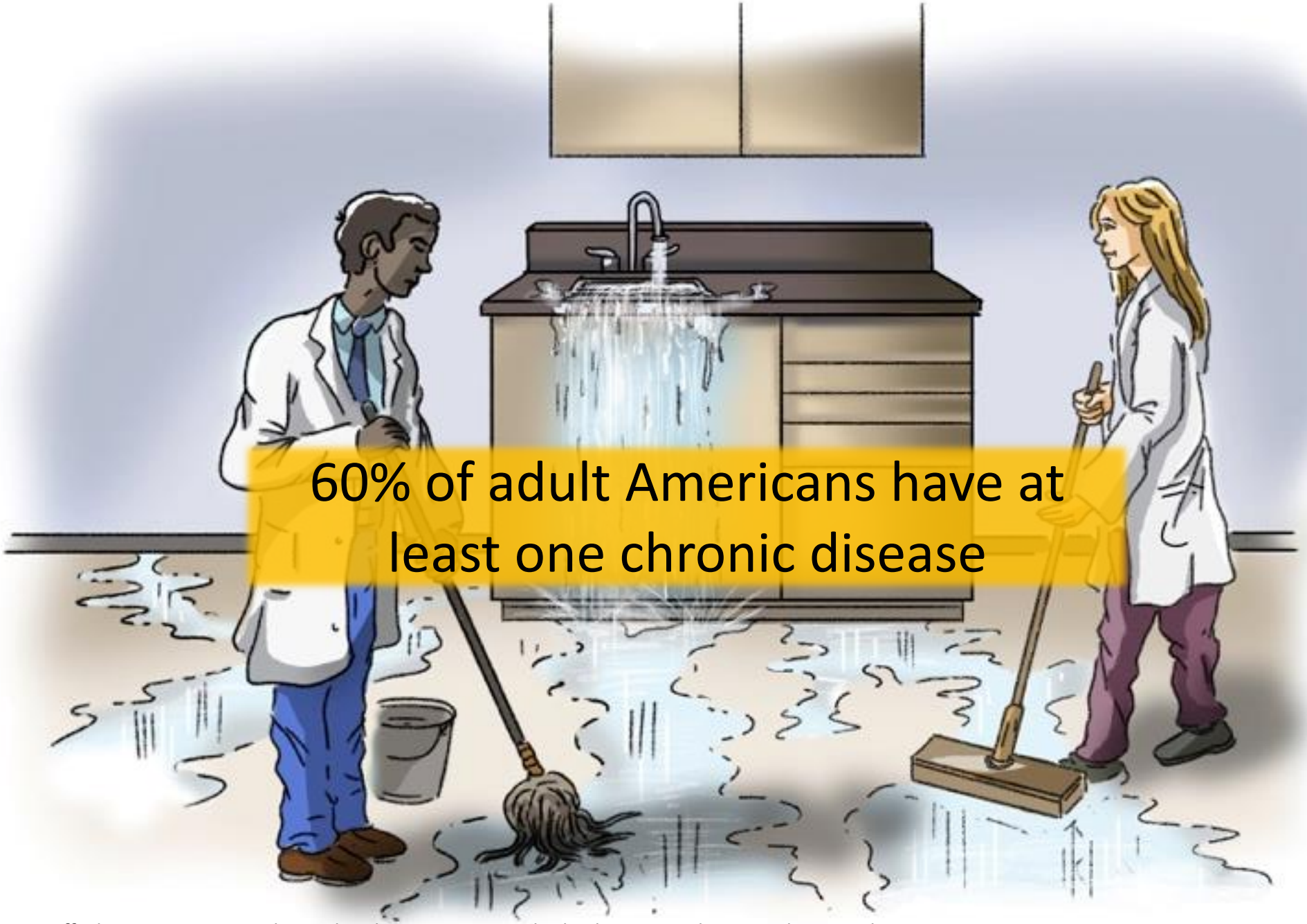
The lowest rates of NCDs are in populations living healthy lifestyles and eating unprocessed, plant-based diets

https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases accessed 12/1/2023

Rachel

- 51 postmenopausal woman presents for breast cancer risk assessment
- Younger sister recently diagnosed w/ breast cancer
- BMI 31 (90kg, gained 60#s since her late 30s)
- DM2 A1C 6.7 (metformin and dulaglutide)
- HTN (losartan; HCTZ)
- LDL 196, elevated TGs, ApoB 132, CRPhs 13 (statin)
- NASH
- OSA on CPAP
- Depression (venlafaxine)





Buttorff, Christine, Teague Ruder, and Melissa Bauman, Multiple Chronic Conditions in the United States. Santa Monica, CA: RAND Corporation, 2017.

https://harvardpublichealth.org/policy-practice/processed-foods-make-us-sick-its-time-for-government-action accessed 12/1/2023.

Rachel

- Breakfast: 2 scrambled eggs with cheese, toast w mayo and butter, coffee with cream + raw sugar; few slices bacon weekends; turkey sausage weekdays
- Morning Snack: Frappuccino
- Noon Meal: Sandwich, chips, soda
- Afternoon Snack: Peanut butter and crackers
- Evening Meal: Protein, veggie, white rice and wine
- Evening Snack: Cookie (sugar free)

Rachel

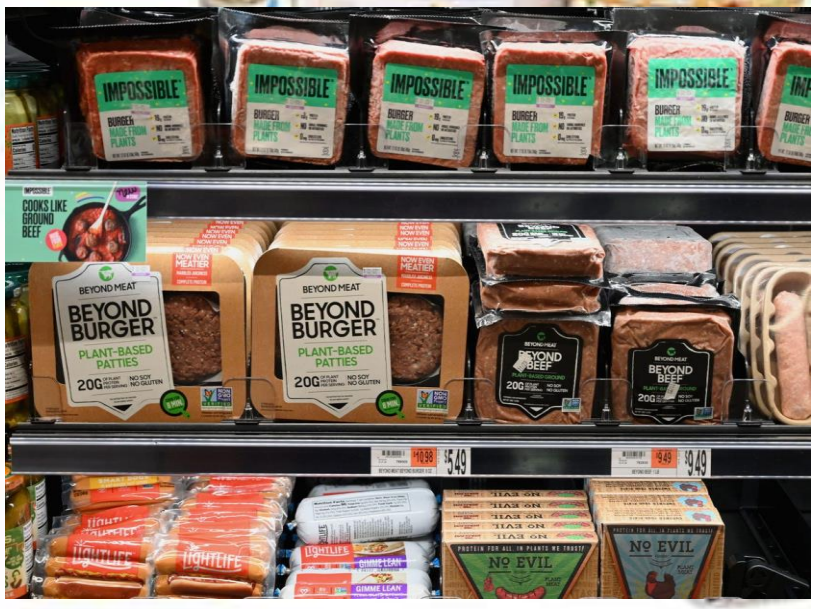
"I am terrified of getting breast cancer… watching what my sister is going through is very hard. After I scheduled the appt with you Dr. Dawn, I decided to go vegan!"

This is what she described….


Yves
daiya
mozzarella style shreds
PURELY DECADENT
Tofurky
FIELD ROAST
crispy tenders


VEGAN GOURMET
daiya
ALMOND DREAM
teese


egg free
coconut water
Quinoa Chips
GREEN & BLACK'S
NUGGETS
COCONUT DREAM
vego


IMPOSSIBLE
BEYOND MEAT
BEYOND BURGER
PLANT-BASED PATTIES
20G
COOKS LIKE GROUND BEEF
LIGHTLIFE
Nº EVIL

Breast Cancer Risk And Ultraprocessed Plant Food (UPF)

- 65,000 French women (median age 53) followed for two decades
- Consumed mostly animal vs. plant-based
  - Healthy, primarily plant-based diet
    - **14% reduced risk of breast cancer**
  - Unhealthy processed plant diets (sugary fruit juices, refined grains, potatoes, sugar-sweetened beverages and/or desserts)
    - **20% increase breast cancer risk**

Sanam Shah, MBBS, FCPS, MPH, PhD student, epidemiology, Center for Research in Epidemiology and Population Health, Paris-Saclay University, France; Lona Sandon, PhD, RDN, LD, program director and associate professor, clinical nutrition department, School of Health Professions, University of Texas Southwestern Medical Center, Dallas; American Society for Nutrition virtual meeting, June 14-16, 2022

A Randomized Crossover Trial on the Effect Of Plant-based Compared with Animal-based Meat on Trimethylamine-n-oxide and Cardiovascular Disease Risk Factors in Generally Healthy Adults: Study with Appetizing Plantfood-meat Eating Alternative Trial (SWAP-MEAT)

- SWAP-MEAT was a randomized crossover trial that involved generally healthy adults eating 2 or more servings of plant-based meats per day for 8 weeks (i.e. Plant phase) followed by 2 or more servings of animal meats per day for 8 weeks (i.e. Animal phase)
- 36 participants
- Dietary counseling, lab assessments, microbiome assessments (16S), and anthropometric measurements
- Consume ≥2 servings/d of Plant vs Animal for 8 wk each, all other foods/ beverages as similar as possible between the 2 phases
- Mean ± SD servings per day were not different by intervention sequence
- Mean ± SEM TMAO concentrations were significantly lower overall for Plant (2.7 ± 0.3) than for Animal (4.7 ± 0.9) ($P = 0.012$), but a significant order effect was observed ($P = 0.023$)

Crimarco A, Springfield S, Petlura C, Streaty T, Cunanan K, Lee J, Fielding-Singh P, Carter MM, Topf MA, Wastyk HC, Sonnenburg ED, Sonnenburg JL, Gardner CD. Am J Clin Nutr. 2020 Nov 11;112(5):1188-1199.

A Randomized Crossover Trial on the Effect Of Plant-based Compared with Animal-based Meat on Trimethylamine-n-oxide and Cardiovascular Disease Risk Factors in Generally Healthy Adults: Study with Appetizing Plantfood-meat Eating Alternative Trial (SWAP-MEAT)

- TMAO concentrations were significantly lower for Plant meat (n = 18) who received Plant second (2.9 ± 0.4 Plant compared with 6.4 ± 1.5 Animal, P = 0.007), but not for the Plant first (2.5 ± 0.4 compared with 3.0 ± 0.6, Plant compared with Animal, P = 0.23)
- Exploratory analyses of the microbiome failed to reveal possible responder compared with nonresponder factors
- Mean ± SEM LDL-cholesterol concentrations (109.9 ± 4.5 compared with 120.7 ± 4.5 mg/dL, P = 0.002) and weight (78.7 ± 3.0 compared with 79.6 ± 3.0 kg, P < 0.001) were lower during the Plant phase

Among generally healthy adults, contrasting Plant meat with Animal intake, while keeping all other dietary components similar, the Plant products improved several cardiovascular disease risk factors, including TMAO; there were no adverse effects on risk factors from the Plant products

Crimarco A, Springfield S, Petlura C, Streaty T, Cunanan K, Lee J, Fielding-Singh P, Carter MM, Topf MA, Wastyk HC, Sonnenburg ED, Sonnenburg JL, Gardner CD. Am J Clin Nutr. 2020 Nov 11;112(5):1188-1199.

Assessing the Effects of Alternative Plant-based Meats vs. Animal Meats on Biomarkers of Inflammation: A Secondary Analysis of the Swap-meat Randomized Crossover Trial

- None of the change scores between the two diet phases were significantly different
- Within-phase paired scores, only 4 out of 92 biomarkers reached statistical significance
- Biomarkers of inflammation did not improve from the plant-based meats
  - Possibly, too short of intervention to see change in inflammation
  - Other aspects of diet not controlled
  - plant-based meat products used in our study fit the definition of 'ultra-processed' foods, due to a number of added ingredients used to enhanced the flavor and texture of the meats

Crimarco A, Landry MJ, Carter MM, Gardner CD. J Nutr Sci. 2022 Sep 23;11:e82.

Rachel

"Oh geez, and here I thought I was doing myself a favor."

"Dr. Dawn can you help me learn to eat healthy?"

"It isn't just about my fear of breast cancer. I have gained so much weight, I have no energy, I take so many medications."

"I am not happy with my life!"

Integrative Healthcare SYMPOSIUM

Whole Food, Plant-Predominant Nutrition (WFPB)

Maximizes the intake of whole, plant-foods

- Vegetables, fruits, whole grains, beans, chickpeas, split peas, lentils, mushrooms, herbs, spices and small amounts of seeds and nuts

Minimizes-avoids the intake of processed and all animal-derived foods

- Minimize/ avoid consumption of meat (including chicken and fish), dairy products, and eggs, as well as highly refined foods like bleached flour, refined sugar, and oil

THE BENEFITS OF A WFPB NUTRITION

- **Disease prevention**: WHOLE-FOOD, plant-based eating can prevent, halt, and in some cases reverse chronic diseases. The scientific evidence is especially overwhelming when it comes to heart disease, diabetes, and certain cancers but research has also linked plant-based diets to lower rates of arthritis, improved liver function, and healthier kidneys.
- **Easy weight management**: People who eat a plant-based diet tend to be leaner than those who don't, and the diet makes it easy to lose weight and keep it off—without counting calories.
- **A lighter environmental footprint**: A plant-based diet places much less stress on the environment.

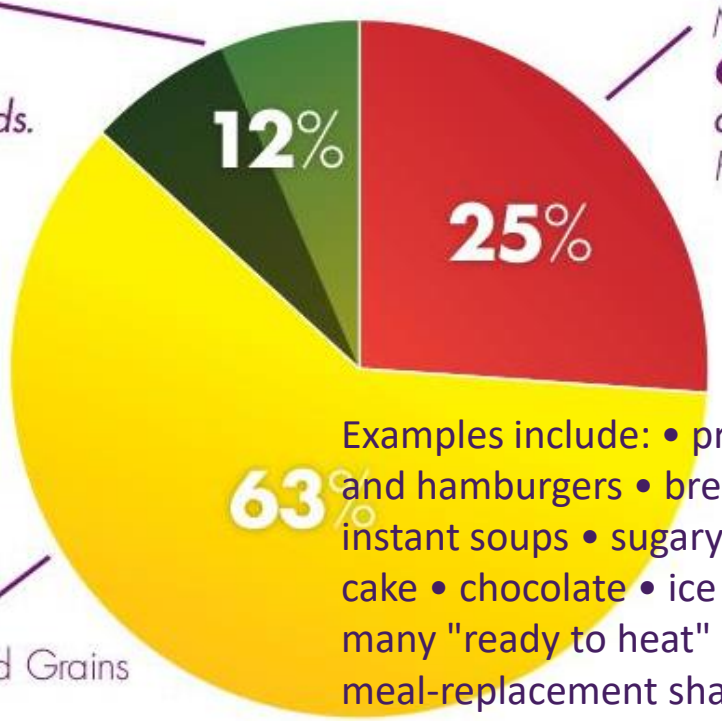
Integrative Healthcare SYMPOSIUM

U.S. FOOD CONSUMPTION
AS A % OF CALORIES

PLANT FOOD:
Vegetables, Fruits, Legumes,
Nuts & Seeds, Whole Grains
***Fiber** is only found in plant foods.*

NOTE: Up to half of this category may be processed

ANIMAL FOOD:
Meat, Dairy, Eggs, Fish, Seafood
***Cholesterol** is only found in animal foods. Animal foods are the PRIMARY source of saturated fat.*



The average diet in the U.S. only has 6% of calories coming from whole, plant-based foods

PROCESSED FOOD:
Added Fats & Oils, Sugars, Refined Grains

Examples include: • processed meat such as sausages and hamburgers • breakfast cereals or cereal bars • instant soups • sugary fizzy drinks • chicken nuggets • cake • chocolate • ice cream • mass-produced bread • many "ready to heat" meals such as pies and pizza | meal-replacement shakes

More than 26,000 unique chemicals are allowed in food sold in the U.S.

Barabási A, Menichetti G, et al. The unmapped chemical complexity of our diet. Nature Food 2020;1:33-7.

Ultraprocessed Food (UPF)

- UPF consumption UK was 22.9% in the total diet (US is > 60%)
- Increased incidence cancer
- Every 10 percentage points increment in UPF consumption was associated with:
  - 6% increase overall cancer mortality
  - 16% breast cancer mortality
  - 30% increased ovarian cancer mortality

Chang et al. Ultra-processed food consumption, cancer risk and cancer mortality: a large-scale prospective analysis within the UK Biobank. EClinicalMedicine. 2023 Jan 31;56:101840.

Ultraprocessed Food (UPF)

- UPF Brazilian adults ranged from 13% to 21% of the total energy intake
- UPF was responsible for approximately 10.5% of all premature deaths in adults aged 30–69 years
- Reducing the contribution of UPF to the total energy intake by 10%–50% could potentially prevent 5,900 to 29,300 deaths

Nilson Eaet aL. Premature Deaths Attributable to the Consumption of Ultraprocessed Foods in Brazil. Am J Prev Med. 2023 Jan;64(1):129-136. doi: 10.1016/j.amepre.2022.08.013. Epub 2022 Nov 7. PMID: 36528353.

Ultra-processed Food Intake and Mortality in the USA: Results From the Third National Health and Nutrition Examination Survey (NHANES III, 1988-1994)

- Prospective analyses of reported frequency of ultra-processed food intake and all-cause mortality and CVD mortality
- Participants Adults aged ≥20 years (n 11,898)
- Median follow-up of 19 years
- Highest quartile of UPF 31% higher risk of all-cause mortality after adjusting for demographic and socio-economic confounders and health behaviors (HR=1.31; 95% CI 1.09,-1.58; P =0·001)
- No association with CVD mortality was observed (P=0.86)
- Higher frequency of ultra-processed food intake was associated with higher risk of all-cause mortality in a representative sample of US adults

Kim H, Hu EA, Rebholz CM. Ultra-processed food intake and mortality in the USA: results from the Third National Health and Nutrition Examination Survey (NHANES III, 1988-1994). Public Health Nutr. 2019 Jul;22(10):1777-1785.

Estimated Burden of Ultra-processed Foods on Cardiovascular Disease Brazil: A Modeling Study

- Attributable to UPF intake in Brazil
  - 883,000 DALYs/year
  - 74,900 new CVD cases
  - 22% of the premature deaths from CVD
  - 19,200 premature CVD deaths
  - 33% of the total premature all-cause deaths

- Reducing UPF consumption
  - 10% → avert 11% premature CVD deaths, 2,100 deaths/year
  - 20% → avert 21% premature CVD deaths, 4,100 deaths/year
  - 50% → avert 52% premature CVD deaths, 9,900 deaths/year

Reducing UPF to first quintile of intake would avert 81% of the premature CVD deaths, 15,600 deaths/year

Nilson EAF, Ferrari G et al. The estimated burden of ultra-processed foods on cardiovascular disease outcomes in Brazil: A modeling study. Front Nutr. 2022 Nov 17;9:1043620.

Brazilian Longitudinal Study of Adult Health and Cognitive Decline

- >10,000 people aged 35+ followed for 8 years
- Higher intake of UPF faster rate of decline in executive and global cognitive function
- > 20% of daily calories UPFs vs. < 20%
  - 25% faster rate of decline in executive function (β = -0.003, 95% CI, -0.005 to 0.000; P = .01)
  - 28% faster rate of decline in global cognition (β = -0.004; 95% CI, -0.006 to -0.001; P = .003)

Gomes Gonçalves N, Vidal Ferreira N, et al. Association Between Consumption of Ultraprocessed Foods and Cognitive Decline. *JAMA Neurol.* 2023;80(2):142–150.

Ultra-Processed Foods and Human Health: A Systematic Review and Meta-Analysis of Prospective Cohort Studies

- A consistently positive association between high UPF intake and increased risk of developing:
  - Diabetes (37%)
  - Hypertension (32%)
  - Hypertriglyceridemia (47%)
  - Low HDL cholesterol concentration (43%)
  - Obesity (32%)

UPF consumption is associated with higher risk of diabetes, hypertension, dyslipidemia, and obesity, but the level of risk consistently changes depending on the methodology used to assess

Vitale et al. Ultra-Processed Foods and Human Health: A Systematic Review and Meta-Analysis of Prospective Cohort Studies. Adv Nutr. 2024 Jan;15(1):100121.

JAMA: Poor Diet Quality

- Leading causes of death in the US, including cancer
- Proportion of cancers attributable to poor diet alone is estimated to be 4.2% to 5.2%
- Diet quality lower among marginalized groups

McCullough ML, Chantaprasopsuk S, et al. JAMA Netw Open. 2022 Jun 1;5(6):e2216406.
Islami F, Goding Sauer et al.. CA Cancer J Clin. 2018;68(1):31-54.
Zhang FF, Cudhea F, Shet al.. JNCI Cancer Spectr. 2019;3(2):pkz034.

Nutrition and Cancer

- Diet patterns high in red and processed meat, starchy foods, refined carbohydrates, and sugary drinks are associated with a higher risk of developing cancer (predominantly colon) (Grosso)
- Diet with emphasis on a variety of fruits and vegetables, whole grains, legumes, fish or poultry, and fewer red and processed meats are associated with lower risk. (Morze)
- Liese et al. found that individuals who have the healthiest diet pattern have an 11%-24% lower risk of cancer death than those with the least healthy diet
- Cancer survivors who follow a healthy diet pattern have a 17%-18% lower risk of dying from cancer or other causes. (Morze)

Grosso et al. Possible role of diet in cancer: systematic review and multiple meta-analyses of dietary patterns, lifestyle factors, and cancer risk. Nutr Rev. 2017;75(6): 405-419.
Morze et al. Diet Quality as Assessed by the Healthy Eating Index, Alternate Healthy Eating Index, Dietary Approaches to Stop Hypertension Score, and Health Outcomes: A Second Update of a Systematic Review and MetaAnalysis of Cohort Studies. J Acad Nutr Diet. 2020;120(12): 1998-2031 e1915.
Liese AD, Krebs-Smith SM, Subar AF, et al. The Dietary Patterns Methods Project: synthesis of findings across cohorts and relevance to dietary guidance. J Nutr. 2015;145(3): 393-402.
Morze et al. An updated systematic review and meta-analysis on adherence to Mediterranean diet and risk of cancer. Eur J Nutr. 2021;60(3): 1561-1586.

Women's Health Initiative Dietary Modification RCT

- 48,835 postmenopausal women aged 50-79 years with no prior BC hx on Western diet (32% fat)
- Intervention: low fat (20%) diet with increase in vegetables, fruit, and whole grains
- 19.6-year follow-up
  - 21% reduced breast cancer specific mortality (HR, 0.79; 95% CI, 0.64 to 0.97; *P* = .02)
  - 15% reduced overall mortality (HR 0.85; 95% CI, 0.74 to 0.96; *P* = .01)
  - Reduced ER-positive, PR-negative cancers in the intervention group (HR 0.77; 95% CI, 0.64 to 0.94)

Chlebowski et al. J Clin Oncol. 2020 May 1;38(13):1419-1428.

Rachel

“My sister is on a several Facebook groups suggesting it is best for her to be on a “keto” diet since she has breast cancer. Do you think she should do more of a whole food, plant-based diet too?”

Whole Food, Plant-Based and Ketogenic Diets As Diverging Paths to Address Cancer: A Review

- Whole foods plant-based diet (WFPBD) and ketogenic diet (KD) have gained popularity in oncology
- **OBSERVATIONS:**
  - Dietary intake is associated with multiple pathways involved in carcinogenesis and tumor progression
  - Plant-enriched diet is associated with reduced cancer incidence and **is recommended by dietary guidelines for cancer prevention**
  - Increased fiber, phytochemicals, and butyrate levels and decreased insulin-like growth factor 1 levels

Shah UA, Iyengar NM. Plant-Based and Ketogenic Diets As Diverging Paths to Address Cancer: A Review. JAMA Oncol. 2022 Aug 1;8(8):1201-1208.

Whole Food, Plant-Based and Ketogenic Diets As Diverging Paths to Address Cancer: A Review

- **OBSERVATIONS:**
  - Keto diet may be of interest in **select, less common** settings, such as tumors treated with phosphatidylinositol 3-kinase inhibitor (Piqray/alpelisib), which induces hyperinsulinemia and hyperglycemia

Shah UA, Iyengar NM. Plant-Based and Ketogenic Diets As Diverging Paths to Address Cancer: A Review. JAMA Oncol. 2022 Aug 1;8(8):1201-1208.

Whole Food, Plant-Based and Ketogenic Diets As Diverging Paths to Address Cancer: A Review

- **CONCLUSIONS AND RELEVANCE**:
  - The results of this review suggest a **plant-enriched diets for the reduction of cancer risk and improvement of metabolic disorders in survivors**
  - Current data support prioritization of plant-based diets, and future data could further personalize dietary recommendations in cancer populations

Shah UA, Iyengar NM. Plant-Based and Ketogenic Diets As Diverging Paths to Address Cancer: A Review. JAMA Oncol. 2022 Aug 1;8(8):1201-1208.

Adults Meeting Fruit and Vegetable Intake Recommendations — United States, 2019

Summary

What is already known about this topic?

The percentage of U.S. adults meeting fruit and vegetable intake recommendations is low.

What is added by this report?

In 2019, 12.3% and 10.0% of surveyed adults met fruit and vegetable intake recommendations, respectively. Meeting fruit intake recommendations was highest among Hispanic adults (16.4%) and lowest among males (10.1%). Meeting vegetable intake recommendations was highest among adults aged ≥51 years (12.5%) and lowest among adults with low income (6.8%).

What are the implications for public health practice?

States can use this information to tailor efforts to populations at high risk (e.g., men, young adults, and adults with lower income) and to implement enhanced interventions, policies, and programs that help persons increase fruit and vegetable consumption to support immune function and prevent chronic diseases.

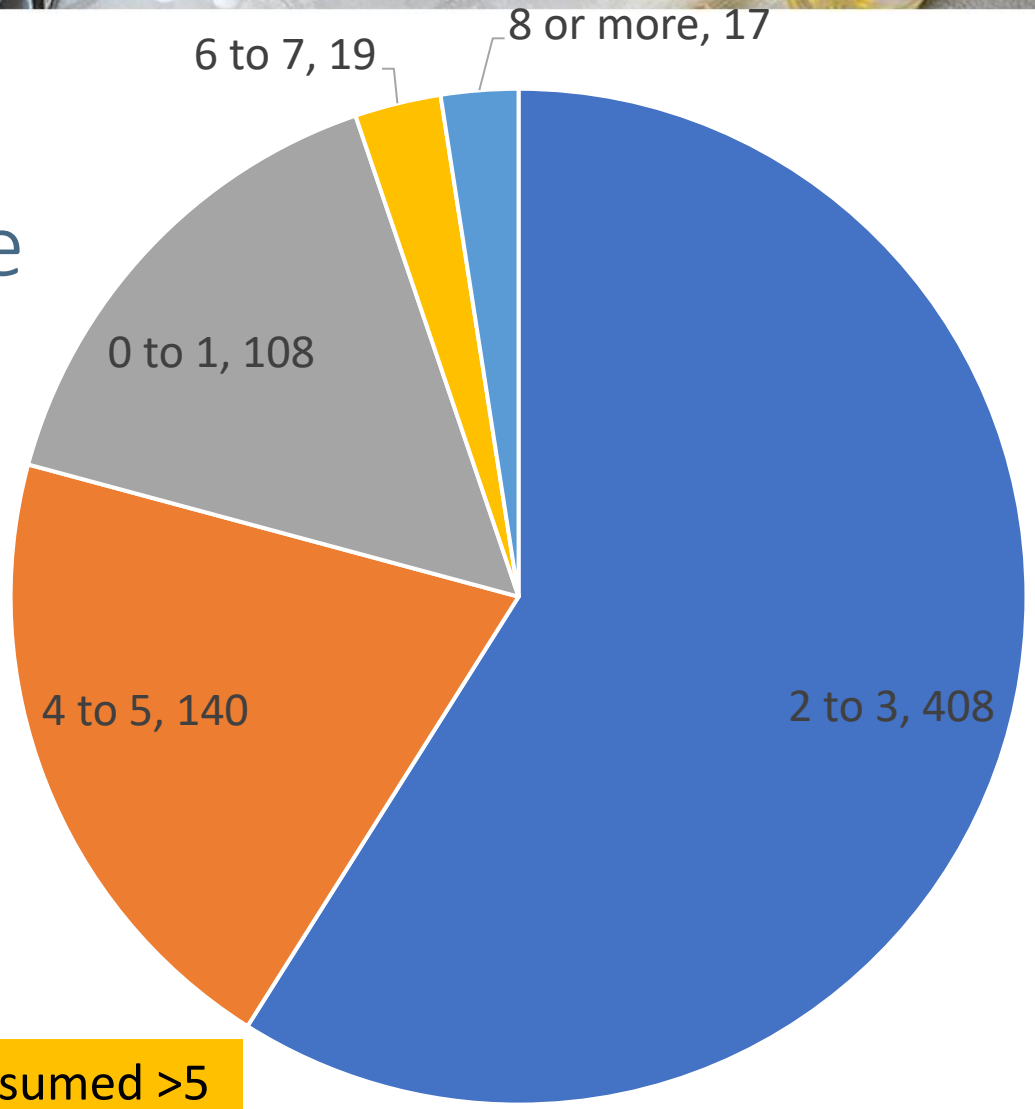
Per day adults should consume:
1.5–2 cup fruits
2–3 cup vegetables

Only 1 in 10 adults meet recommendation

Lee SH, Moore LV, Park S, Harris DM, Blanck HM. Adults Meeting Fruit and Vegetable Intake Recommendations — United States, 2019. MMWR Morb Mortal Wkly Rep 2022;71:1–9

Mayo Clinic Jacoby Center for Breast Health: Fruit And Vegetable Intake

- 692 women with a diagnosis of breast cancer
- 94.7% (n=656) patients reported consuming less than 4-5 servings fruit and vegetable servings per day
- 58.96% (n=408) reported 2 to 3 servings per day
- 15.61% (n=108) reported eating 0 to 1 serving per day



Only 5% of patients consumed >5 serving vegetables/fruits a day

Fruit And Vegetable Intake And Mortality:

Results from Two Prospective Cohort Studies of US Men and Women and a Meta-Analysis of 26 Cohort Studies

- In comparison with the reference level (2 servings/d), 5 servings of fruit and vegetables per day associated with HR (95% CI):

  - 0.87 (0.85-0.90) total mortality
  - 0.90 (0.86-0.95) cancer mortality
  - 0.88 (0.83-0.94) CVD mortality
  - 0.65 (0.59-0.72) respiratory disease mortality

- Aune et al found that most of the reduction in mortality was achieved by **five servings** per day, **but an additional small reduction was suggested up to daily intake of 10 servings**

Wang et al. 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. Circulation. 2021 Apr 27;143(17):1642-1654.
Aune et al. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality–a systematic review and dose-response meta-analysis of prospective studies. Int J Epidemiol. 2017;46:1029–1056

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Wang et al. 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. Circulation. 2021 Apr 27;143(17):1642-1654.

Kim H, Rebholz CM, Hegde S, *et al*. *BMJ Nutrition, Prevention & Health* 2021;bmjnph-2021-000272.

Nutrition, vention & Health

Plant-based diets, pescatarian diets and COVID-19 severity: a population-based case–control study in six countries

Hyunju Kim,[1,2] Casey M Rebholz,[1,2] Sheila Hegde,[3] Christine LaFiura,[4] Madhunika Raghavan,[4] John F Lloyd,[5] Susan Cheng,[5] Sara B Seidelmann[6,7]

: Kim H, Rebholz CM, S, *et al*. Plant-based pescatarian diets OVID-19 severity: a tion-based case– study in six countries. *lutrition, Prevention &* 2021;0. doi:10.1136/ h-2021-000272

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ed 16 March 2021 d 28 April 2021 ted 3 May 2021

ABSTRACT

Background Several studies have hypothesised that dietary habits may play an important role in COVID-19 infection, severity of symptoms, and duration of illness. However, no previous studies have investigated the association between dietary patterns and COVID-19.

Methods Healthcare workers (HCWs) from six countries (France, Germany, Italy, Spain, UK, USA) with substantial exposure to COVID-19 patients completed a web-based survey from 17 July to 25 September 2020. Participants provided information on demographic characteristics, dietary information, and COVID-19 outcomes. We used multivariable logistic regression models to evaluate the association between self-reported diets and COVID-19 infection, severity, and duration.

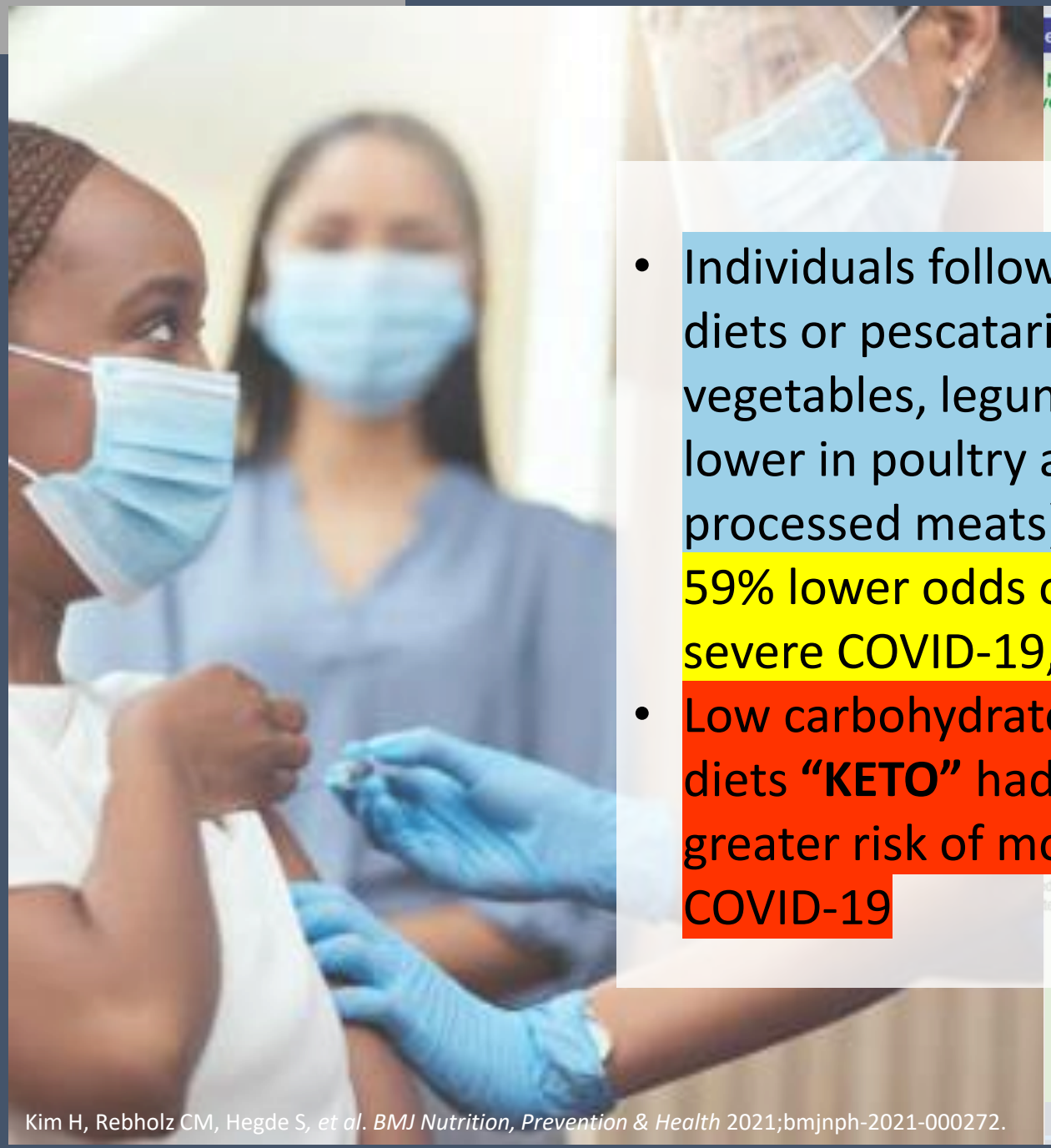
Results There were 568 COVID-19 cases and 2316 controls. Among the 568 cases, 138 individuals had moderate-to-severe COVID-19 severity whereas 430 individuals had very mild to mild COVID-19 severity. After adjusting for important confounders, participants who reported following 'plant-based diets' and 'plant-based diets or pescatarian diets' had 73% (OR 0.27, 95% CI 0.10 to 0.81) and 59% (OR 0.41, 95% CI 0.17 to 0.99) lower odds of moderate-to-severe COVID-19 severity, respectively, compared with participants who did not follow these diets. Compared with participants who reported following 'plant-based diets', those who reported following 'low carbohydrate, high protein diets' had greater odds of moderate-to-severe COVID-19 (OR 3.86, 95% CI 1.13 to 13.24). No association was observed between self-reported diets and COVID-19 infection or duration.

Conclusion In six countries, plant-based diets or pescatarian diets were associated with lower odds of moderate-to-severe COVID-19. These dietary patterns may be considered for protection against severe COVID-19.

What this paper adds

- In 2884 front-line healthcare workers from six countries (France, Germany, Italy, Spain, UK, USA), individuals who reported following plant-based diets and plant-based diets or pescatarian diets that were higher in vegetables, legumes and nuts, and lower in poultry and red and processed meats, had 73% and 59% lower odds of moderate-to-severe COVID-19, respectively.
- Plant-based diets or pescatarian diets are healthy dietary patterns, which may be considered for protection against severe COVID-19.

by the WHO on 11 March 2020. Since then, several new variants of SARS-CoV-2 have emerged,[2] adding to the global burden of infection despite public health practices including personal protective equipment (PPE), social distancing, and hand-washing. Healthcare workers (HCWs) who treat patients with COVID-19 illness in medical clinics, emergency rooms, and hospitals are particularly susceptible to contracting the infection given their high rates of exposure.[3] While HCWs are being vaccinated in many countries currently, with the emergence of new variants and challenges in accessing COVID-19 vaccines globally, understanding risk factors associated with COVID-19 susceptibility and disease course in physicians and nurses may help to develop supportive strat-



- Individuals following plant-based diets or pescatarian diets (high in vegetables, legumes and nuts, and lower in poultry and red and processed meats), had 73% and 59% lower odds of moderate-to-severe COVID-19, respectively
- Low carbohydrate, high protein diets **"KETO"** had more than a 3.5X greater risk of moderate-to-severe COVID-19

Kim H, Rebholz CM, Hegde S, *et al*. *BMJ Nutrition, Prevention & Health* 2021;bmjnph-2021-000272.

en access Original research

Nutrition, vention & Health

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- Plant-based diets or pescatarian diets are healthy dietary patterns, which may be considered for protection against severe COVID-19.

by the WHO on 11 March 2020. Since then, several new variants of SARS-CoV-2 have emerged,[2] adding to the global burden of infection despite public health practices including personal protective equipment (PPE), social distancing, and hand-washing. Healthcare workers (HCWs) who treat patients with COVID-19 illness in medical clinics, emergency rooms, and hospitals are particularly susceptible to contracting the infection given their high rates of exposure.[3] While HCWs are being vaccinated in many countries currently, with the emergence of new variants and challenges in accessing COVID-19 vaccines globally, understanding risk factors associated with COVID-19 susceptibility and disease course in physicians and nurses may help to develop supportive strat-

odds of moderate-to-severe COVID-19 (OR 3.86, 95% CI 1.13 to 13.24). No association was observed between self-reported diets and COVID-19 infection or duration.

Conclusion In six countries, plant-based diets or pescatarian diets were associated with lower odds of moderate-to-severe COVID-19. These dietary patterns may be considered for protection against severe COVID-19.

Vegetarian and Plant-based Diets Associated with Lower Incidence of COVID-19

- 702 participants divided into two groups based on their dietary habits, omnivorous (n=424) and plant-based (n=278), further divided into vegetarian and flexitarian subgroups and compared with respect to the incidence of COVID-19 infection, severity and duration
- Plant-based and vegetarian groups had a higher intake of vegetables, legumes and nuts, and lower intake of dairy and meat
- Adjusted for BMI, physical activity and pre-existing medical conditions
- Plant-based diet had a 39% (OR=0.61, 95% CI 0.44-0.85; p=0.003) and vegetarian group had a 39% (OR 0.61, 95% CI 0.42-0.88; p=0.009) lower incidence of COVID-19 infection vs. omnivorous group
- Plant-based and vegetarian diets associated with a lower incidence of COVID-19 infection

Acosta-Navarro JC, Dias LF, de Gouveia LAG, *et al* Vegetarian and plant-based diets associated with lower incidence of COVID-19 *BMJ Nutrition, Prevention & Health* 2024;e000629.

Fiber

- Antioxidants and fiber that exerts favorable hormonal effects, bind carcinogens, and improve the gut microbiome
- **Only 5% of Men and 9% of women meet fiber requirement**
- Aim for a MINIMUM: Women 30g* a day and Men 30-38g a day, increase to exceed this overtime
- Vegan 44g fiber per day avg vs 21 g among meat eaters
- Goal:
  - Good source of fiber = at least 3 grams of fiber per serving
  - Excellent source of fiber = at least 5 grams of fiber per serving
- AICR dietary fiber could reduce the risk of death after breast cancer.
  - 13% lower risk of all-cause mortality for each 10g/day increase in fiber intake

Becerra-Tomás et al. Postdiagnosis dietary factors, supplement use and breast cancer prognosis: Global Cancer Update Programme (CUP Global) systematic literature review and meta-analysis. Int J Cancer. 2023 Feb 15;152(4):616-634.

Red and Processed Meat

- Red meat
  - Beef, pork, lamb, veal, goat, venison
  - **WHO Group 2A, probable carcinogenic to humans**
- Processed meat cured, smoked, salted, fermented, or added preservatives
  - Bacon, hot dogs, bologna, sausage, salami, pepperoni, ham, cold cuts, deli slices, chicken nuggets
  - **WHO Group IA carcinogen (lunch meat, bacon, hot dogs, etc)**
  - Approx. 34,000 cancer deaths/yr worldwide attributable to diets high processed meat

Farvid et al. A systematic review and meta-analysis of prospective studies. Int. J. Cancer, 2018; 143: 2787-2799.

Red and Processed Meat

1. Oxidized cholesterol (atherogenic)+ proteins & fats
2. Reactive aldehydes: malondialdehyde, glyoxal, acrolein, etc. (mutagenic)
3. Neu5Gc - pro -inflammatory sialic acid
4. Endotoxins - HEAT STABLE!
5. TMAO from carnitine metabolism
6. Carcinogenic heterocyclic amines
7. IGF-1 elevated from animal protein
8. Heme iron - ↑ strokes, cancers
9. Bio-concentrated pesticides, herbicides, heavy metals, hormones and antibiotics

American Cancer Society

"It is not known if there is a safe level of consumption for either red or processed meats"

https://www.cancer.org/healthy/eat-healthy-get-active/acs-guidelines-nutrition-physical-activity-cancer-prevention/guidelines.html accessed 09/01/23

Red Meat Intake and Risk of Type 2 Diabetes in a Prospective Cohort Study of United States Females and Males

- 216,695 participants (81% females) from the Nurses' Health Study (NHS), NHS II, and Health Professionals Follow-up Study (HPFS)
- 5,483,981 person-years of follow-up
- Intakes of total, processed, and unprocessed red meat were positively associated with higher risks of T2D

- Comparing he highest to the lowest quintiles, hazard ratios (HR):
  - 1.62 (95% confidence interval [CI]: 1.53, 1.71) total red meat
  - 1.51 (95% CI: 1.44, 1.58) processed red meat
  - 1.40 (95% CI: 1.33, 1.47) unprocessed red meat
- The percentage lower risk of T2D associated with substituting 1 serving/d of nuts and legumes for:
  - Total red meat was 30% (HR = 0.70, 95% CI: 0.66, 0.74)
  - Processed red meat was 41% (HR = 0.59, 95% CI: 0.55, 0.64)
  - Unprocessed red meat was 29% (HR = 0.71, 95% CI: 0.67, 0.75)
- Substituting 1 serving/d of dairy for total, processed, or unprocessed red meat was also associated with significantly lower risk of T2D

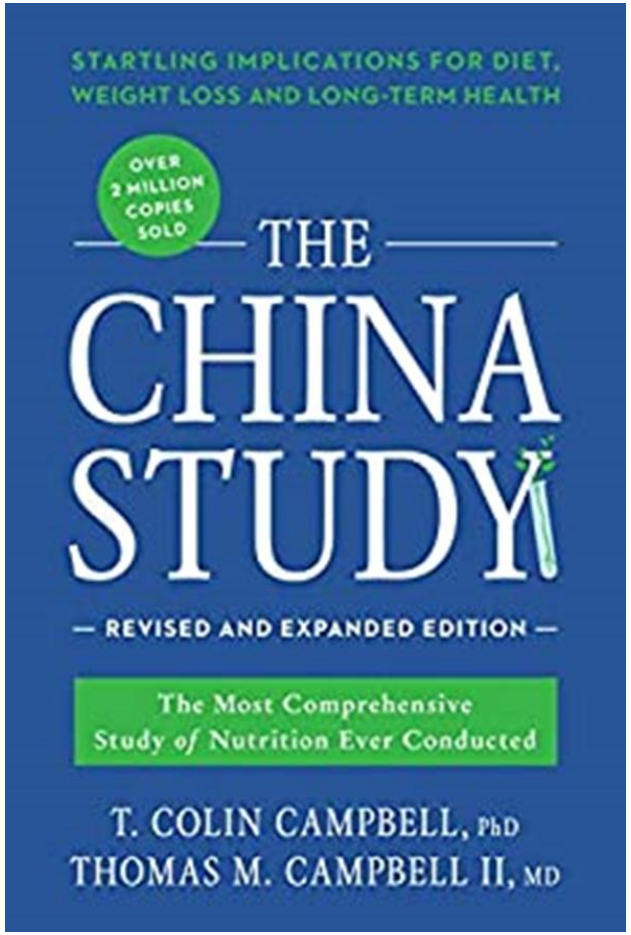
Gu et al.. Red meat intake and risk of type 2 diabetes in a prospective cohort study of United States females and males. Am J Clin Nutr. 2023 Dec;118(6):1153-1163.

Long-Term Effects of High-Meat Diets Citations

- Dietary protein intake and all-cause and cause-specific mortality: results from the Rotterdam Study and a meta-analysis of prospective cohort studies. Eur J Epidemiol. 2020 PMID: 32076944
- Plant versus animal-based diets and insulin resistance, prediabetes and type 2 diabetes: the Rotterdam Study. Eur J Epidemiol. 2018 PMID: 29948369
- Plant-Based Diets Are Associated With a Lower Risk of Incident Cardiovascular Disease, Cardiovascular Disease Mortality, and All-Cause Mortality in a General Population of Middle-Aged Adults. J Am Heart Assoc. 2019 PMID: 31387433
- Low-carbohydrate diets and all-cause and cause-specific mortality: two cohort studies. Ann Intern Med. 2010 PMID: 20820038
- Kalantar-Zadeh K, Kramer HM, Fouque D. High-protein diet is bad for kidney health: unleashing the taboo. Nephrol Dial Transplant. 2020 Jan 1;35(1):1-4. PMID: 31697325.

The China Study

- T. Colin Campbell, PhD of Cornell University, in partnership with researchers at Oxford University and the Chinese Academy of Preventive Medicine conducted one of most comprehensive nutritional studies
- Nutrition and lifestyle population data
- Over 80 counties in rural and urban China
- 10,200 adults and their families
- Statistically significant association between cancer risk and animal protein
- “Plant based diet for optimal health”
- https://nutritionstudies.org/the-china-study/
- https://youtu.be/DgJH50ifMxs



T. COLIN CAMPBELL Center for Nutrition Studies

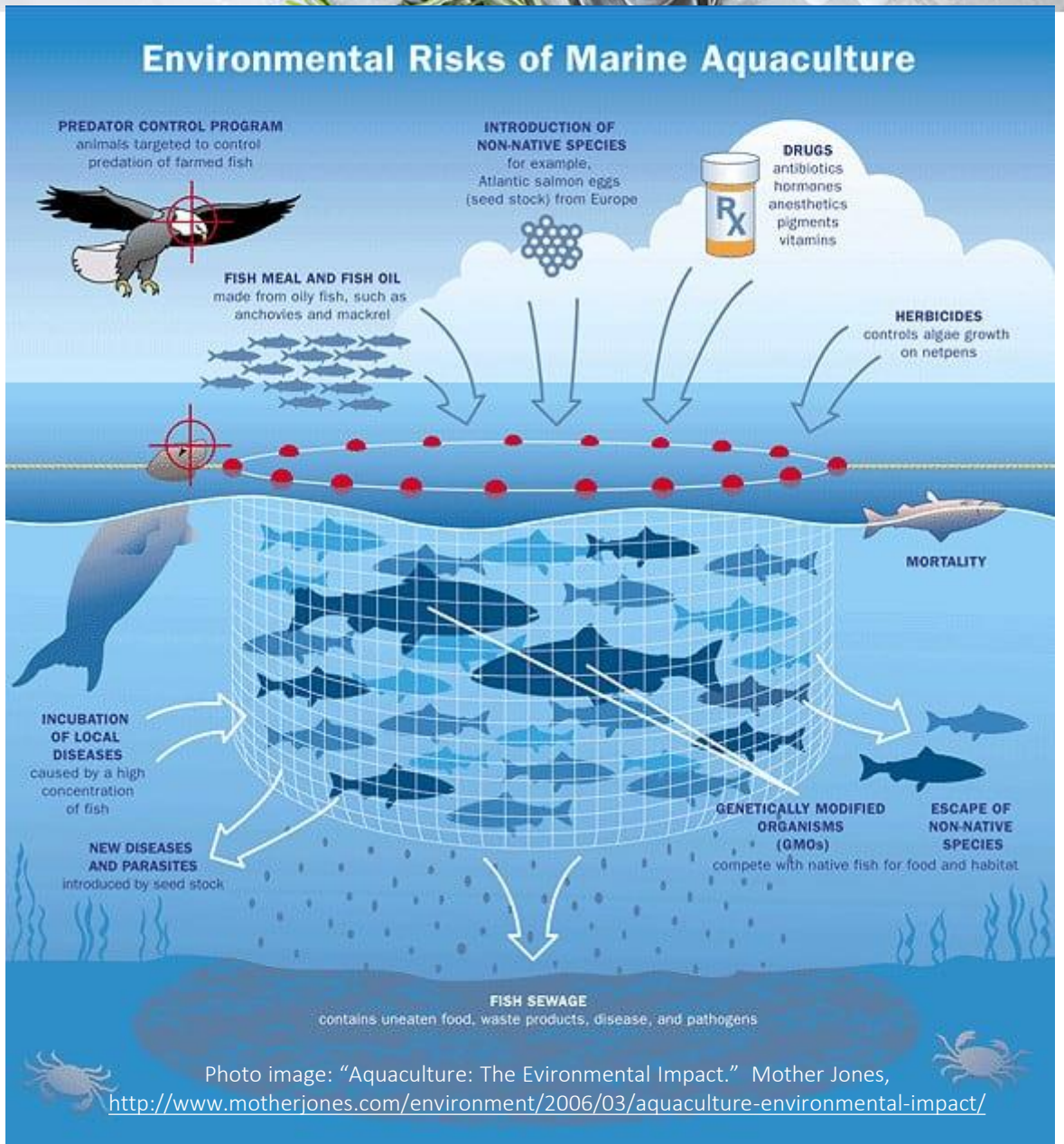
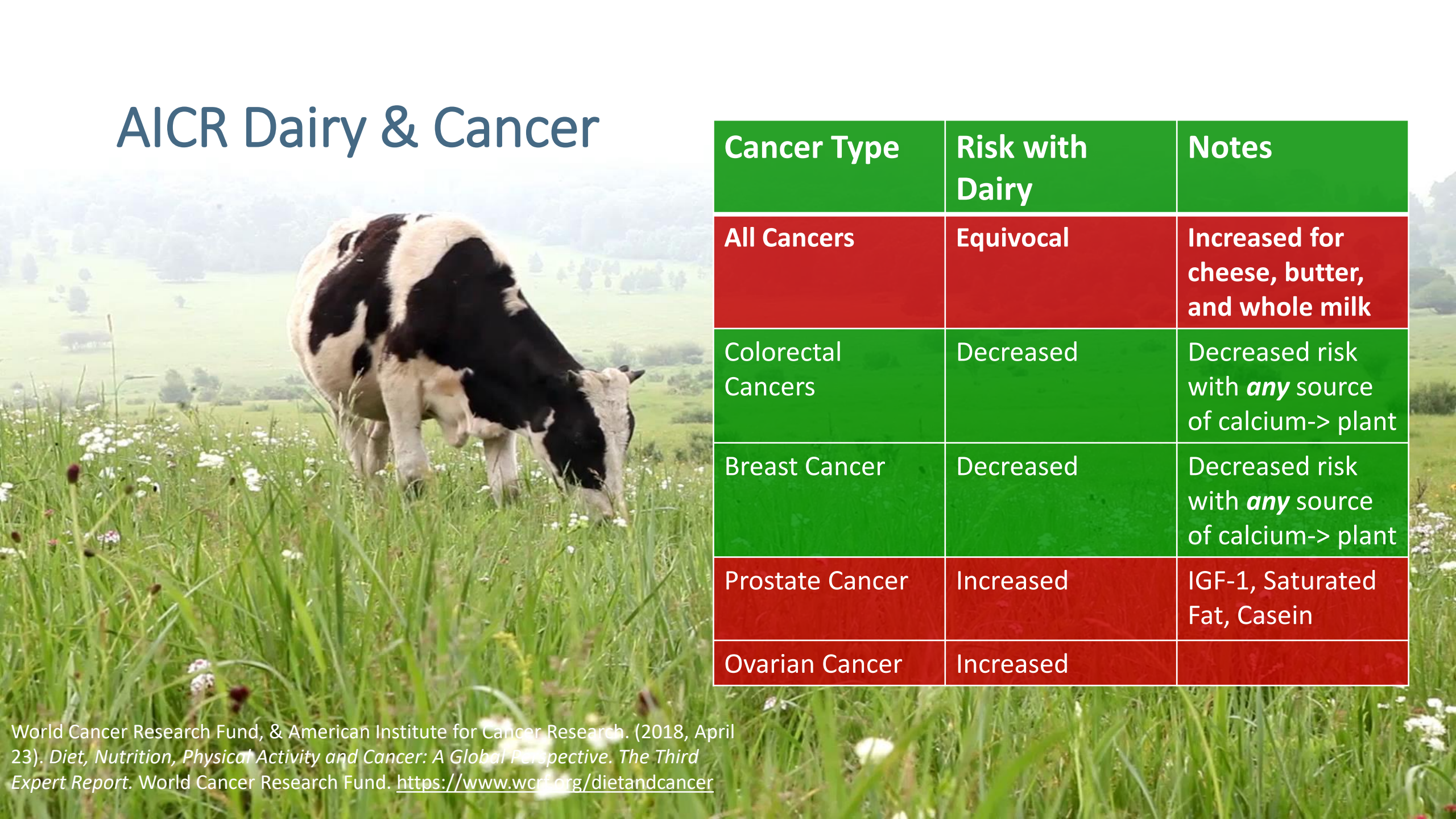


Photo image: "Aquaculture: The Evironmental Impact." Mother Jones, http://www.motherjones.com/environment/2006/03/aquaculture-environmental-impact/

AICR Dairy & Cancer



Cancer Type	Risk with Dairy	Notes
All Cancers	**Equivocal**	**Increased for cheese, butter, and whole milk**
Colorectal Cancers	Decreased	Decreased risk with ***any*** source of calcium-> plant
Breast Cancer	Decreased	Decreased risk with ***any*** source of calcium-> plant
Prostate Cancer	Increased	IGF-1, Saturated Fat, Casein
Ovarian Cancer	Increased	

World Cancer Research Fund, & American Institute for Cancer Research. (2018, April 23). *Diet, Nutrition, Physical Activity and Cancer: A Global Perspective. The Third Expert Report.* World Cancer Research Fund. https://www.wcrf.org/dietandcancer

Adventist Health Study- Dairy and Breast Cancer

- 53,000 women US/ Canada
- Higher intake of dairy calories and milk linked to increased BC risk (adjusted fam hx, BMI, ETOH)
- **50 percent increased BC risk among the top 10% of milk drinkers vs. bottom 10%**
  - Comparing 90th vs. 10th percentiles of intakes
    - Dairy milk HR 1.50 [CI 1.22–1.84]
    - Dairy calories HR 1.22 [95 CI: 1.05–1.40]
- Substituting intake of dairy milk users by those of soymilk consumers was associated with HR of 0.68 (95% CI: 0.55–0.85)
- No clear links to BC found with cheese/yogurt
- Risk similar both full-fat and low-fat and pre-menopausal and post-menopausal cases
- Limits: diet was measured only once at enrollment, very specific population

Fraser et al. Dairy, soy, and risk of breast cancer: those confounded milks, *International Journal of Epidemiology*, Volume 49, Issue 5, October 2020

AMERICAN COLLEGE OF Lifestyle Medicine

NUTRITION

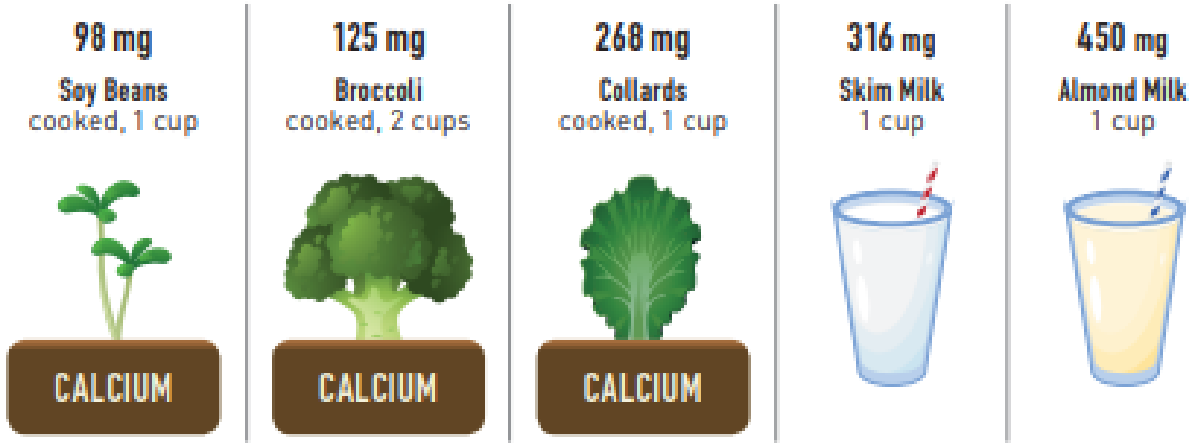
NUTRITION MYTHS

MYTH: You have to consume milk or dairy to meet calcium needs.

FACT: Plants are the original source of calcium absorbing minerals from the soil.

Calcium and other minerals are found in the soil and are absorbed into the roots of plants. The calcium in cow's milk originates in those calcium-rich plants the cow eats.

Daily calcium requirement: 1,000 mg for adults and children ages 4 and older.



Source: USDA Nutrient Analysis Database

https://connect.lifestylemedicine.org/resources/complimentary-resources

Soy (Non-GMO)

- SOY CONSUMPTION DOES NOT CAUSE CANCER
- Limited evidence shows soy possibly protects against **lung cancer** in people who have never smoked tobacco
- Soy may reduce the risk of **prostate cancer**

- Soy binds ER-Beta strongly, suggested to be **breast tumor suppressor**
- Emerging research links soy food consumption with greater variety of health-promoting bacteria in the gut microbiome

https://www.aicr.org/resources/blog/soy-and-cancer-myths-and-misconceptions/

Beans

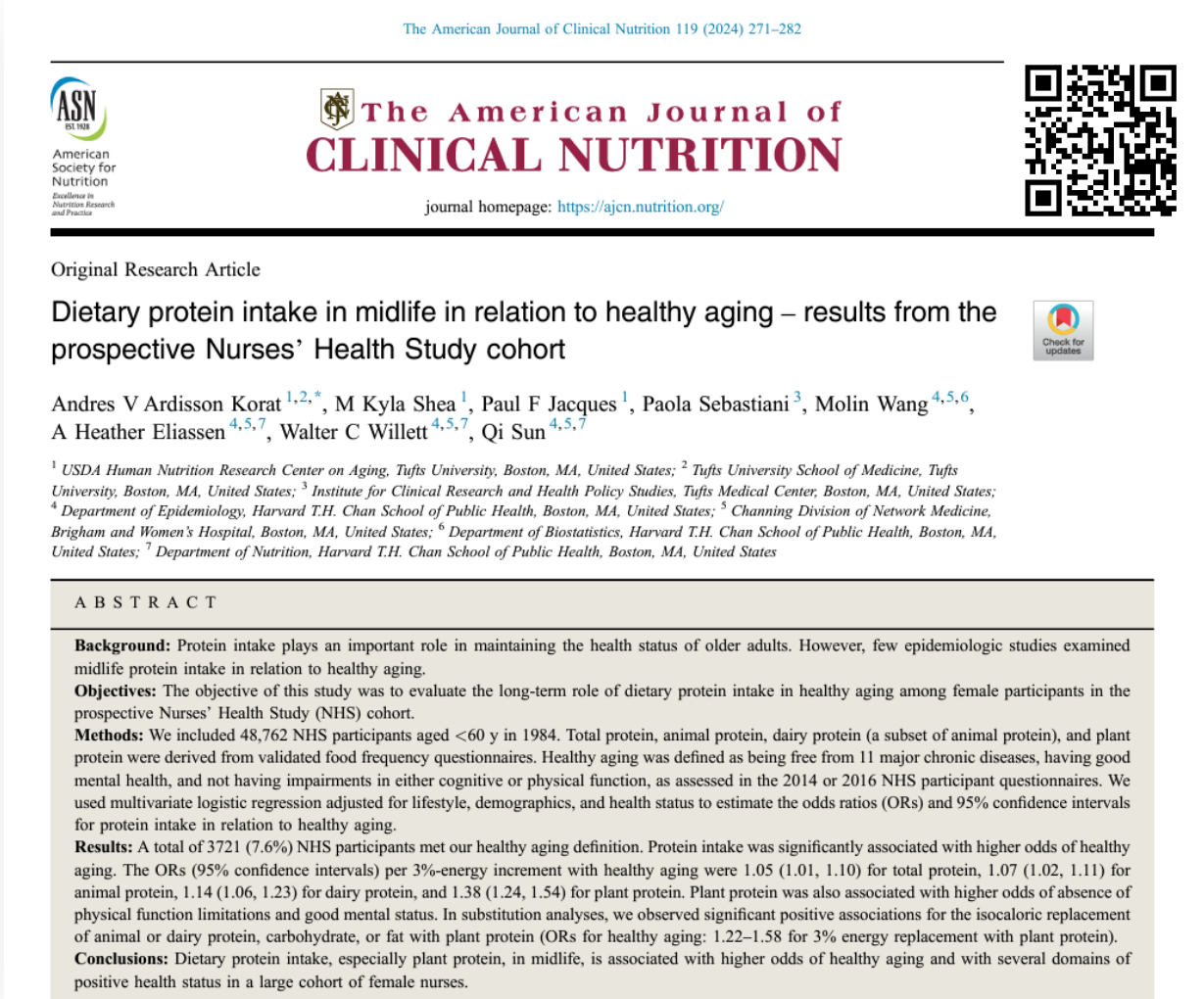
- Dietary fiber, resistant starch, and phenolic compounds in beans may support the growth of health-promoting gut bacteria (the microbiome)
- AICR probable evidence that foods with dietary fiber DECREASE the risk of:
  - Colorectal cancer
  - Weight gain, overweight and obesity
    - Strong evidence that excess body fat increases the risk of at least 12 different cancers

- Some data link regular legume consumption with a possible reduced risk of prostate and breast cancers, but more research is needed
- Bottom Line: Get 1-3 servings BEANS everyday!

- 48,762 NHS participants <60 y old (1984)
- Total protein, animal protein, dairy protein, and plant protein intake validated food frequency questionnaires
- Healthy aging defined as free from 11 major chronic diseases, having good mental health, and not having cognitive or physical function impairments
- Adjusted for lifestyle, demographics, and health status

RESULTS

- 3721 (7.6%) NHS participants met healthy aging definition (2016)
- Protein intake was significantly associated with of healthy aging
- The LIKELIHOOD per 3%-energy increment with healthy aging (OR 95% confidence intervals)
    - 1.05 (1.01, 1.10) for total protein
    - 1.07 (1.02, 1.11) for animal protein
    - 1.14 (1.06, 1.23) for dairy protein
    - 1.38 (1.24, 1.54) for plant protein
    - Plant protein also associated with absence of physical function limitations and good mental status



The American Journal of Clinical Nutrition 119 (2024) 271–282

The American Journal of CLINICAL NUTRITION

journal homepage: https://ajcn.nutrition.org/

Original Research Article

Dietary protein intake in midlife in relation to healthy aging – results from the prospective Nurses' Health Study cohort

Andres V Ardisson Korat [1,2,*], M Kyla Shea [1], Paul F Jacques [1], Paola Sebastiani [3], Molin Wang [4,5,6], A Heather Eliassen [4,5,7], Walter C Willett [4,5,7], Qi Sun [4,5,7]

[1] *USDA Human Nutrition Research Center on Aging, Tufts University, Boston, MA, United States;* [2] *Tufts University School of Medicine, Tufts University, Boston, MA, United States;* [3] *Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, Boston, MA, United States;* [4] *Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA, United States;* [5] *Channing Division of Network Medicine, Brigham and Women's Hospital, Boston, MA, United States;* [6] *Department of Biostatistics, Harvard T.H. Chan School of Public Health, Boston, MA, United States;* [7] *Department of Nutrition, Harvard T.H. Chan School of Public Health, Boston, MA, United States*

ABSTRACT

Background: Protein intake plays an important role in maintaining the health status of older adults. However, few epidemiologic studies examined midlife protein intake in relation to healthy aging.

Objectives: The objective of this study was to evaluate the long-term role of dietary protein intake in healthy aging among female participants in the prospective Nurses' Health Study (NHS) cohort.

Methods: We included 48,762 NHS participants aged <60 y in 1984. Total protein, animal protein, dairy protein (a subset of animal protein), and plant protein were derived from validated food frequency questionnaires. Healthy aging was defined as being free from 11 major chronic diseases, having good mental health, and not having impairments in either cognitive or physical function, as assessed in the 2014 or 2016 NHS participant questionnaires. We used multivariate logistic regression adjusted for lifestyle, demographics, and health status to estimate the odds ratios (ORs) and 95% confidence intervals for protein intake in relation to healthy aging.

Results: A total of 3721 (7.6%) NHS participants met our healthy aging definition. Protein intake was significantly associated with higher odds of healthy aging. The ORs (95% confidence intervals) per 3%-energy increment with healthy aging were 1.05 (1.01, 1.10) for total protein, 1.07 (1.02, 1.11) for animal protein, 1.14 (1.06, 1.23) for dairy protein, and 1.38 (1.24, 1.54) for plant protein. Plant protein was also associated with higher odds of absence of physical function limitations and good mental status. In substitution analyses, we observed significant positive associations for the isocaloric replacement of animal or dairy protein, carbohydrate, or fat with plant protein (ORs for healthy aging: 1.22–1.58 for 3% energy replacement with plant protein).

Conclusions: Dietary protein intake, especially plant protein, in midlife, is associated with higher odds of healthy aging and with several domains of positive health status in a large cohort of female nurses.

Korat VA A, Shea, M K, Jacques, F P, et al. Dietary protein intake in midlife in relation to healthy aging – results from the prospective Nurses' Health Study cohort. *Am. J. Clin.* Published online January 17, 2024. https://doi.org/10.1016/j.ajcnut.2023.11.010

- 48,762 NHS participants aged <60 y in 1984.
- Total protein, animal protein, dairy protein (a subset of animal protein), and plant protein were derived from validated food frequency questionnaires.
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Results

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The American Journal of Clinical Nutrition 119 (2024) 271–282

American Society for Nutrition

The American Journal of CLINICAL NUTRITION

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Original Research Article

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Medicine, Tufts
n, MA, United States;
f Network Medicine,
Health, Boston, MA,

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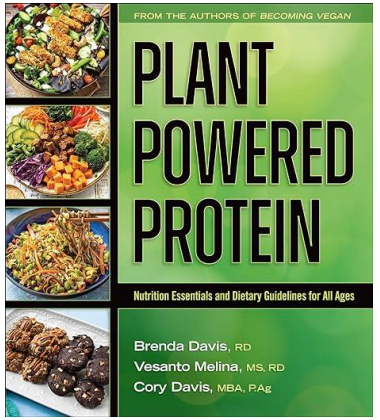
CONCLUSIONS

Dietary PLANT protein intake, in midlife, is associated with healthy aging and several domains of positive health status in a large group of female nurses

Korat VA A, Shea, M K, Jacques, F P, et al. Dietary protein intake in midlife in relation to healthy aging – results from the prospective Nurses' Health Study cohort. *Am. J. Clin.* Published online January 17, 2024. https://doi.org/10.1016/j.ajcnut.2023.11.010



Can I Really Get Enough… Protein?

- 0.8g/kg of Recommended Dietary Allowance (RDA)
- Does the type of Protein matter? Complete protein?
  - Broccoli (0.97 grams protein/cal) is higher in per-calorie protein content than beef (0.93 grams/protein/cal)
  - Soybeans (29 grams protein/cup) are comparable to chicken (30 grams for ½ breast) in available protein

- Protein goal for "plant only patients":
  - < 65 years of age
    - 0.9g/kg IBW
    - If extreme sports, consider 1.2-1.5 g/kg IBW
  - >65 years of age
    - 1.3 g/kg IBW
- Special circumstances:
  - 1.1g/kg during pregnancy and 1.3g/kg during lactation

MYTH: You need to eat animal protein to meet your protein needs.

FACT: Plants foods such as beans, lentils, nuts, whole grains, and veggies provide ample protein, as well as fiber and other essential vitamins, minerals, and phytochemicals not found in animal products such as meat, fish, poultry, eggs, and dairy.

PLANT PROTEIN

per serving

ADVANTAGES

- Fiber
- Phytonutrients
- Vitamins & minerals
- Low or healthy fat profile
- No cholesterol

18g	17g	15g	6g	5g	5g	5g
Red Lentils boiled, 1 cup	**Edamame** boiled, 1 cup	**Black Beans** cooked, 1 cup	**Almonds** 1 oz	**Peas** cooked, 1 cup	**Baked Potato** 1 medium	**Spinach** boiled, 1 cup

ANIMAL PROTEIN

per serving

DISADVANTAGES

- Cholesterol
- Saturated fat
- No fiber
- Higher in calories

6g	20g	25g	25g
Egg cooked, 1	**Salmon** cooked, 3 oz	**Steak** cooked, 3 oz	**Chicken** cooked, 3 oz

Eating minimally processed whole plant foods such as vegetables, fruits, whole-grains, legumes, and nuts lower the risk of diabetes, heart disease, cancer, and promote overall health.

Source: USDA Nutrient Analysis Database

https://connect.lifestylemedicine.org/resources/complimentary-resources

Protein and Longevity

- Consumption of >20% of calories from proteins vs. <10% of calories from protein is associated with:
  - 75% increase in overall mortality risk
  - 400% increase in the risk of cancer mortality in subjects ≤ 65 years
  - **Subjects < 65, IGF-1 levels correlate with level of protein intake but NOT in subjects 66+ → protein/ IGF-1 associations** are not observed in those 66 and older
  - **Associations were either abolished or attenuated if the proteins were plant derived**
- Example. Blue Zones
  - Animal products represented about 1% of the traditional diet of the record longevity Okinawans (Willcox et al., 2007)
  - Occasional meat or animal-product consumption also characterized the populations of the Sardinian and Loma Linda areas with high prevalence of centenarians or high average lifespan

Longo VD, Anderson RM. Nutrition, longevity and disease: From molecular mechanisms to interventions. Cell. 2022 Apr 28;185(9):1455-1470.
Levine et al. Cell Metab. 2014 Mar 4;19(3):407-17.

Estimating Impact of Food Choices on Life Expectancy: A Modeling Study

- Meta-analyses and data form the Global Burden of Disease 2019 study including studies from the United States, China, and Europe
- Provides evidence in support of a sustained change from the typical Western diet to an optimal diet rich in legumes, whole grains, fruit, vegetables, fish, and nuts with reduced red and processed meats
  - **Increase in life expectancy of 10.7 years in females 13 years in males if started at age 20**
  - **Over 8 years of increased life expectancy when started at age 60; and 3.4 years if changes made at 80y**
  - **Largest gains would be made by eating more legumes, whole grains and nuts**
  - **Less red and processed meat**

Fadnes LT, Økland JM, Haaland ØA, Johansson KA. Estimating impact of food choices on life expectancy: A modeling study. PLoS Med. 2022 Feb 8;19(2):e1003889.

Gut Health

- Researchers at the American Gut Project found that people who ate more than 30 different plant foods each week had a more diverse gut microbiome compared with those who ate less than 10
- What counts toward 30/ week:
  - Fruit and vegetables--> each variety can count as one (includes potatoes)
  - Legumes--> beans, example black, cannellini or kidney, chickpeas, and lentils
  - Grains--> oats, buckwheat, millet, wheat, brown rice, wholemeal pasta and quinoa (white pasta and white rice NOT included, because the industrial processes used to remove the wholegrains strip them of many of their nutritional benefits)
  - Spices→ 4 each = 1 toward the 30

Reaching 50-70 different plant foods a week showed most diverse gut microbiome!

McDonald et al. American Gut: an Open Platform for Citizen Science Microbiome Research. (2018) American Society for Microbiology doi: 10.1128/mSystems.00031-18

Food And Your Gut Microbiome Matter More Than Genetics

- Researchers looked at 1,200 markers of metabolic health
- 50% determined by food
- 7% determined by gut microbiome
- 3% determined by genetics

Chen, L., Zhernakova, D.V., Kurilshikov, A. *et al.* Influence of the microbiome, diet and genetics on inter-individual variation in the human plasma metabolome. *Nat Med* **28**, 2333–2343 (2022).

Higher Consumption of Fruit and Vegetables Is Associated With Lower Worries, Tension and Lack of Joy Across the Lifespan

- Participants (n = 8,640); men and women aged ≥25 years from the Australian Diabetes, Obesity and Lifestyle (AusDiab) Study
- Mean age was 47.8 (SD 15) years
- Dietary intake assessed 74-item validated FFQ. Perceived stress domains determined using a validated 20-item version of the Perceived Stress Questionnaire
- Higher intakes of FV, combined and separately, had a significantly lower odds (16-36%) for higher worries, tension and lack of joy, independent of other lifestyle factors

Radavelli-Bagatini et al. Higher Consumption of Fruit and Vegetables Is Associated With Lower Worries, Tension and Lack of Joy Across the Lifespan. Front Nutr. 2022 May 2;9:837066.

BUT… Isn't It More Expensive To Eat Healthy???

- **Food costs decrease 16% on a low-fat vegan diet, a savings of more than $500 a year,** compared to a diet that includes meat, dairy, and other animal products (Kahleova et al. *JAMA Netw Open.* 2023;6(9).)
- A 2021 study estimated that diets including **less animal and more plant foods were up to 25% to 29% less expensive** than omnivorous diets (Springmann et al. *BMJ*. 2020;370:m2322.)
- **Large US Internet survey found that food expenditures for vegetarians were lower than for their meat-eating counterparts** (Lusk et al. *Ecol Econ*. 2016;130:232-242.)

Kahleova H, Sutton M, Maracine C, et al. Vegan Diet and Food Costs Among Adults With Overweight: A Secondary Analysis of a Randomized Clinical Trial. *JAMA Netw Open.* 2023;6(9):e2332106.

International Agency For Research on Cancer (IARC) And World Cancer Research Fund (WCRF)

- The IARC Monographs and the Continuous Update Project of the WCRF/AICR have attributed the highest level of causal evidence to the association between consumption of alcoholic beverages and the development of cancer.
- **IARC classified alcohol consumption as carcinogenic to humans (Group 1).**
- The WCRF/AICR Continuous Update Project **concluded that there is convincing evidence that consumption of alcoholic beverages increases cancer risk.**
- Alcoholic beverages contain numerous carcinogenic compounds, but most of the risk relationship between alcohol consumption and the development of cancer is due to ethanol.

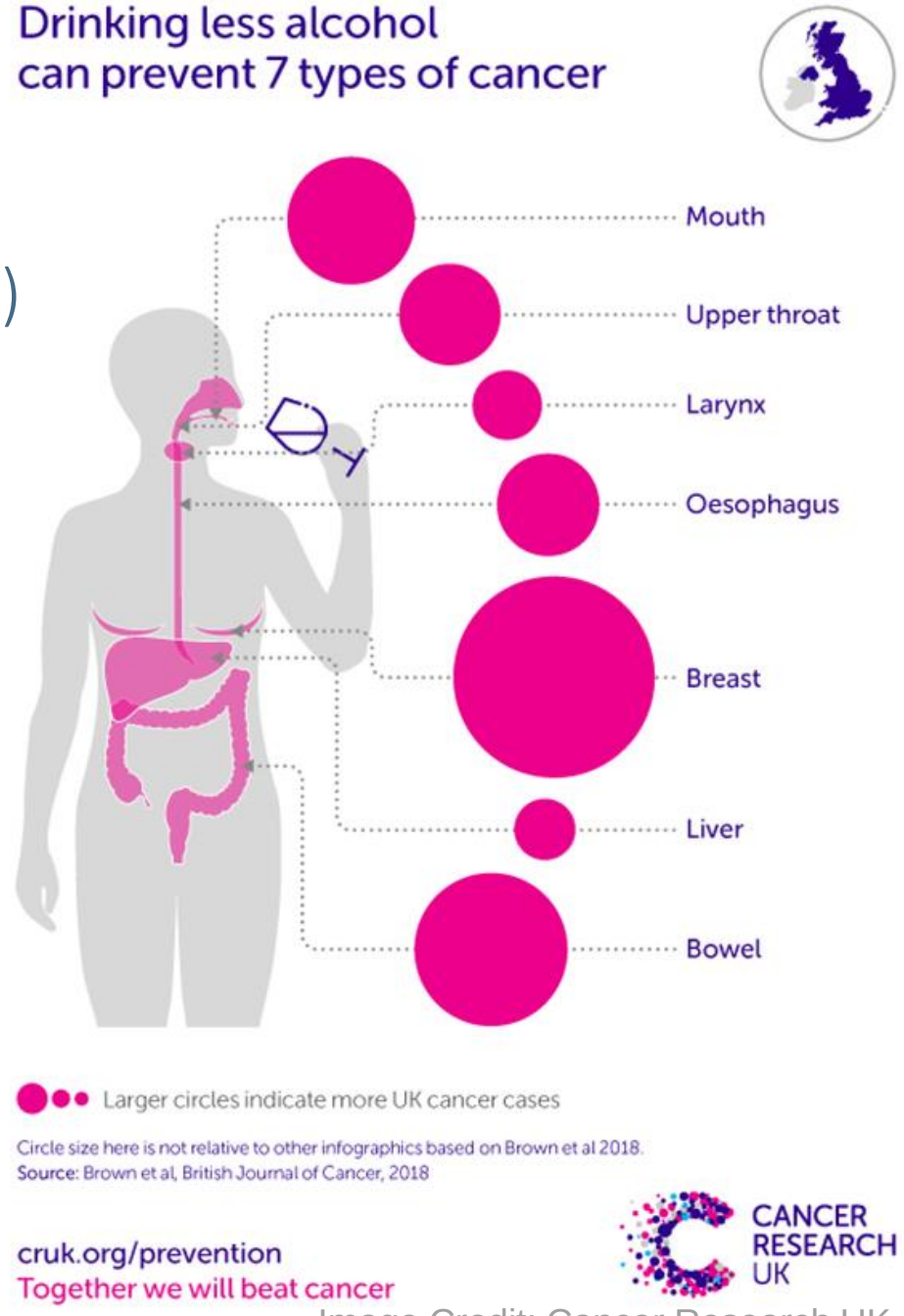


Image Credit: Cancer Research UK

IARC (2012). Personal habits and indoor combustions. IARC Monogr Eval Carcinog Risks Hum. 100E:1–575. WCRF/AICR (2018). Diet, nutrition, physical activity and cancer: a global perspective. Continuous Update Project Expert Report 2018. World Cancer Research Fund/American Institute for Cancer Research. Available from: https://www.wcrf.org/dietandcancer.

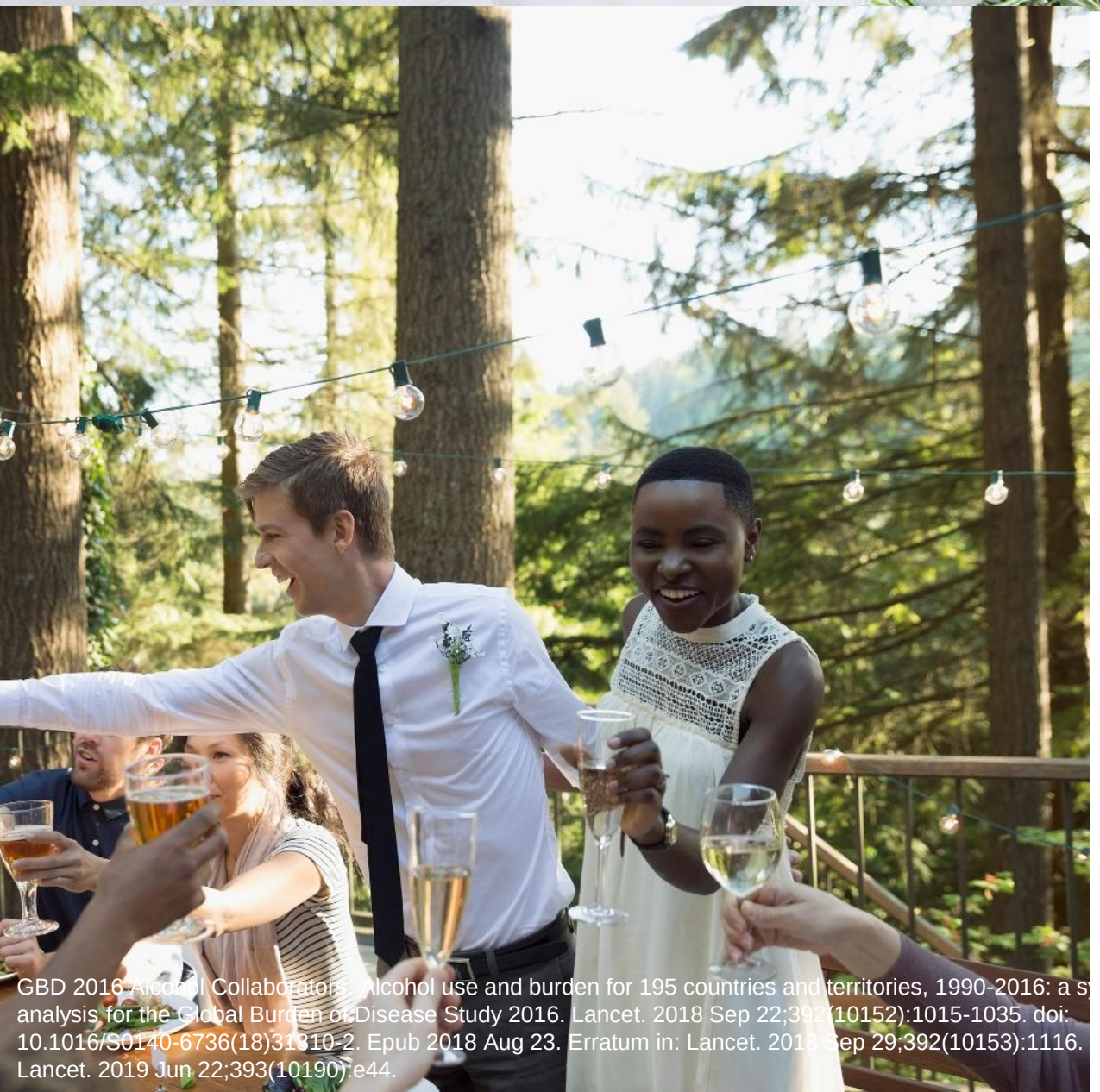
WHAT IS A STANDARD DRINK?

12 fl oz of regular beer = **8-9 fl oz of malt liquor** (shown in a 12 oz glass) = **1.5 fl oz shot of distilled spirits** (gin, rum, tequila, vodka, whiskey, etc) = **5 fl oz of table wine**

Worldwide 740,000 new cases of cancer attributed to alcohol
Esophageal cancer- 190,000 cases
Liver cancer- 155,000 cases
Female breast cancer- 98,000 cases

Rumgay et al. Global burden of cancer in 2020 attributable to alcohol consumption: a population-based study. Lancet Oncol. Published online 14 July 2021.

Integrative Healthcare SYMPOSIUM



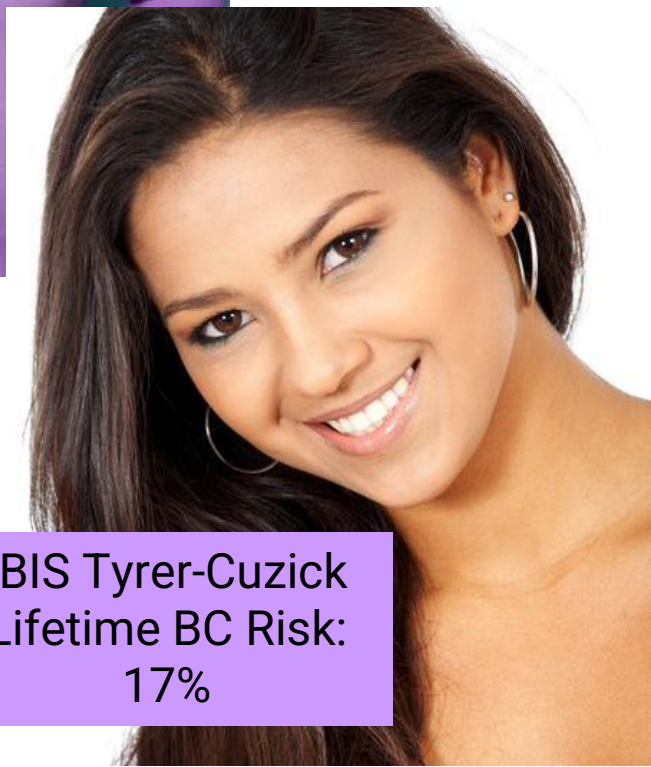
GBD 2016 Alcohol Collaborators. Alcohol use and burden for 195 countries and territories, 1990-2016: a s analysis for the Global Burden of Disease Study 2016. Lancet. 2018 Sep 22;392(10152):1015-1035. doi: 10.1016/S0140-6736(18)31310-2. Epub 2018 Aug 23. Erratum in: Lancet. 2018 Sep 29;392(10153):1116. Lancet. 2019 Jun 22;393(10190):e44.

Alcohol: No Health Benefit

- Most national guidelines suggest health benefits to one or two glasses of wine or beer a day
- Global Burden of Disease Study showed level of alcohol consumption that minimized harm across health outcomes was ZERO standard drinks per week.
- Once all the evidence was weighed, NO BENEFIT WAS FOUND ON OVERALL HEALTH FROM CONSUMPTION.
- *"If everyone cut their alcohol consumption in half, we could save one million lives globally. If you drink on Fridays and Saturdays, perhaps only drink on one of those days."* --Max Griswold, Institute for Health

Rachel… 11 months later

- BMI 31→ 23 LOST 60#s
- DM2 A1C 6.7-> 5.3 off metformin and dulaglutide. Enjoys 1 T ACV w meals
- LDL 196 -> 82 normal TGs, ApoB 65, and CRPhs 2 off statin on Amla fruit extract BID
- Nonalcoholic fatty liver disease-> LFTs normal
- HTN resolved off losartan and HCTZ
- OSA off CPAP
- Depression resolved, tapered off venlafaxine after 2 mo on WFPB and now takes magnesium glycinate q HS



IBIS Tyrer-Cuzick Lifetime BC Risk: 17%

Current Challenges In Nutrition Research

- Overnutrition rather than undernutrition
- Self-proclaimed “experts”
- Attempts to oversimplify complex science when constructing guidelines based on limited scientific evidence have largely failed
- The system of assessing the benefits or harms of foods is imperfect
- Benefits of fiber, vegetables, and fruits and the need to reduce sugar and ultra-processed foods is clear
- Far less consensus on dietary advice for patients with diabetes, the benefits/risks of keto diets, and the role of meat, saturated fats, and salt restriction

Spector TD, Gardner CD. Challenges and opportunities for better nutrition science-an essay by Tim Spector and Christopher Gardner. BMJ. 2020 Jun 26;369:m2470.

Current Challenges In Nutrition Research: Big Food

"The commercial food system has the potential to show leadership and support for dietary public health, but systemic change is needed first and this is likely to require governmental action." (White)

- Food and drink industry has gone from mid-size companies in the 70s to global multinationals with immense power, money, and influence
- The top 10 companies control over 70% of what we eat and drink
- Aimed at producing greater amounts of affordable, accessible food for our expanding population, but at the cost of our health
- Funding from the food industry or its intermediaries, may drive research agendas (Nestle)
- Hard lessons from the tobacco and pharmaceutical industries, but it has yet to recognize fully the influence of food and drink companies, which have far greater impact on our health
- 40 years for the first quality randomized controlled trial of the effects of junk food in humans (Hall)

Nestle M. *Unsavory truth: how food companies skew the science of what we eat.* Basic Books, 2019.
Hall KD, Ayuketah A et al. Ultra-processed diets cause excess calorie intake and weight gain: an inpatient randomized controlled trial of ad libitum food intake. Cell Metab2019;30:67-77.e3.
White M, Aguirre E, et al. What role should the commercial food system play in promoting health through better diet? BMJ2020;368:m545.

Current Challenges In Nutrition Research and Future Direction

- **Funding**
  - Miniscule % funding directed towards nutrition research
- **Experts Don't Always Agree**
  - Many notable areas of disagreement exist, particularly for dairy, meats, and beverages
- **Study Quality**
  - Most of our nutritional evidence has come from large observational studies supplemented with small, short term human trials, usually of low quality, plus animal experiments
  - Large observational studies tend to maximize generalizability but are subject to inherent biases BUT with such large amounts data → perhaps correlation = causation!
  - Short term and often reductionist human trials tend to maximize rigor but lack generalizability
  - The power of using both approaches is to maximize the combination of generalizability and rigor

Current Challenges In Nutrition Research and Future Direction

- **Context and Reductionism**
  - "INSTEAD OF WHAT" question context in which an ingredient or meal is eaten and the alternative food(s) are being compared to
  - Studying food groups and patterns, rather than macronutrients or individual items in isolation
- **Microbiome**
  - Manipulating the microbiome through diet is one of the major challenges of the next decade
  - Simply adding fiber supplements or single microbe probiotics may not be enough for many individuals
  - Understanding the composition, function, and diversity of the microbiome needs to be incorporated into nutritional education at all levels

Spector TD, Gardner CD.. BMJ. 2020 Jun 26;369:m2470.
Berry SE, Valdes AM. Decoding human postprandial responses to food and their potential for precision nutrition: the PREDICT 1 study. Nat Med2020;26:964-73.
Valdes AM, Walter J, et al. Role of the gut microbiota in nutrition and health. BMJ2018;361:k2179.
Gardner CD, Trepanowski JF et al. Effect of low-fat vs. low-carbohydrate diet on 12-month weight loss in overweight adults and the association with genotype pattern or insulin secretion: a randomized clinical trial [the Diet Intervention Examining The Factors Interacting with Treatment Success (DIETFITS)] study. JAMA2018;319:667-79.

Current Challenges In Nutrition Research and Future Direction

- **Demoting the Calorie**
  - Lacks value as a practical tool in weight management
  - Research in humans suggests our bodies and metabolic rates can behave differently when given identical calories in different contexts
  - We need different sustainable public health approaches that focus on food quality, not just quantity
- **Personalized Nutrition**
  - Recent large scale population studies using artificial intelligence mixed with digital technologies and the microbiome have clearly shown wide variation in our metabolic response to foods
  - Large scale trials (eg, DIETFITS) have shown no differences in mean results between high and low-fat healthy diets but large inter-individual differences regardless of allocated diet
  - Population health could be improved by promoting diet changes for which there is broad consensus—eating more vegetables, fibre, and whole foods and avoiding ultra-processed food

Spector TD, Gardner CD.. BMJ. 2020 Jun 26;369:m2470.
Berry SE, Valdes AM. Decoding human postprandial responses to food and their potential for precision nutrition: the PREDICT 1 study. Nat Med2020;26:964-73.
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Mother Earth

THE LANCET

Volume 394, Issue 10211, 16–22 November 2019, Pages 1836-1878

Review

The 2019 report of The *Lancet* Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate

Nick Watts MA [a], Markus Amann PhD [i], Prof Nigel Arnell PhD [j], Sonja Ayeb-Karlsson PhD [l], Kristine Belesova PhD [n], Prof Maxwell Boykoff PhD [p], Prof Peter Byass PhD [s], Prof Wenjia Cai PhD [t], Diarmid Campbell-Lendrum DPhil [u], Stuart Capstick PhD [w], Jonathan Chambers PhD [x], Carole Dalin PhD [b], Meaghan Daly PhD [y], Niheer Dasandi PhD [z], Prof Michael Davies PhD [c], Paul Drummond MSc [b], Prof Robert Dubrow PhD [aa], Prof Kristie L Ebi PhD [ac], Matthew Eckelman PhD [ae], Prof Paul Ekins PhD [b]...Prof Hugh Montgomery MD [f †]

The Lancet: Earth On the Line: How Food Choices Can Change The World

- 15-20% of the total warming effect related to food production, much of this is potentially modifiable by our food choices
- 2019 Eat-Lancet report advocated a global shift in our eating patterns to reduce emissions—shift from meat and dairy production→ increasing plant sources of protein ie pulses low carbon imprints
- Experts agree that eating less meat, especially beef, and to a lesser extent dairy, may be one of the most important climate actions individuals can take
- Current health recommendations that endorse daily cow's milk may not be sustainable for the planet
- Linking an individual's behavioral diet change to a national or global environmental goal could increase its chances of sustained success by aligning personal values with external, societal issues

Willett W, Rockström J et al. Food in the anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet2019;393:447-92.

- The world's food system is responsible for one-third of greenhouse gasses. Beef, lamb, cheese the most polluting.

- Oxford Scarborough et al. 55,504 vegans, vegetarians, fish-eaters and meat-eaters with food-level data on greenhouse gas emissions, land use, water use, potential biodiversity loss from a review of 570 life-cycle assessments covering more than 38,000 farms in 119 countries.

- Dietary impacts of vegans vs. high meat-eaters (100g. a day):
  - Plant-based diets 75 percent less in greenhouse gas emissions compared to high meat diet (3.5 ounces of meat a day)
    - 25.1% (95% uncertainty interval, 15.1–37.0%) for greenhouse gas emissions
    - 25.1% (7.1–44.5%) for land use
    - 46.4% (21.0–81.0%) for water use
    - 34.3% (12.0–65.3%) for biodiversity

Scarborough, P., Clark, M., Cobiac, L. *et al.* Vegans, vegetarians, fish-eaters and meat-eaters in the UK show discrepant environmental impacts. *Nat Food* **4**, 565–574 (2023).

NYC Health + Hospitals Menu - Plant Based / General Menu

LUNCH	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Soup	Minestrone Soup	Black Bean Soup	Tomato Soup	Carrot Ginger Soup	Green Pea Soup	Lentil Soup	Butternut Squash & Apple Soup
Salad	Spring Mix Salad with Grape Tomatoes & Shredded Carrots	Spring Mix Salad with Grape Tomatoes & Shredded Carrots	Spring Mix Salad with Grape Tomatoes & Shredded Carrots	Spring Mix Salad with Grape Tomatoes & Shredded Carrots	Spring Mix Salad with Grape Tomatoes & Shredded Carrots	Spring Mix Salad with Grape Tomatoes & Shredded Carrots	Spring Mix Salad with Grape Tomatoes & Shredded Carrots
Entrée	Sancocho	Jackfruit and Lentil Jambalaya	Sloppy Joe	Mushroom Stroganoff	Curried Kabocha Squash	Penne Pasta with Pea Pesto	Gandules Y Calabaza
Starch	White Rice	Sunshine Rice	Whole Wheat Hamburger Bun	Rotini	White Rice, Lima Beans & Dill	Peas	Sunshine Rice
Vegetable		Broccoli	Mixed Vegetables	Peas and Carrots		Roasted Grape Tomatoes	
Dessert	Diced Peaches	Diced Pears	Fruit Cocktail	Apple	Mandarin Oranges	Diced Pears	Orange
Bread	WW Bread	WW Bread			WW Bread	WW Bread	WW Bread
Alternate Lunch							
Entrée	*Three Bean Chili*	*Garden Bolognese*	*Gandules Y Calabaza*	*Three Bean Chili*	*Sancocho*	*Black Bean Burger*	*Orange Cauliflower with Edamame*
Starch	*Yellow Rice*	*Rotini*	*Sunshine Rice*	*Yellow Rice*	*White Rice*	*Whole Wheat Bun*	*Brown Rice Pilaf*
Vegetable	*Green Beans*	*Mixed Vegetables*		*Broccoli*		*Cauliflower*	
Fruit	*Orange*	*Orange*	*Orange*	*Orange*	*Orange*	*Orange*	*Orange*

15,000 plant-based meals offered a day NYC hospitals – Sodexo
50% patients opt for plant based; 95% patients happy with it
$0.59 saving per meal on average

NYC Health + Hospitals Menu - Plant Based / General Menu

DINNER	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
Salad	Tossed Salad	Spring Mix Salad	Coleslaw	Chick Pea Salad	Cucumber Salad	Tangy Slaw	Tossed Salad
Entrée	Garden Bolognese	Chilaquiles	Root Vegetable Tagine	Black-eye Pea Casserole	Jackfruit Carnitas and White Rice Burrito Bowl with Jicama Slaw	Vegetables for Paella	Red Curry Vegetables with Roasted Tofu
Starch	Rotini		Tri-Color Cous Cous	Corn Bread topped with Dairy-Free Shredded Cheddar Cheese	Flour Tortilla	Paella Yellow Rice	
Vegetable	Spinach	Caribbean Blend Vegetables			Broccoli		
Dessert	Rice Pudding	Vanilla Pudding	Chocolate Chip Cookies	Diced Peaches	Chocolate Pudding	Fresh Baked Cookie	Apple Cobbler
Bread	WW Dinner Roll	WW Dinner Roll	WW Dinner Roll			WW Dinner Roll	WW Dinner Roll
Fruit	Apple	Orange	Apple		Apple	Orange	
Alternate Dinner							
Entrée	*Roasted Moroccan Vegetables*	*Rigatoni Pasta Al Forno with made with Dairy-Free Cheeses*	*Curried Kabocha Squash*	*Orange Cauliflower with Edamame*	*Garden Bolognese*	*Mushroom Stroganoff*	*Whole Wheat Sicilian Pizza with Dairy-Free Mozzarella Cheese*
Starch	*Brown Rice Pilaf*		*White Rice, Lima Beans & Dill*	*Brown Rice Pilaf*	*Rotini*	*Rotini*	
Vegetable					*Mixed Vegetables*	*Peas and Carrots*	*Large Mixed Green Salad*
Fruit	*Apple*	*Apple*	*Apple*	*Apple*	*Apple*	*Apple*	*Apple*

15,000 plant-based meals offered a day NYC hospitals – Sodexo
50% patients opt for plant based; 95% patients happy with it
$0.59 saving per meal on average

NYC Health + Hospitals Serves Culturally-Diverse Plant-Based Meals As Primary Dinner Option for Inpatients at All of Its 11 Public Hospitals

Below are all the plant-based foods that are featured in the NYC Health + Hospitals dinner menu for inpatients. Non-plant-based options will continue to be available at the patient's request and in accordance with their prescribed diet.

- Garden Bolognese with Rotini and Spinach
- Pad Thai Noodle Bowl
- Moroccan Root Vegetable Tagine with Tricolor Couscous
- Southern Black-Eyed Pea Casserole with Plant-Based Cornbread Topped with Plant-Based Shredded Cheese
- Zesty Burrito Bowl with Jicama Slaw with a Broccoli and Flour Tortilla
- Spanish Vegetable Paella with Yellow Rice
- Red Curry Vegetables with Roasted Tofu

Alternate dinner options:

- Moroccan Vegetable Tagine with Roasted Chickpeas and Brown Rice Pilaf
- Rigatoni Pasta al Forno with Plant-Based Ricotta Cheese
- Curried Kabocha Squash with Lima Beans, Dill, and White Rice
- Orange Cauliflower with Edamame and Brown Rice Pilaf
- Garden Bolognese with Rigatoni and Mixed Vegetables
- Fiesta Black Bean Burger on a Whole Wheat Bun with Cauliflower
- Whole Wheat Sicilian Pizza with Plant-Based Cheese

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15 Sweet and Savory Plant-Based Recipes Perfect for Easter Brunch

Integrative Healthcare SYMPOSIUM

Want to Learn More?

- Mayo Clinic proudly offers a unique continuing education opportunity from the American College of Lifestyle Medicine to YOU
- Part of the pledge highlighted at the recent White House Conference on Hunger, Health, and Nutrition to provide CME courses to up to 100,000 healthcare professionals
- Foundational, evidence-based introduction to the field of lifestyle medicine with a focus on nutrition, often the most complex behavior to change, to prevent and treat chronic disease
- Free 5.5 hours of CME/CE content

Course Bundle Includes:

1 CME/CNE/CPE/CE

In this course, Cate Collings, MD, MS, FACC, DipABLM, demonstrates how lifestyle medicine has the power to treat and often reverse chronic disease.

Learning Objectives

- Define lifestyle medicine.
- Discuss the importance and timeliness of lifestyle medicine.
- Review evidence and current endorsements and guidelines for lifestyle medicine.
- Illustrate six key interventions to treat lifestyle-related chronic conditions.
- Explore unique components of a lifestyle medicine practice.
- Describe opportunities to train and certify in lifestyle medicine.
- Discuss the emerging priorities for lifestyle medicine.

3 CME/CNE/CPE/CE

Diet has been identified as the single most important risk factor for morbidity and mortality in the U.S., yet most health care providers spend relatively few hours learning about nutrition during their formal training.

Learning Objectives

- Review the current challenges in nutrition research and the challenges of disseminating accurate nutrition information to the public.
- Explain national and global nutrition recommendations and basic nutrition principles.
- Distinguish differences between health-promoting and health-harming foods.
- Describe the dietary pattern recommended by the American College of Lifestyle Medicine for disease prevention, treatment and reversal.
- Apply the concept of the dietary spectrum when making nutrition recommendations.
- Apply nutrition therapy scope of practice.
- Review the scientific evidence of popular diets.

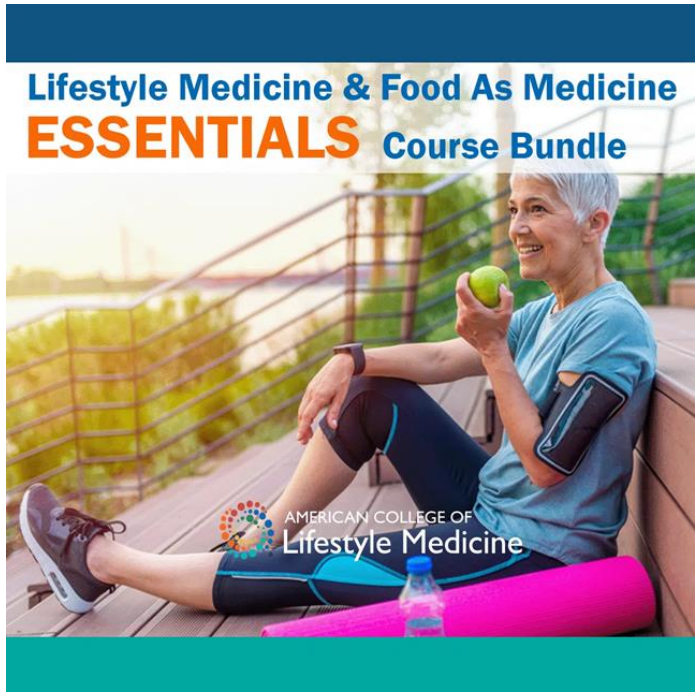
1.5 CME/CNE/CPE/CE

This Food as Medicine course session will provide an overview of the scientific evidence on food groups and dietary patterns for treatment and risk reduction of common lifestyle-related conditions, with a focus on cardiovascular disease, insulin resistance, cancer prevention, and obesity.

Learning Objectives

- Describe dietary patterns that have been shown to be effective in the treatment and risk reduction of common lifestyle-related chronic diseases.
- Discuss how diet behaviors impact chronic disease development and progression.
- Identify ways in which different macronutrient sources may contribute to disease progression or improvement.
- Explore basic counseling strategies for dietary behavior change.

To enroll, select REGISTER NOW at www.lifestylemedicine.org/essentials
Scroll to the bottom of the page
login or create an ACLM account
Proceed to Check Out
Enter promo code: ESS-MAYO



Wishing you vibrant health!
Thank you!

Mussallem.dawn@mayo.edu

@drdawnmussallem


904 FITNESS
7:43:30
START/FINISH
MAYO CLINIC
RACE
220
622
621
243
427
467
310
425
315

Friday 10:45am – 11:45am

CME: Food as Medicine: The Evidential Power of Whole Food, Plant-Predominant Nutrition

Please scan this QR code on you mobile

or tablet device to access the session feedback survey

CME: Food as Medicine: The Evidential P
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