Food as Medicine

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Connecticut Academy of PAs
Mystic Marriott, Groton, CT
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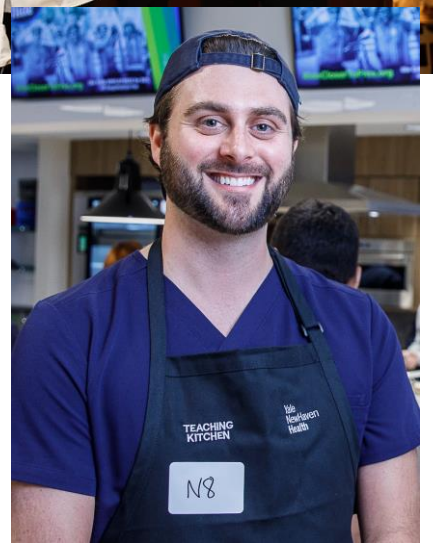
Disclosures & Conflicts of Interest: None

1. Unabashedly omnivorous
2. Love pizza (too much)
3. Improving our diets is a lifelong journey

Food → Medicine → Food as Medicine



Learning Objectives

1. Describe the contribution of poor nutrition to the burden of chronic disease in the United States.
2. Identify the health-promoting components common among evidence-based dietary patterns, including the Mediterranean diet, DASH diet, USDA's MyPlate, Harvard Healthy Eating Plate, and whole food, plant-based diet.
3. Define the term "ultra-processed food" (UPF) and explain UPFs' contribution to the development of diet-related chronic diseases.
4. Use a Nutrition Guideline framework to define how "healthy" everyday foods and diets are.
5. Define "Food is Medicine" and "culinary medicine" and describe their role in improving patients' dietary patterns.

Prevalence of Diet-Sensitive Diseases in the United States

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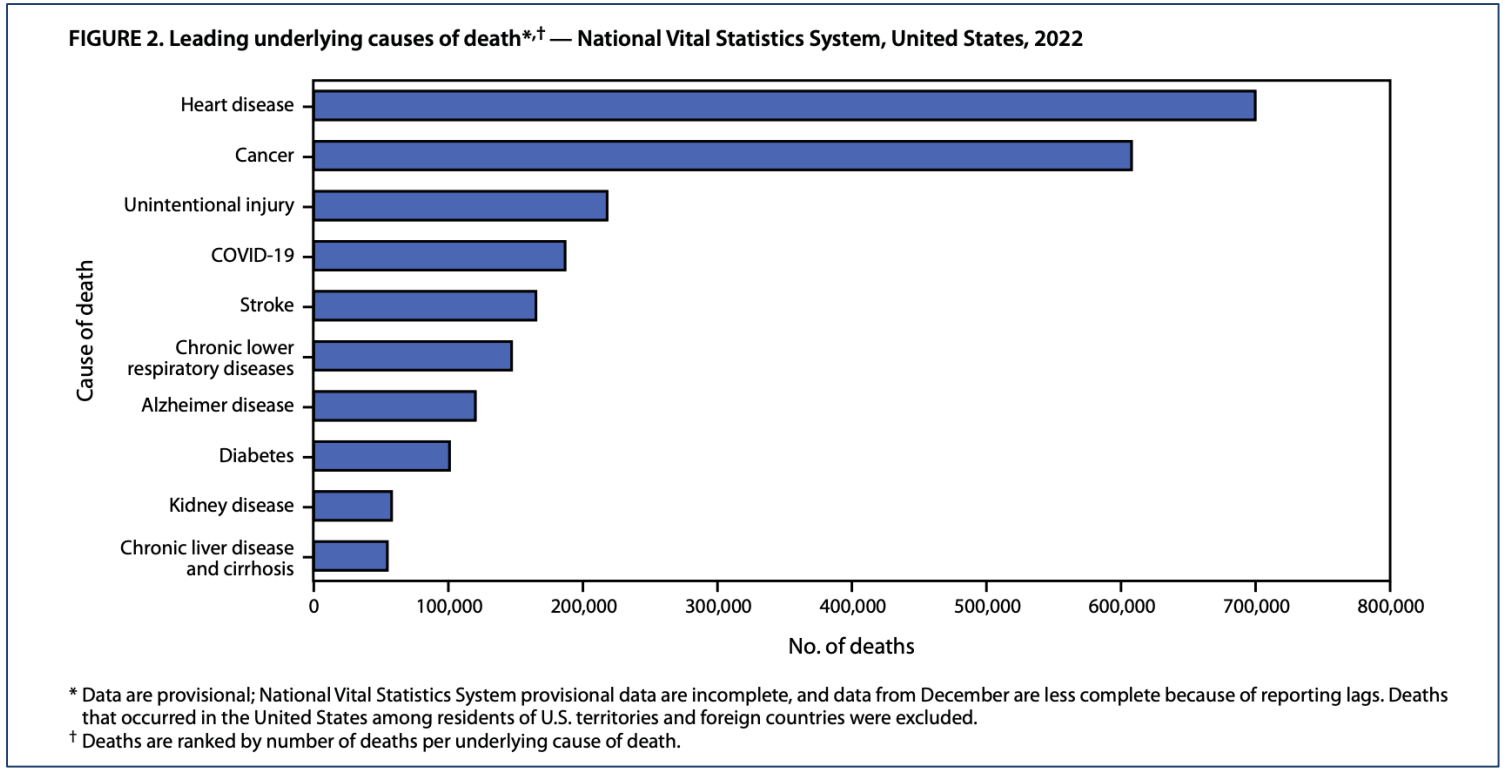
  - 2013-2016: 48.0% of US adults (20 years and older)
  - #1 cause of mortality in the US every year since 1921



CDC | Benjamin et al. *Circulation*. 2019.

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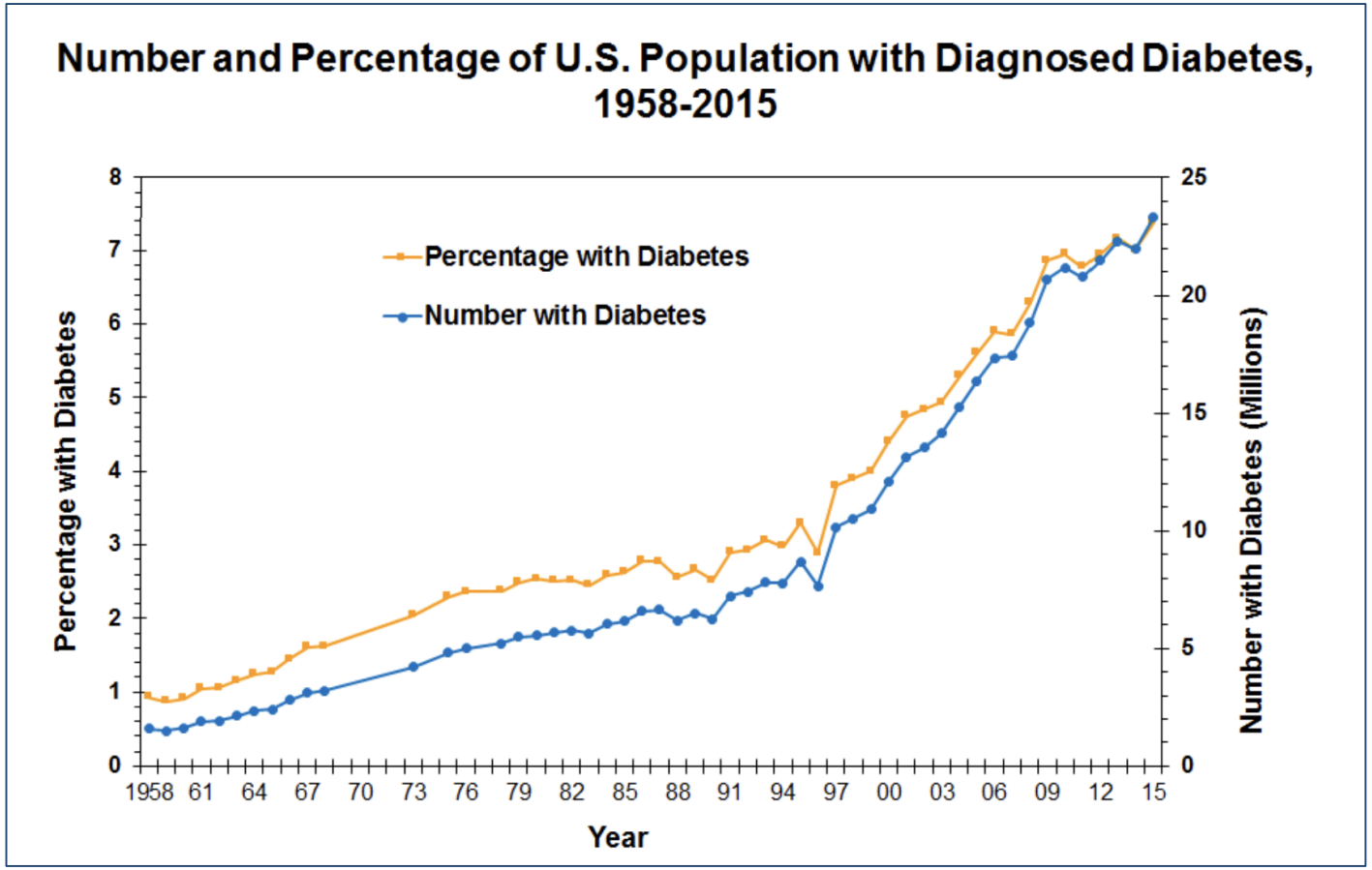
- Diabetes
  - 11.6% of US population
- Prediabetes
  - 38.0% of US adults



CDC | Harris et al. ADA. 2020.

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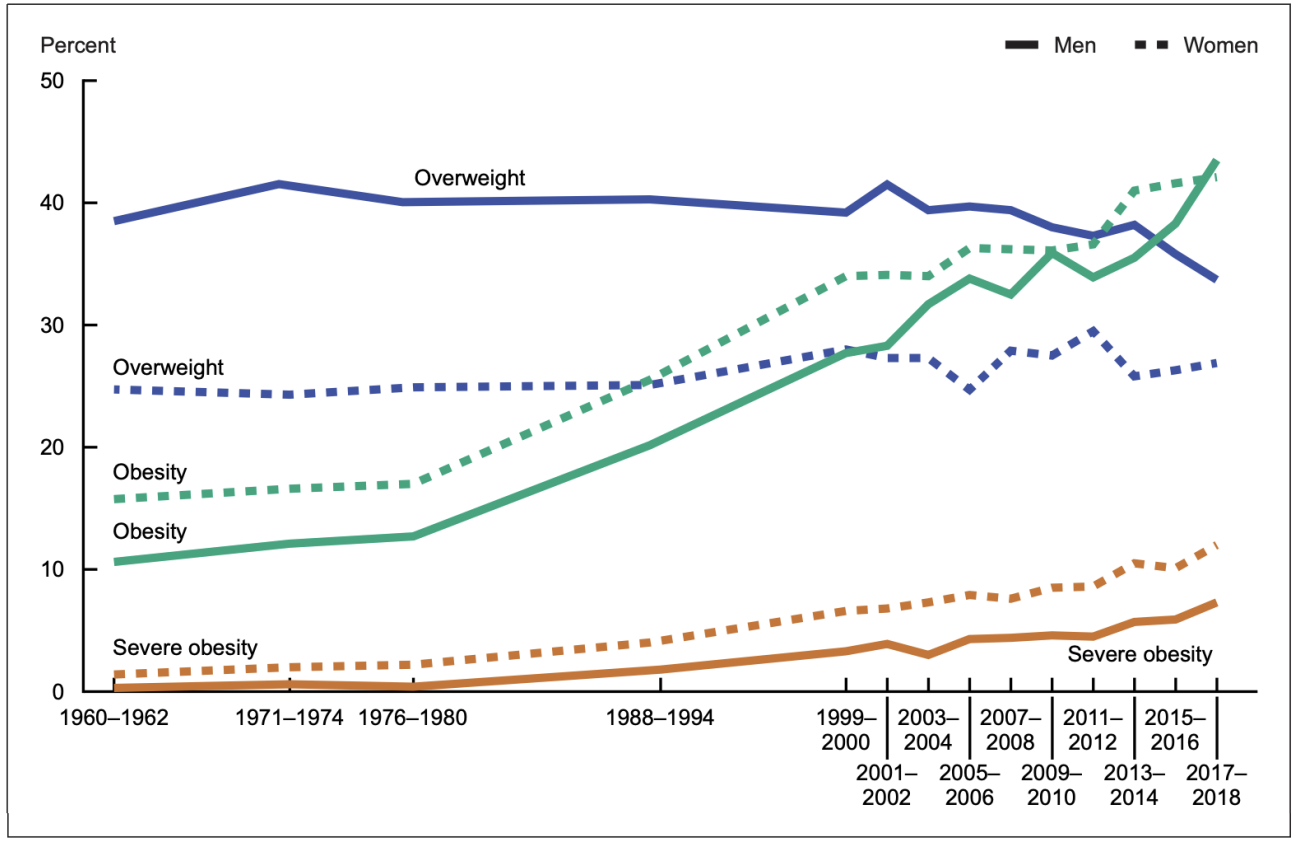
- Obesity
  - 2017-2020: 41.9% of US adults
  - 2030: 48.9% of US adults

Figure. Age-adjusted trends in overweight, obesity, and severe obesity among men and women aged 20–74: United States, 1960–1962 through 2017–2018



NOTES: Data are age adjusted by the direct method to U.S. Census 2000 estimates using age groups 20–39, 40–59, and 60–74. Overweight is body mass index (BMI) of 25.0–29.9 kg/m^2. Obesity is BMI at or above 30.0 kg/m^2. Severe obesity is BMI at or above 40.0 kg/m^2. Pregnant women are excluded from the analysis.
SOURCES: National Center for Health Statistics, National Health Examination Survey and National Health and Nutrition Examination Surveys.

CDC | Ward et al. *NEJM*. 2019.

Prevalence of Diet-Sensitive Diseases in the United States

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- Metabolic dysfunction-associated steatotic liver disease (MASLD)
- Cancer
- Dementia
- Others

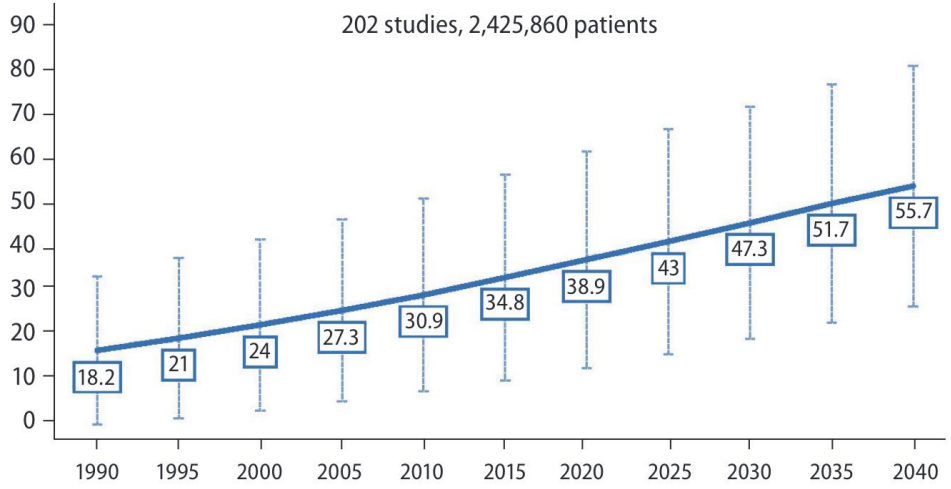
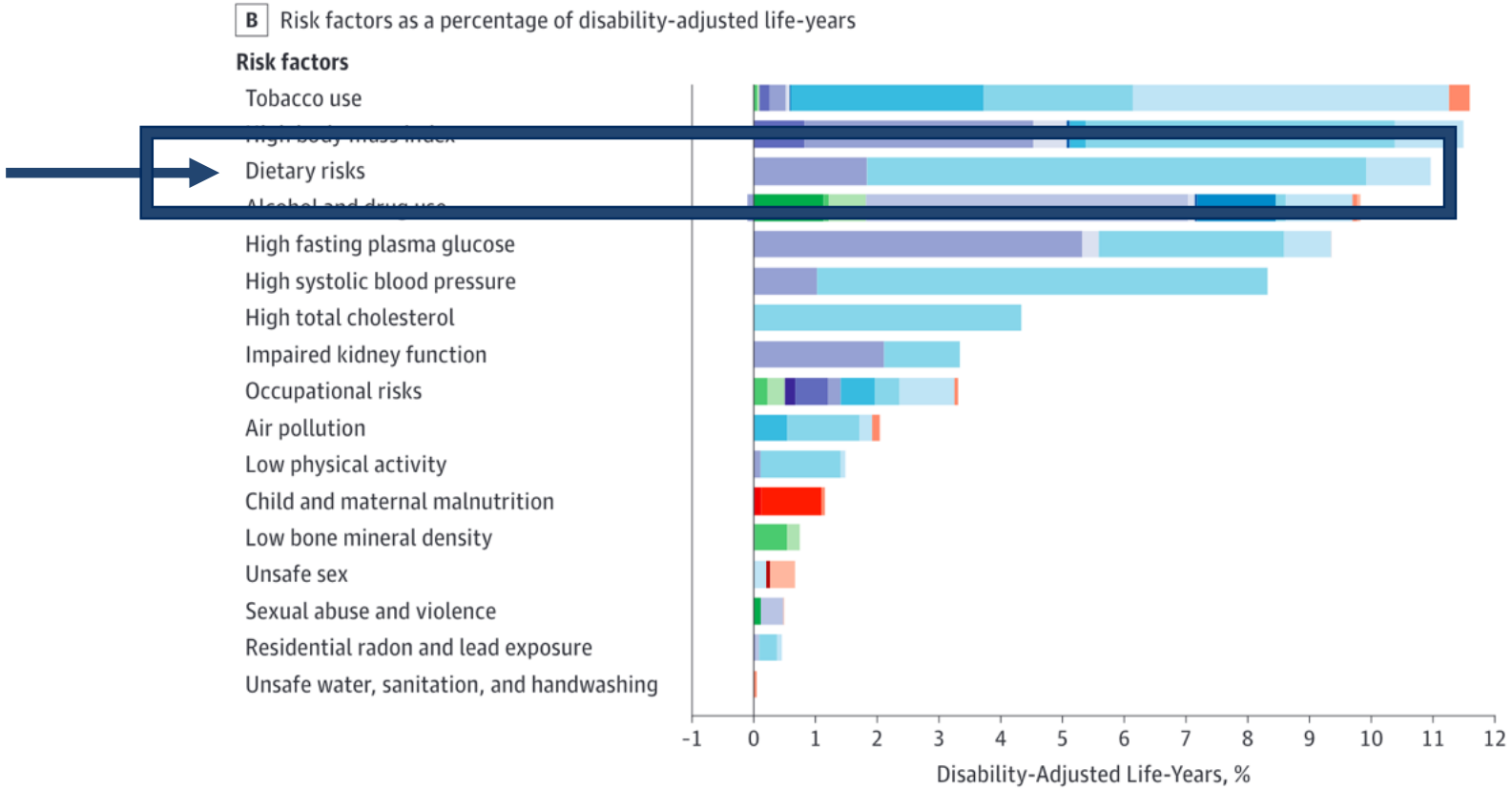


Figure 1. Overall forecast of global nonalcoholic fatty liver disease prevalence.

Le et al. *Clin Mol Hepatol.* 2022.

Diet: 3rd Leading Risk Factor for Morbidity

Figure 2. Number of Deaths and Percentage of Disability-Adjusted Life-Years Related to the 17 Leading Risk Factors in the United States, 2016



The US Burden of Disease Collaborators. *JAMA*. 2018.

Diet: Leading Risk Factor for Mortality

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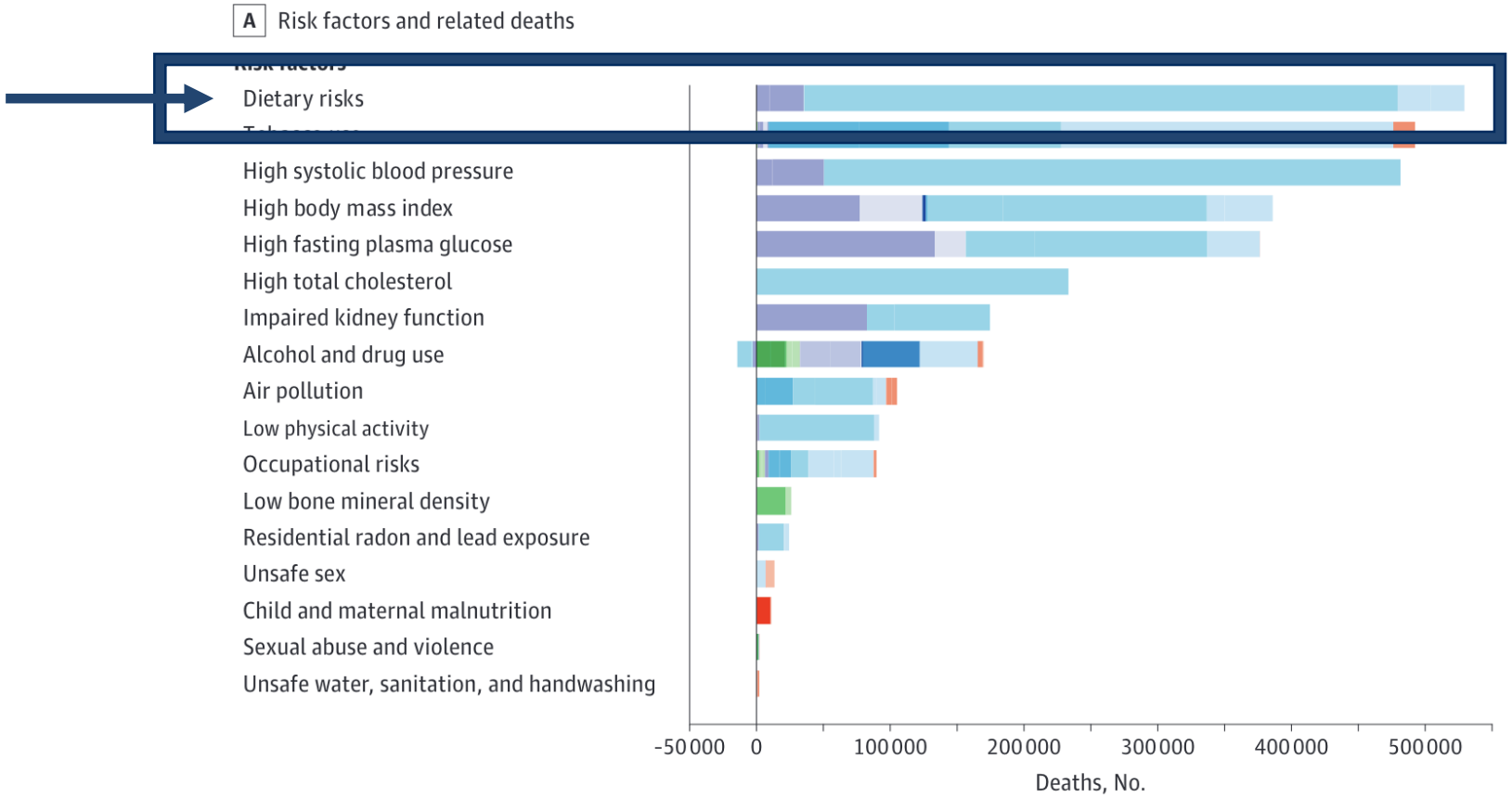


The US Burden of Disease Collaborators. *JAMA*. 2018.

Defining “Healthy”

Defining “Healthy”

What makes a food or dietary pattern “healthy”?

What would a food or a dietary pattern that does NOT increase our risk for morbidity and/or mortality look like?

FEATURES

Food Confusion

Nutrition advice is confounding and often contradictory. What are we supposed to believe? Writer Nathanael Johnson went shopping for answers.

HEALTH NEWS

Analysis | Health

One Study, Five Headlines: How to Deal With Conflicting Diet News

trition

I asked 8 researchers why the science of nutrition is so messy. Here's what they said.

By Julia Belluz | @juliaoftoronto | Updated Aug 16, 2016, 9:30am EDT

ine. Why

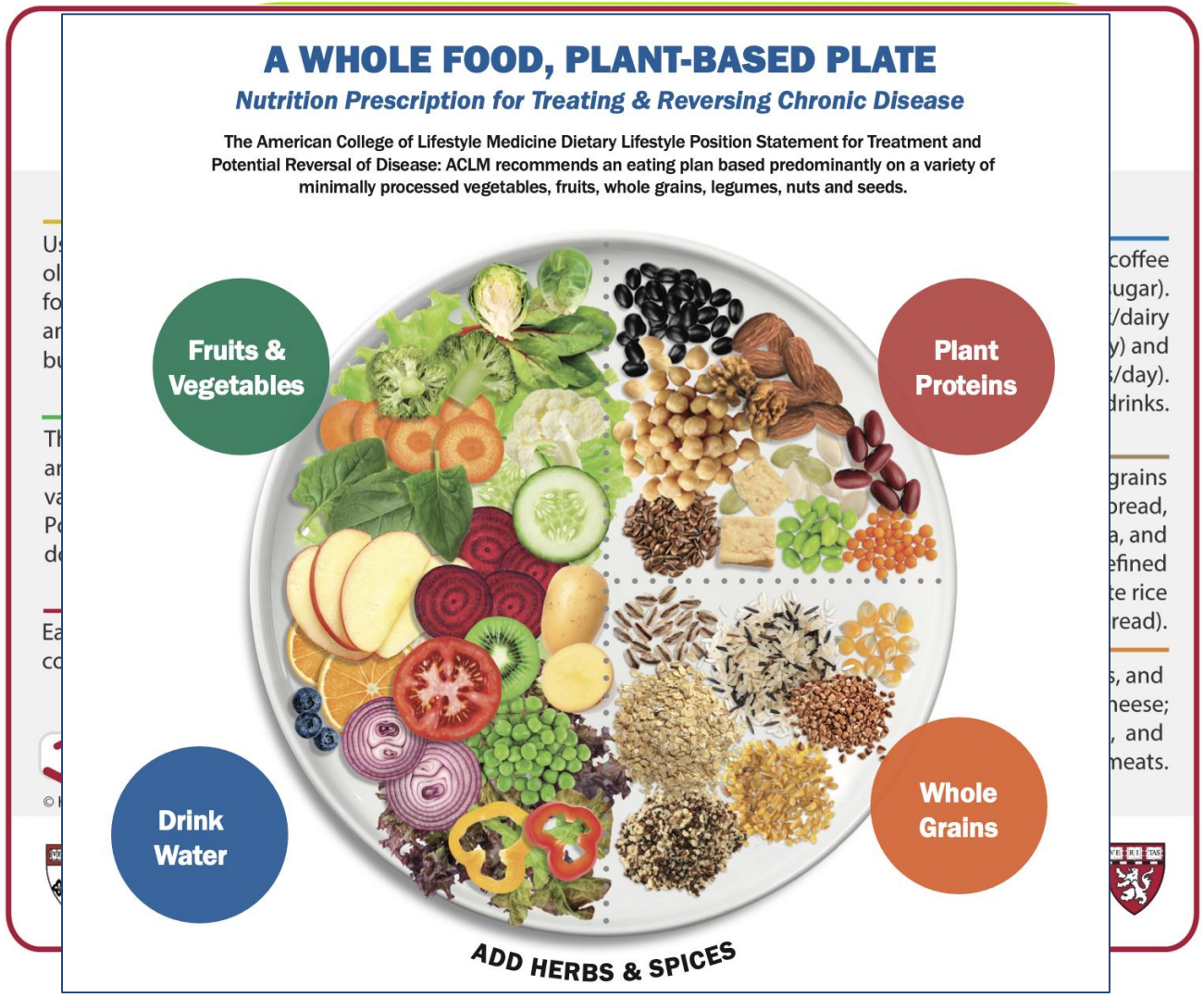
ng advice

tudies?

Examples of Evidence-Based Diets

- Mediterranean Diet
- DASH Diet
- USDA MyPlate
- The “Harvard Diet” Healthy Eating Plate
- Whole Food, Plant-Based Diet

DASH Eating Plan



Estruch et al. *N Engl J Med*. 2018. | Appel et al. *N Engl J Med*. 1997. | USDA. US Department of Health and Human Services. 2020. | The Nutrition Source. Harvard T.H. Chan School of Public Health. 2012. | Satija et al. *JACC*. 2017. | Hauser et al. *JFP*. 2022.

Dietary Components

- **Mediterranean Diet:** fruits, vegetables, legumes, nuts, fish, olive oil, alcohol
- **DASH Diet:** fruits, vegetables, legumes, nuts, fish, whole grains, low-fat dairy, poultry
- **USDA MyPlate:** fruits, vegetables, whole grains, low-fat dairy, lean protein (low-fat meats, poultry, fish, and legumes)
- **The "Harvard Diet" Healthy Eating Plate:** fruits, vegetables, legumes, nuts, seeds, whole grains, fish, poultry
- **Whole Food, Plant-Based Diet:** fruits, vegetables, legumes, nuts, seeds, whole grains

What do they have in common?

- **Mediterranean Diet:** fruits, vegetables, legumes, nuts, fish, olive oil, alcohol
- **DASH Diet:** fruits, vegetables, legumes, nuts, fish, whole grains, low-fat dairy, poultry
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PLANTS

Why are Plants Healthy?

PLANTS

Low in calories (anti-obesogenic)

- No added sugar
- Low in fat
- High in water and fiber

Anti-atherosclerotic/-inflammatory

- No added sugar
- Low in fat (especially saturated)
- High in antioxidants

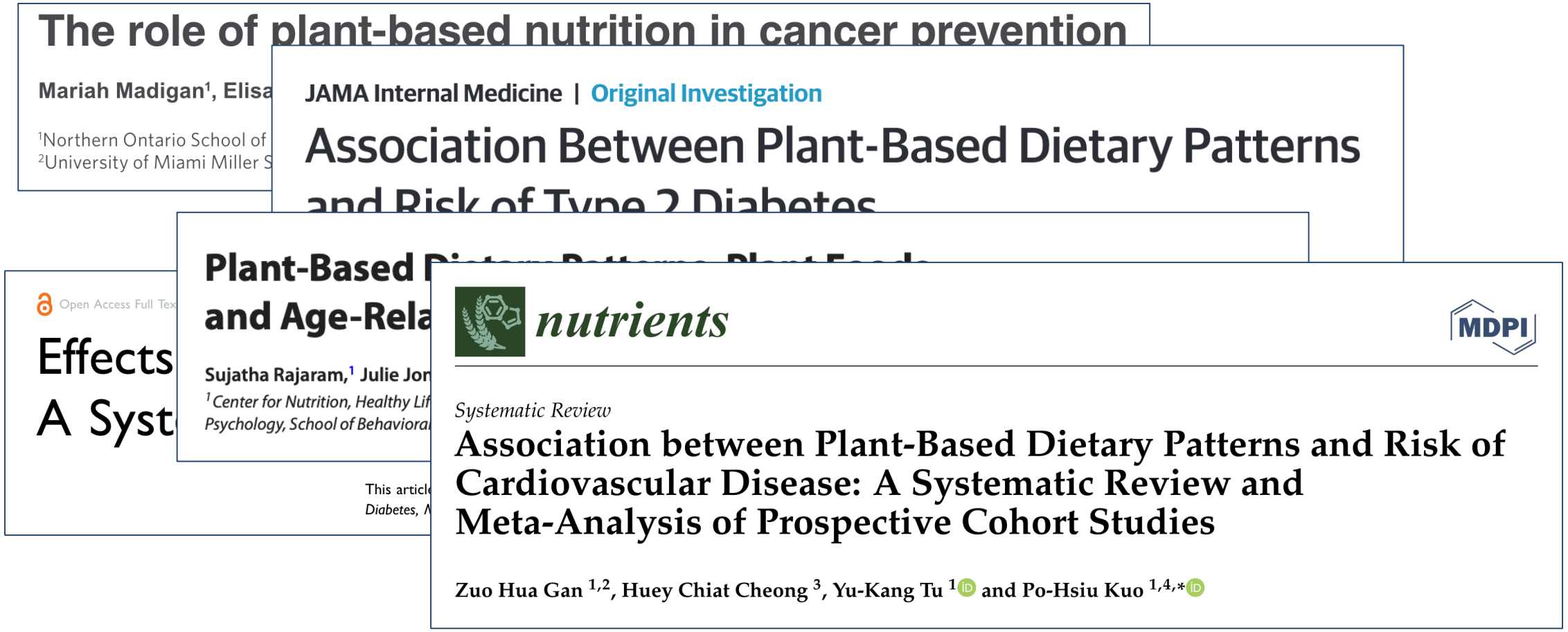
Anti-carcinogenic

- High in antioxidants
- Low in nitrites

NOT addicting

- High sugar + fat is a combination not found in plants
- Salt (sodium chloride) is not found in plants

Outcomes Associated with High Consumption of Plants



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Rigi et al. *Sci Rep*. 2021. | Rodríguez-García et al. *Antioxidants*. 2019. | Madigan et al. *J Unexplored Med Data*. 2018.
Gan et al. *Nutrients*. 2021. | Qian et al. *JAMA Intern Med*. 2019. | Rajaram et al. *Adv Nutr*. 2019.
Tran et al. *Diabetes Metab Syndr Obes Targets Ther*. 2020. | Ahmad. *Front Nutr*. 2022.

Defining “Unhealthy”

Defining “Unhealthy”

What makes a food or dietary pattern “unhealthy”?

What would a food or a dietary pattern that DOES increase our risk for morbidity and/or mortality look like?

Standard American Diet (S.A.D.)

- Excess calories
- Red and processed (carcinogenic) meats
- So-called “ultra-processed foods”
  - Tons of sodium
  - High in fat, often saturated to increase shelf-life
  - Sugar everywhere
  - Refined carbohydrates

Notice what’s missing?

Bouvard et al. *Lancet Oncol*. 2015. | Monteiro et al. *Public Health Nutr*. 2018. | Monteiro et al. FAO of the UN. 2019.


PLANTS

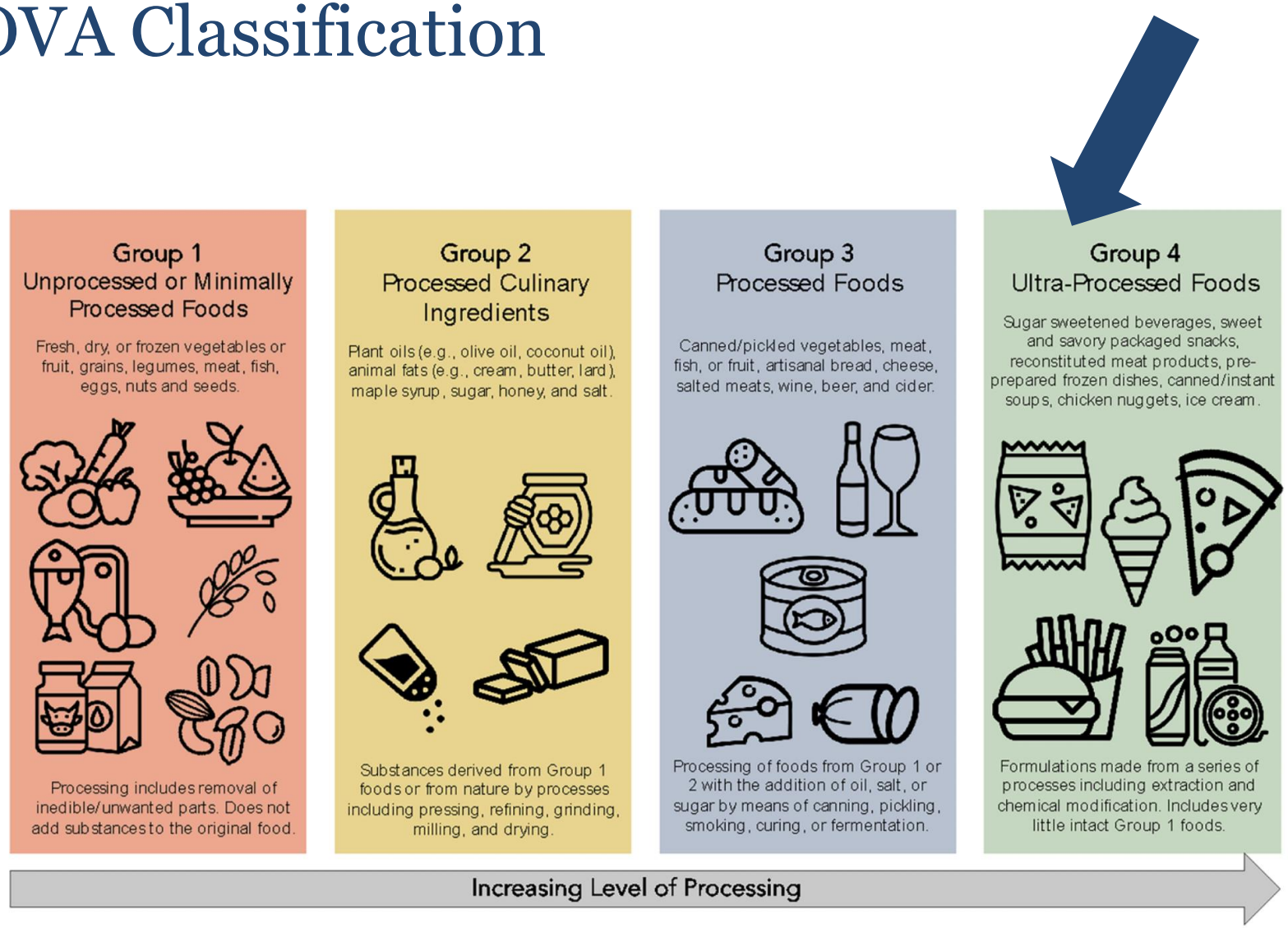
Definition of UPFs: NOVA Classification

Group 1: Edible parts of plants and animals "taken straight from nature"

Group 2: Culinary ingredients (e.g., salt, oil, sugar)

Group 3: Processed versions of groups 1 & 2 (e.g., canning, curing, pickling, smoking)

Group 4: Food made from industrial ingredients, i.e., "mostly or entirely from substances derived from foods and additives with little if any intact group 1 food"



Crimarco et al. *Curr Obes Rep*. 2021.

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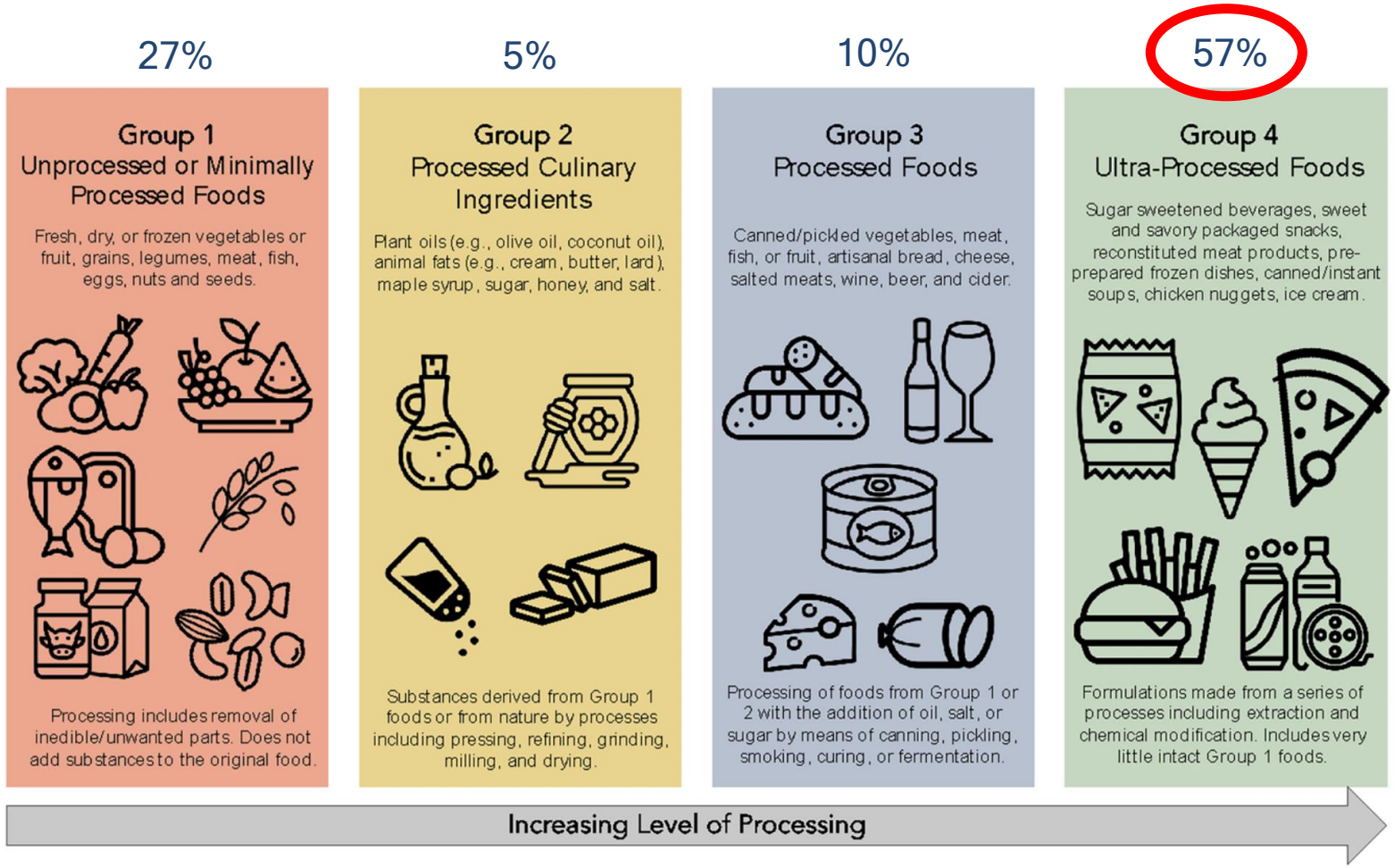


Crimarco et al. *Curr Obes Rep*. 2021.
Juul F et al. *Am J Clin Nutr*. 2022.

UPF Consumption by Country

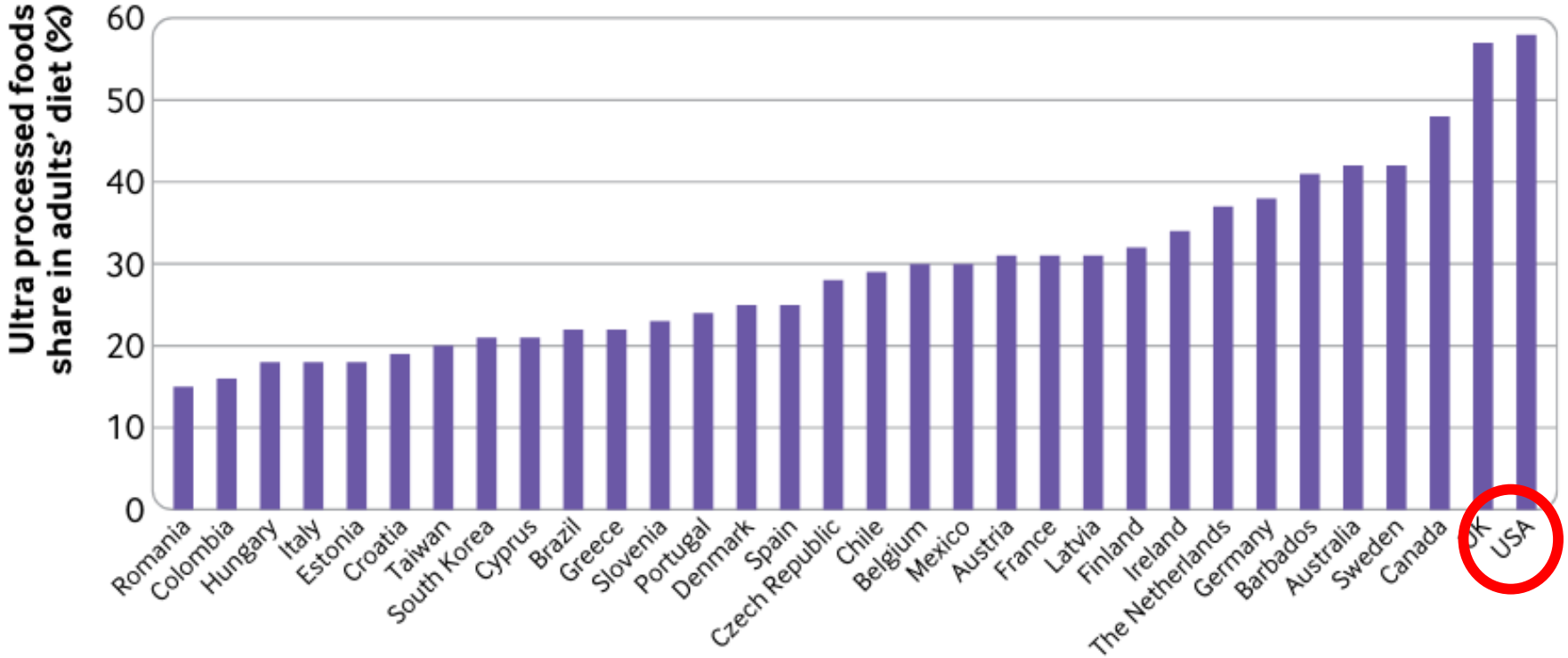


Fig 1 | Mean proportion of ultra-processed foods in adults' diet across countries (% energy intake) from nationally representative surveys[9 16 17]

Touvier et al. *BMJ*. 2023.

Why are Ultra-Processed Foods Unhealthy?

PLANTS

Low in calories (anti-obesogenic)

- No added sugar
- Low in fat
- High in water and fiber

Anti-atherosclerotic/-inflammatory

- No added sugar
- Low in fat (especially saturated)
- High in antioxidants

Anti-carcinogenic

- High in antioxidants
- Low in nitrites

NOT addicting

- High sugar + fat is a combination not found in plants
- Salt (sodium chloride) is not found in plants

ULTRA-PROCESSED FOODS

High in empty calories (obesogenic)

- High in added sugar
- High in fat
- Low/no fiber or water

Atherosclerotic/Inflammatory

- High in added sugar
- High in fat (especially if saturated)
- Low/no antioxidants

Carcinogenic

- Sodium nitrite in processed meats
- Others?

Addicting (by design)

- High in sugar + fat + salt

Outcomes Associated with High Consumption of UPFs

Fiolet et al. *BMJ*. 2018. | Srour et al. *BMJ*. 2019. | Srour et al. *JAMA Intern Med*. 2020.
Gomes et al. *JAMA Neurol*. 2023. | Cordova et al. *Clin Nutr*. 2021.

UPFs and Cardiometabolic Outcomes

Table 1 | Meta-analyses reporting associations between ultra-processed food consumption and cardiometabolic outcomes*

Study	Risk increase (highest versus lowest exposure categories)
Chen et al (2023)[19]	Type 2 diabetes (40% higher risk)
Yuan et al (2023)[20]	Cardiovascular events (35% higher risk)
Wang et al (2022)[21]	Hypertension (23% higher risk)
Taneri et al (2022)[22]	All-cause mortality (29% higher risk)
Moradi et al (2021)[23]	Abdominal obesity (41% higher risk) Overweight (36% higher risk) Obesity(55% higher risk)
Lane et al (2021)[24]	Metabolic syndrome (81% higher odds)
Suksatan et al (2021)[25]	Cardiovascular mortality (50% higher risk) Cardiac mortality (66% higher risk)

*When more than one meta-analysis was available for a given outcome, the most recent and complete (in terms of number of prospective studies included) was selected.

Touvier et al. *BMJ*. 2023.

Great. Now what?

“Plant-Forward” Dietary Pattern

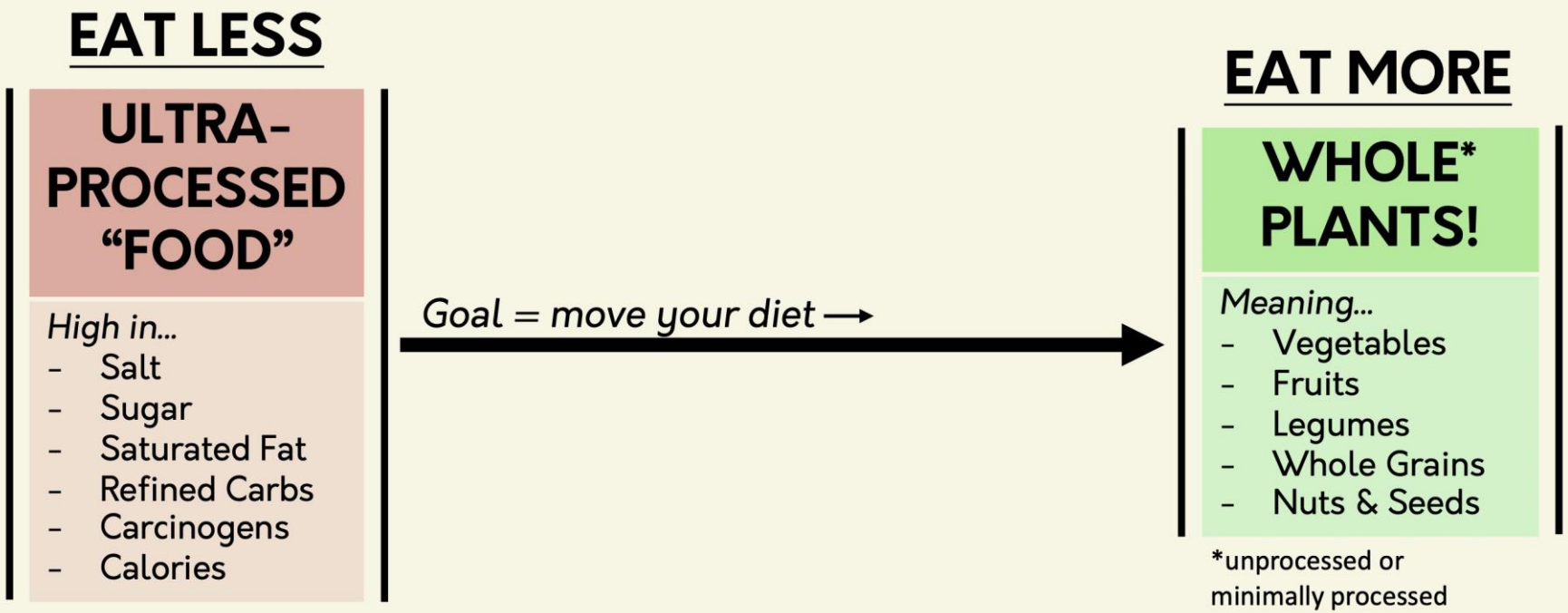
- “Plant-forward is a style of cooking and eating that emphasizes plant-based foods but is not strictly limited to them. Meat may be included but it’s usually not the main feature of the meal”
  – American Heart Association
- “Unlike a vegan or vegetarian approach, a plant-forward diet showcases vegetables, fruits, legumes, and grains, but does not necessarily eliminate all animal-based foods”
  – Yale Office of Sustainability

- Repeatedly shown to improve all-cause and disease-specific morbidity and mortality

AHA. 2023. | Yale Office of Sustainability. 2020. Huang et al. *JAMA Intern Med*. 2020. | Sun et al. *J Am Heart Assoc*. 2021. | Quek et al. *Front Cardiovasc Med*. 2021. Baden et al. *Circulation*. 2019. | Kim et al. *Clin Nutr*. 2021.

Nature Does It Better

A NUTRITION GUIDELINE FOR PLANT-FORWARD EATING



How?

Culinary Medicine

"Culinary medicine is an evidence-based, interprofessional field of medicine that combines culinary arts, nutrition science, and medical education to prevent and treat diet-related disease.

It employs hands-on learning through healthy cooking and is typically taught in a teaching kitchen, either in-person or virtually."

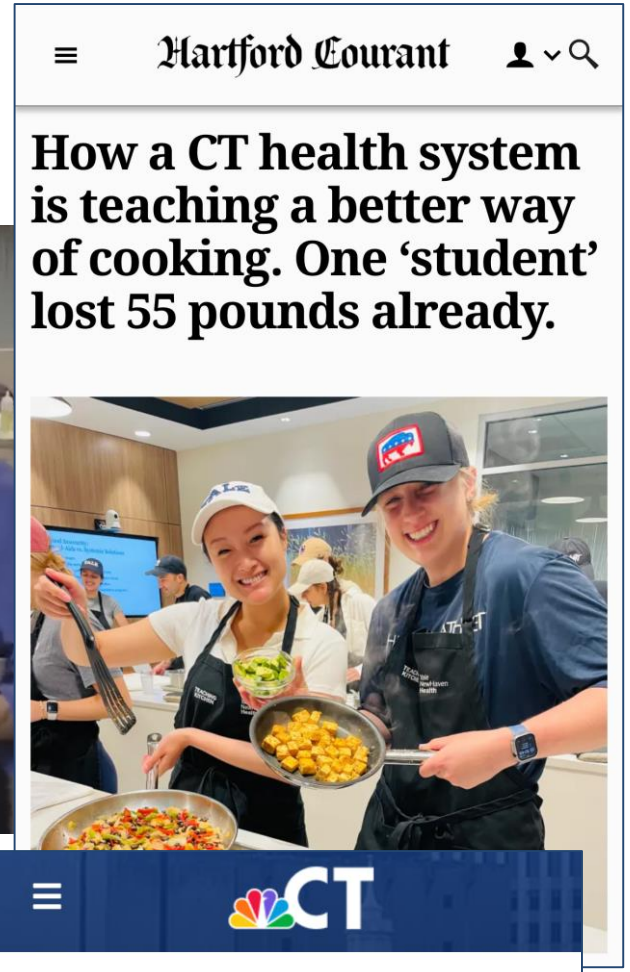
Wood et al. *J Healthc Leadersh.* 2023.

YNHH Teaching Kitchen

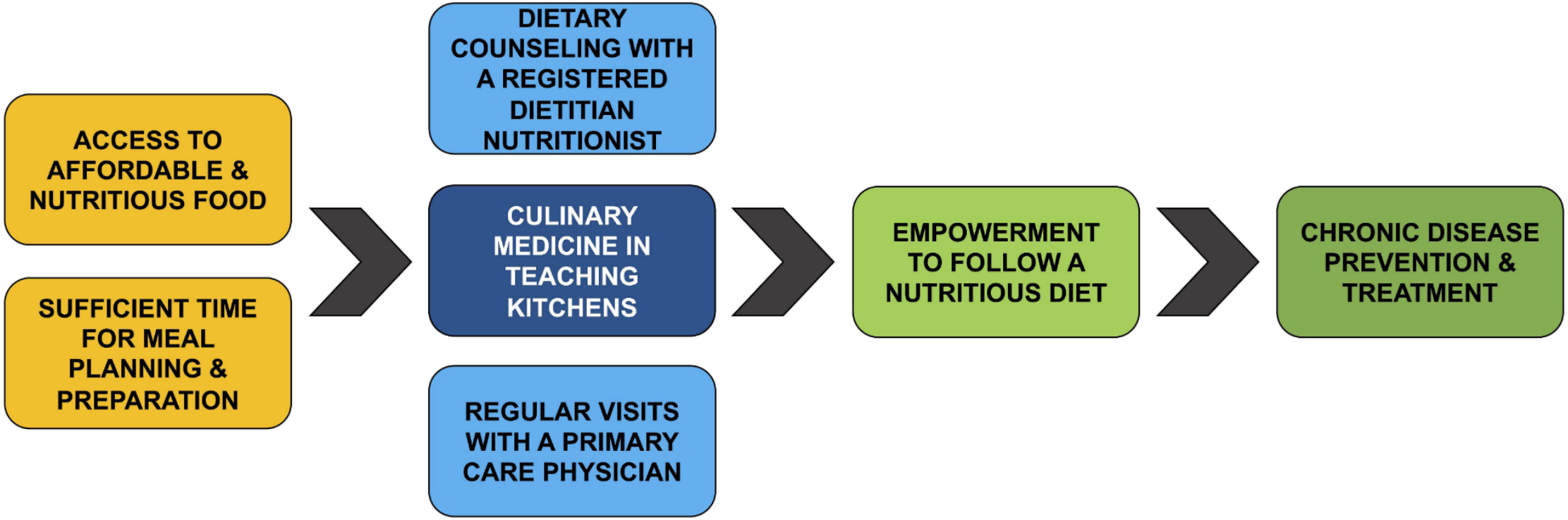
Free (!) classes for patients

2 ½ hours per class

1. Introduction to Culinary Medicine
2. Breakfast
3. Lunch
4. Dinner
5. Snacks
6. Full Menu Ideas



How does culinary medicine fit in?



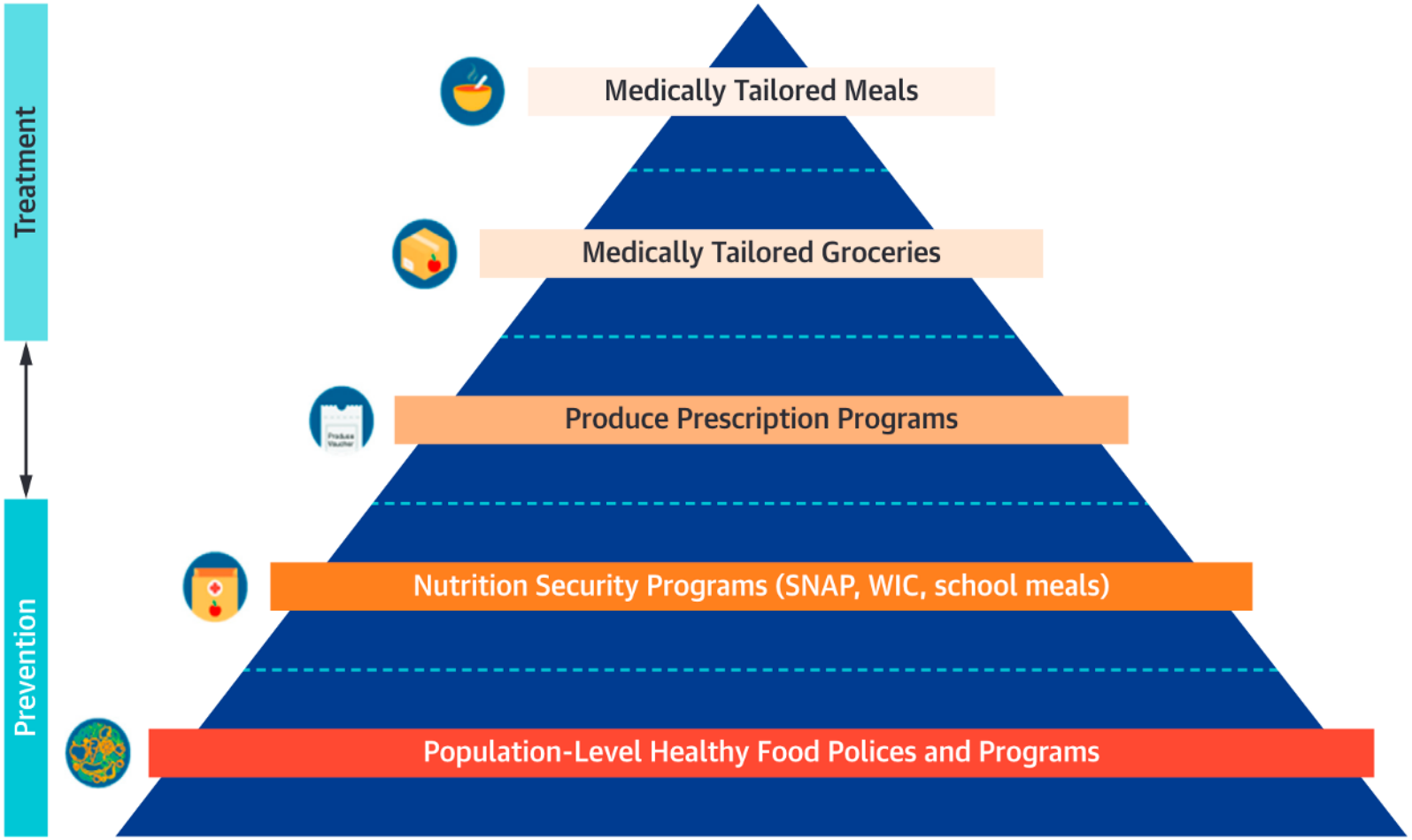
Wood et al. *J Healthc Leadersh.* 2023.

Culinary Medicine Outcomes

- Lower
  - Blood sugar
  - Blood pressure
  - Serum cholesterol
  - BMI
- Higher
  - Adherence to a Mediterranean diet
  - Fruit and vegetable intake
- Improved
  - Psychological well-being
  - Quality of life

Sharma et al. *Nutrients.* 2021. | Monlezun et al. *Diabetes Res Clin Pract. 2015.* | Penn et al. *BMJ Open.* 2013. Reicks et al. *J Nutr Educ Behav.* 2018. | Stauber et al. *AJLM.* 2022. | Kwon et al. *J Am Med Dir Assoc.* 2015. Jyväkorpi et al. *Eur Geriatr Med.* 2013. | Silver et al. *Nutrients.* 2021. | Barak-Nahum et al. *Soc Sci Med.* 2016.

“Food is Medicine” for Patients



Medically tailored meals

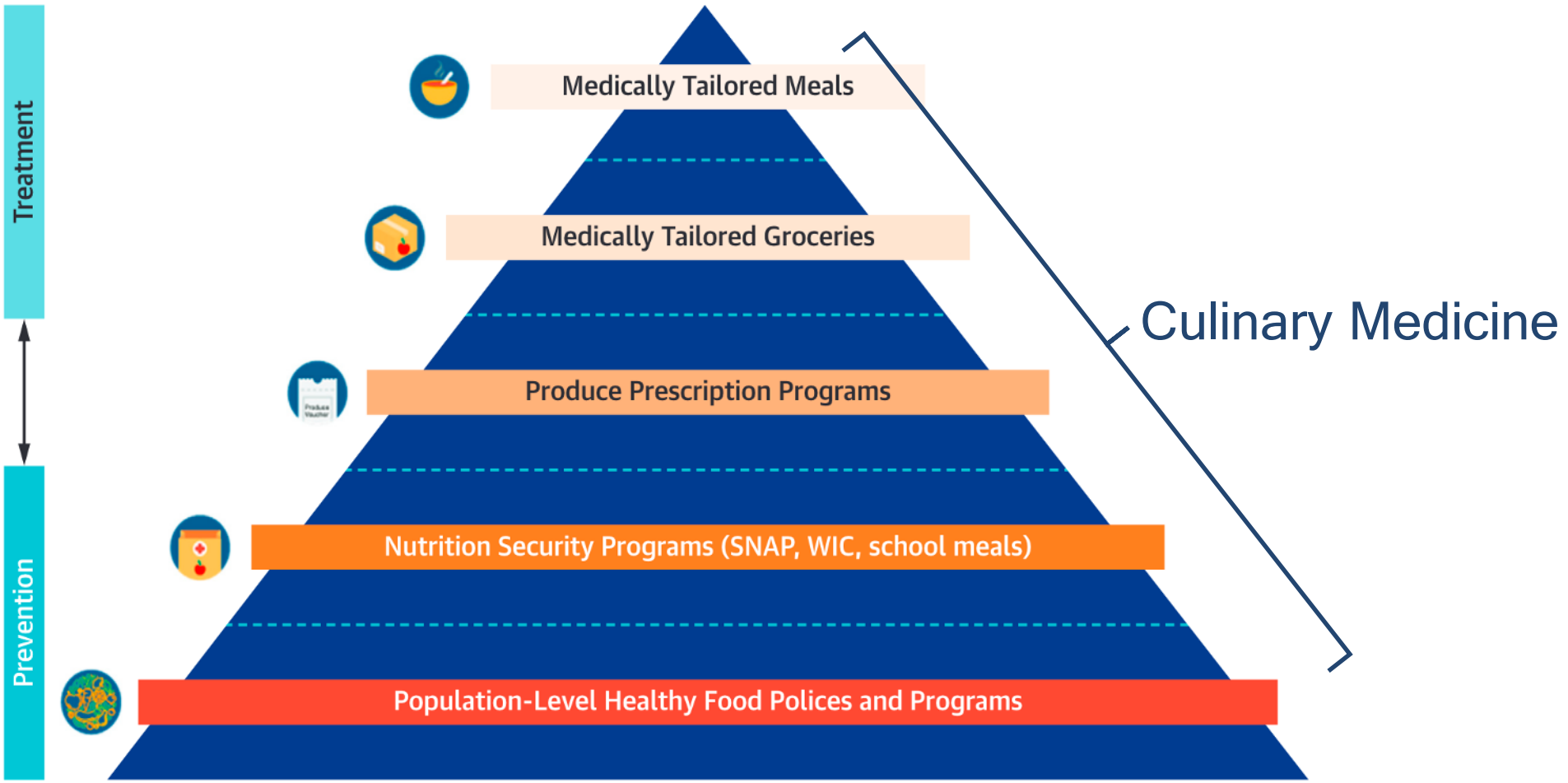
Medically tailored groceries

Produce prescriptions

Nutrition and culinary education

Mozaffarian et al. *JACC.* 2024.

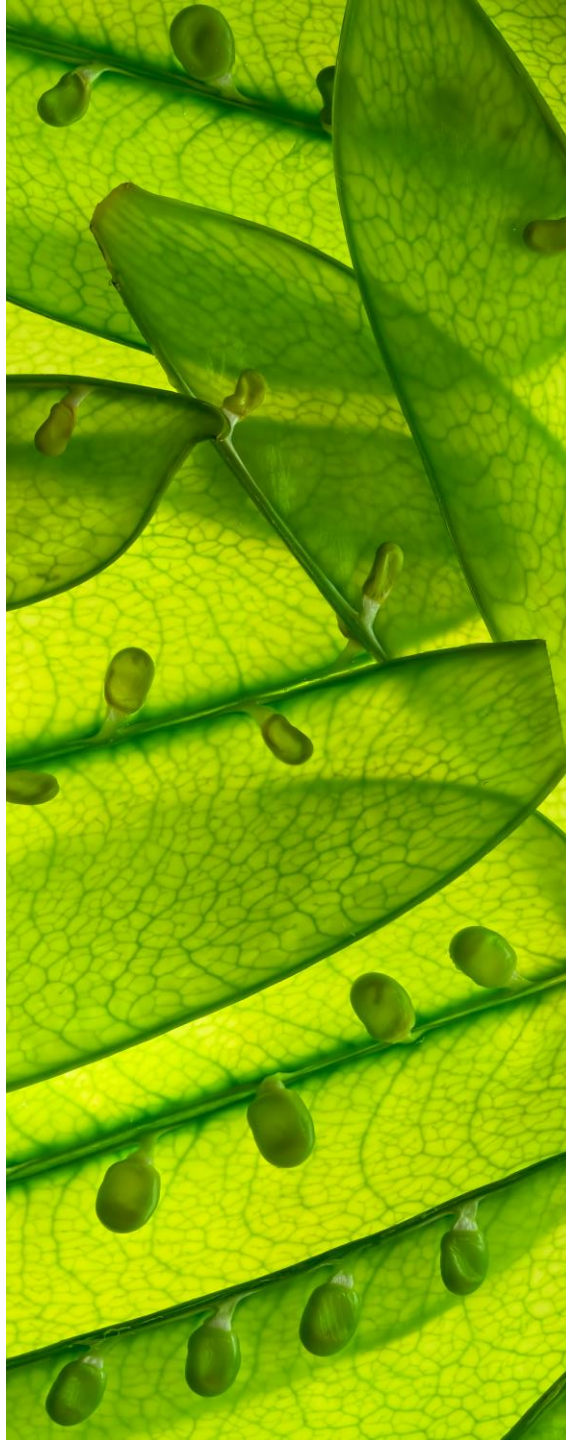
Integration of "Food is Medicine" with Culinary Medicine



Mozaffarian et al. *JACC.* 2024.

Taking Action *Now*

- Screen for Food Insecurity with the two-question Hunger Vital Sign
- Talk to your patients and their parents about household dietary patterns
  - How can we add more whole or minimally processed plants to our plates?
  - Where can we swap out UPFs for more health-promoting alternatives?
- Refer to dietitian nutritionists whenever able
- Resources:
  - The Nutrition Source
  - American College of Lifestyle Medicine
  - American College of Culinary Medicine
  - Budget Bytes
  - *Good and Cheap / Bueno y Barato*
  - USDA's Thrifty Food Plan
  - USDA's MyPlate "Shop Simple"



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Thank You!

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Nate’s nephew, Carter

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