2020 BEE MARKS SYMPOSIUM

Preparing Consumers for the New Food Future: Challenges and Opportunities for Nutrition Educators

Wednesday July 22, 2020, 11:10 am – 12:30 pm

Session Objectives

- **Identify specific challenges in and opportunities for educating consumers in the new food future, including continued evolution and controversies in nutrition science, proliferation of new foods, sustainable food systems, and food safety.**

- **Discuss the connectivity and complexity of sustainable food systems.**

- **Integrate keys to success for nutrition educators to effectively prepare consumers for the new food future.**

2020 BEE MARKS SYMPOSIUM SPEAKERS

MR. BILL LAYDEN

DR. KATIE BROWN

Preparing Consumers for the New Food Future: Challenges and Opportunities for Nutrition Educators

Bill Layden
Layden Enterprises, LLC
SNEB July 2020

#SNEB2020: What Food Future?

Outline

Disclosures

Back in 2019….

Inflection Points in 2020…

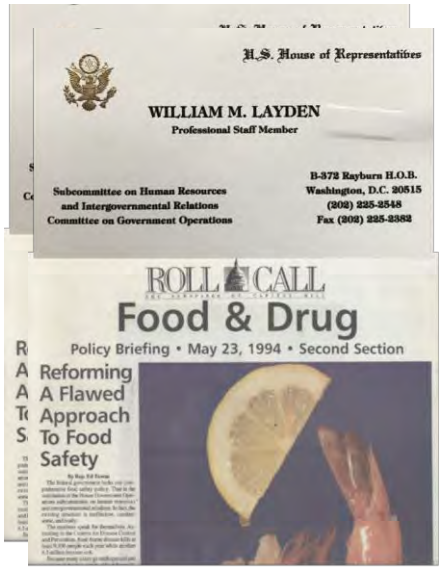
A Window Opening?

It’s About Knowing

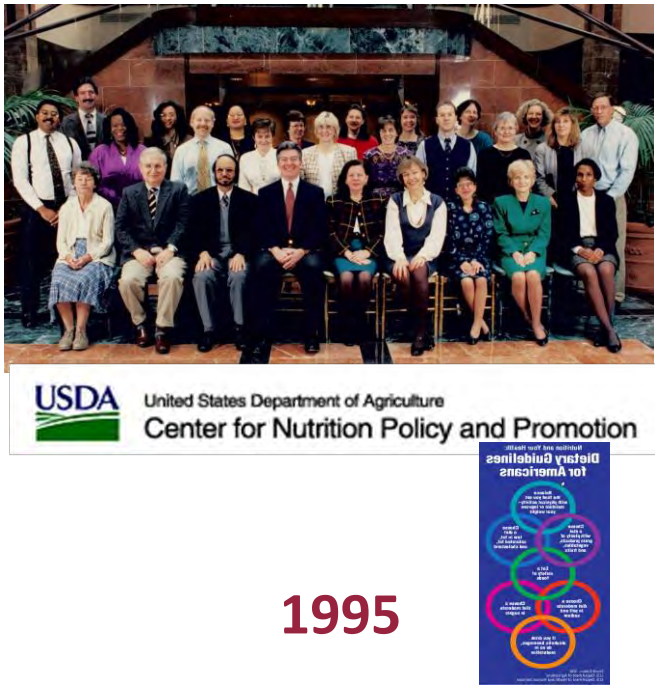
Disclosures

Experience

1986

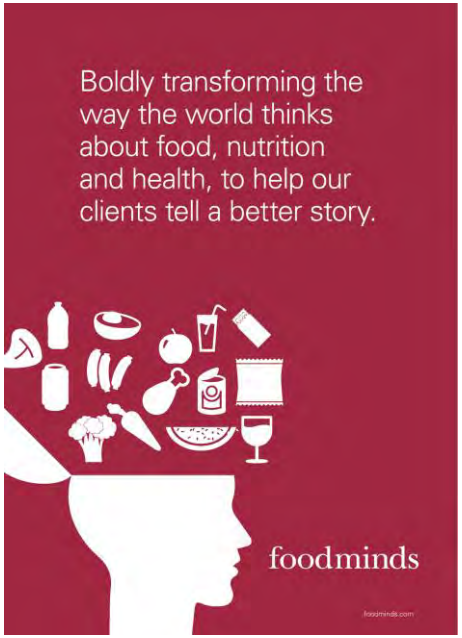


1994



1995

Former Clients Served*



2006-2016

*Includes only clients that have authorized public disclosure.

Nutrient Rich Foods Coalition™

www.NutrientRichFoods.org

FactsUpFront.org

FMI™ THE VOICE OF FOOD RETAIL
Feeding Families | Enriching Lives

GMA
The Association of Food, Beverage and Consumer Products Companies

Layden Enterprises, LLC

Bill Layden
Principal
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4353 Lawn Ave.
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INDIANA UNIVERSITY
Office of the Dean
Bloomington

TEXAS A&M AGRILIFE

Tufts University | Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy

Back in 2019...

Wicked Problems

Policy Sciences 4 (1973), 155–169

Dilemmas in a General Theory of Planning*

HORST W. J. RITTEL
Professor of the Science of Design, University of California, Berkeley

MELVIN M. WEBBER
Professor of City Planning, University of California, Berkeley

ABSTRACT

The search for scientific bases for confronting problems of social policy is bound to fail, because of the nature of these problems. They are "wicked" problems, whereas science has developed to deal with "tame" problems. Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the undisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about "optimal solutions" to social problems unless severe qualifications are imposed first. Even worse, there are no "solutions" in the sense of definitive and objective answers.

George Bernard Shaw diagnosed the case several years ago; in more recent times popular protest may have already become a social movement. Shaw averred that "every profession is a conspiracy against the laity." The contemporary publics are responding as though they have made the same discovery.

Few of the modern professionals seem to be immune from the popular attack—whether they be social workers, educators, housers, public health officials, policemen, city planners, highway engineers or physicians. Our restive clients have been telling us that they don't like the educational programs that schoolmen have been offering, the redevelopment projects urban renewal agencies have been proposing, the law-enforcement styles of the police, the administrative behavior of the welfare agencies, the locations of the highways, and so on. In the courts, the streets, and the political campaigns, we've been hearing ever-louder public protests against the professions' diagnoses of the clients' problems, against professionally designed governmental programs, against professionally certified standards for the public services.

It does seem odd that this attack should be coming just when professionals in

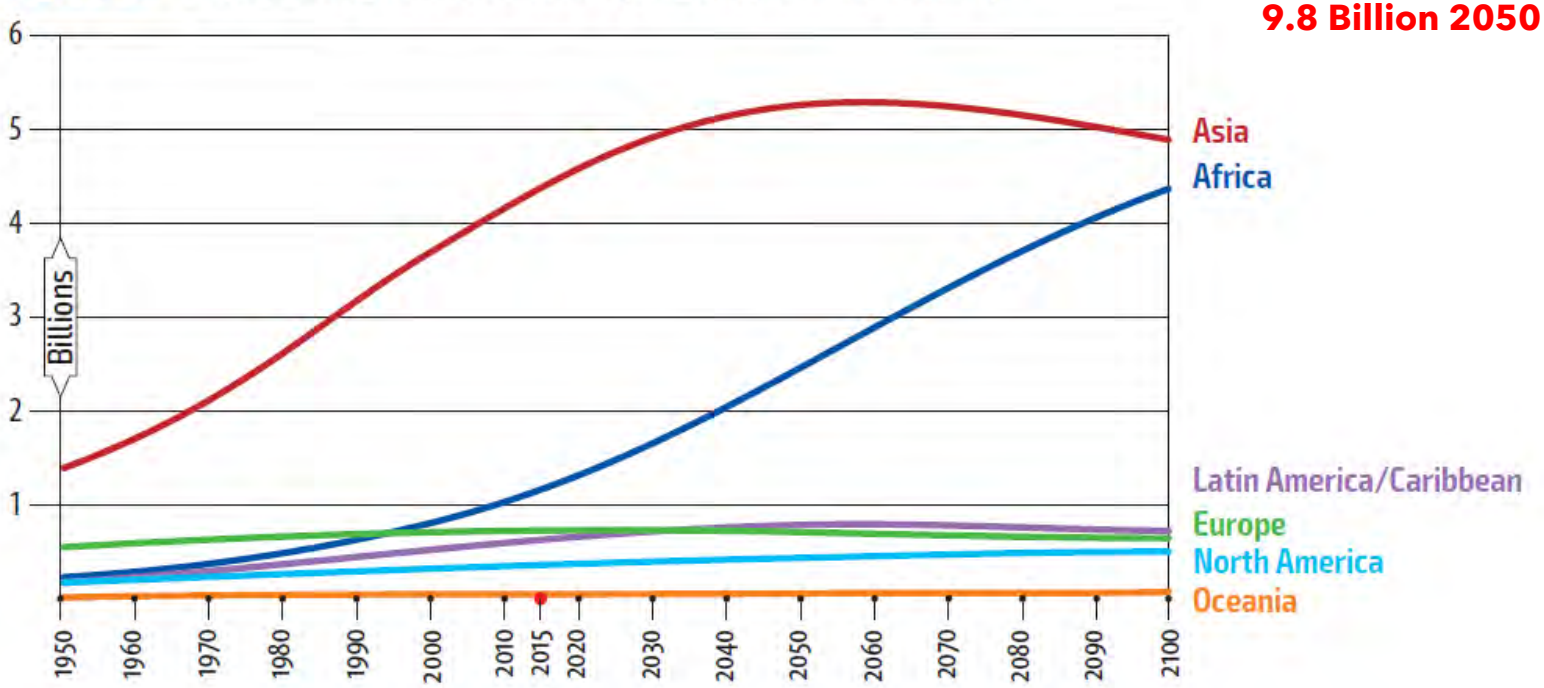
* This is a modification of a paper presented to the Panel on Policy Sciences, American Association for the Advancement of Science, Boston, December 1969.

Trends

Major drivers of change in the 21st century

1. Population growth, urbanization and ageing
2. Global economic growth, investment and trade
3. Increasing competition for natural resources
4. Climate change
5. Agricultural productivity and innovation
6. Transboundary pests and diseases
7. Conflicts, crises and natural disasters
8. Poverty, inequality and food insecurity
9. Nutrition and health
10. Structural change and employment
11. Migration and agriculture
12. Changing food systems
13. Food losses and waste
14. Governance for food security and nutrition
15. Development finance

Figure 1.2 Population growth to 2100, by region (medium variant)

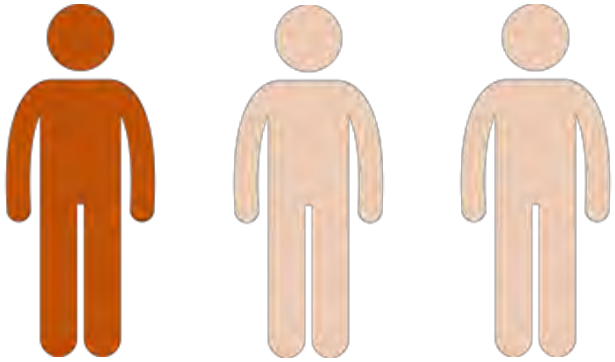


Source: UN, 2015.

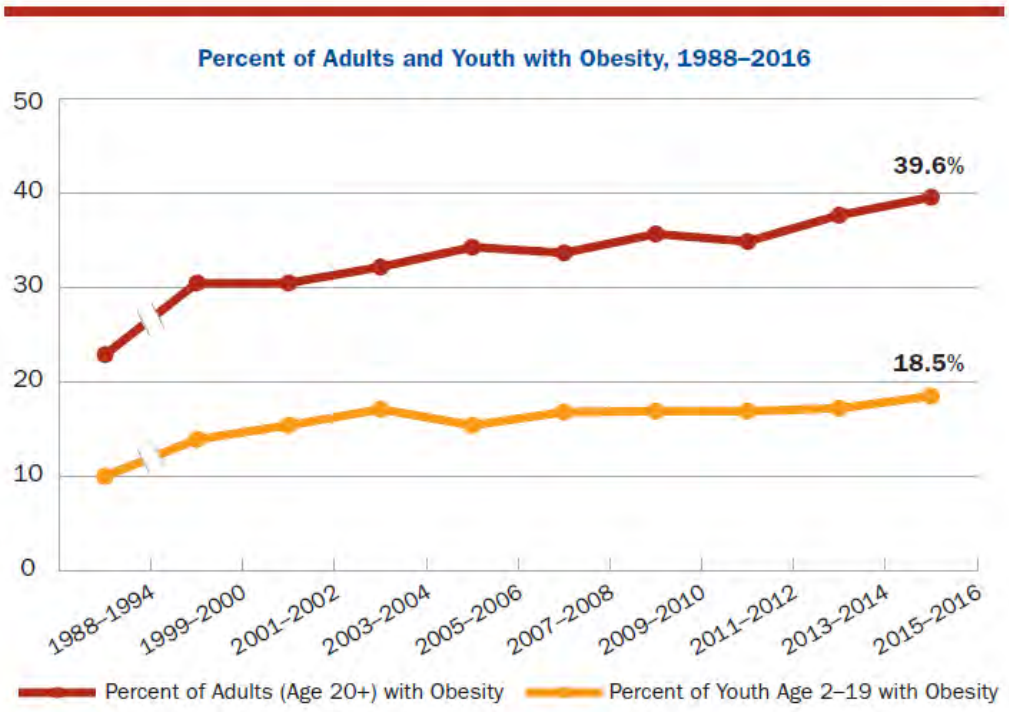
9.8 Billion 2050

TRIPLE BURDEN OF MALNUTRITION IMPACTS ALL COUNTRIES

- One in three people worldwide are malnourished
- 800 million people undernourished
- 1.9 billion adults are overweight or obese



Nutrition and food systems, HLPE, Sept 2017



Source: NHANES

'Significant increasing linear trend from 1999–2000 through 2015–2016.
NOTES: All estimates for adults are age adjusted by the direct method to the 2000 U.S. census population using the age groups 20–39, 40–59, and 60 and over.
Access data table for Figure 5 at: https://www.cdc.gov/nchs/data/databriefs/db288_table.pdf#5.
SOURCE: NCHS, National Health and Nutrition Examination Survey, 1999–2016.

SPECIAL ARTICLE

Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity

Zachary J. Ward, M.P.H., Sara N. Bleich, Ph.D., Angie L. Cradock, Sc.D., Jessica L. Barrett, M.P.H., Catherine M. Giles, M.P.H., Chasmine Flax, M.P.H., Michael W. Long, Sc.D., and Steven L. Gortmaker, Ph.D.

ABSTRACT

BACKGROUND

Although the national obesity epidemic has been well documented, less is known about obesity at the U.S. state level. Current estimates are based on body measures reported by persons themselves that underestimate the prevalence of obesity, especially severe obesity.

METHODS

We developed methods to correct for self-reporting bias and to estimate state-specific and demographic subgroup–specific trends and projections of the prevalence of categories of body-mass index (BMI). BMI data reported by 6,264,226 adults (18 years of age or older) who participated in the Behavioral Risk Factor Surveillance System Survey (1993–1994 and 1999–2016) were obtained and corrected for quantile-specific self-reporting bias with the use of measured data from 57,131 adults who participated in the National Health and Nutrition Examination Survey. We fitted multinomial regressions for each state and subgroup to estimate the prevalence of four BMI categories from 1990 through 2030: underweight or normal weight (BMI [the weight in kilograms divided by the square of the height in meters], <25), overweight (25 to <30), moderate obesity (30 to <35), and severe obesity (≥35). We evaluated the accuracy of our approach using data from 1990 through 2010 to predict 2016 outcomes.

RESULTS

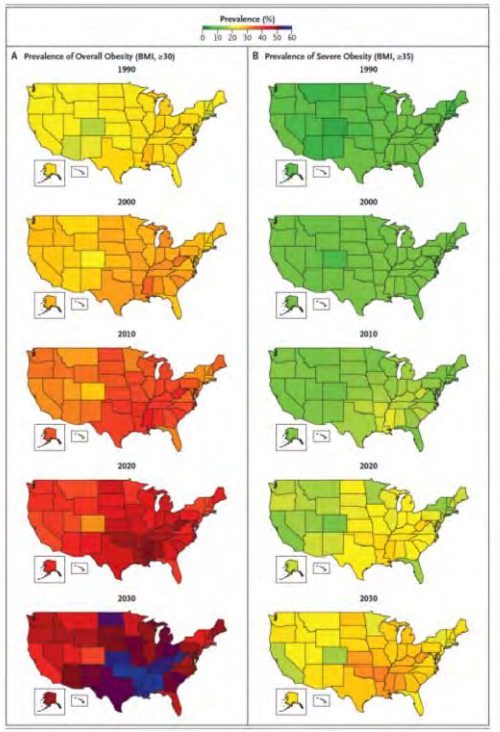
The findings from our approach suggest with high predictive accuracy that by 2030 nearly 1 in 2 adults will have obesity (48.9%; 95% confidence interval [CI], 47.7 to 50.1), and the prevalence will be higher than 50% in 29 states and not below 35% in any state. Nearly 1 in 4 adults is projected to have severe obesity by 2030 (24.2%; 95% CI, 22.9 to 25.5), and the prevalence will be higher than 25% in 25 states. We predict that, nationally, severe obesity is likely to become the most common BMI category among women (27.6%; 95% CI, 26.1 to 29.2), non-Hispanic black adults (31.7%; 95% CI, 29.9 to 33.4), and low-income adults (31.7%; 95% CI, 30.2 to 33.2).

CONCLUSIONS

Our analysis indicates that the prevalence of adult obesity and severe obesity will continue to increase nationwide, with large disparities across states and demographic subgroups. (Funded by the JPB Foundation.)

From the Center for Health Decision Science (Z.J.W.) and the Departments of Health Policy and Management (S.N.B.) and Social and Behavioral Sciences (A.L.C., J.L.B., C.M.G., C.F., S.L.G.), Harvard T.H. Chan School of Public Health, Boston; and the Department of Prevention and Community Health, Milken Institute School of Public Health, George Washington University, Washington, D.C. (M.W.L.). Address reprint requests to Mr. Ward at the Center for Health Decision Science, Harvard T.H. Chan School of Public Health, 718 Huntington Ave., Boston, MA 02115, or at zward@hsph.harvard.edu.

N Engl J Med 2019;381:2440-50.
DOI: 10.1056/NEJMsa1909301



Americans Are Sick – Really Sick

- More Americans are sick than are healthy:
  - 100+ million adults – nearly half – have diabetes or prediabetes.
  - 122 million have cardiovascular disease, causing 841,000 deaths per year – 2,300 deaths each day.
  - 3 in 4 U.S. adults are overweight or obese.
- Tremendous economic costs – since 1970:
  - Healthcare costs have risen from 5% to 28% of the federal budget, 5% to 29% of total state budgets; and $79 billion to $1,180 billion for US businesses (inflation adjusted).
  - Annual costs of Diabetes: $335 billion. CVD: $351 billion. Obesity: $1.72 trillion.

Centers for Medicare & Medicaid Services, 2018
American Heart Association, *Heart Disease and Stroke Statistics*, 2018
The Milken Institute, *America's Obesity Crisis*, 2018

Research

JAMA | Original Investigation

The State of US Health, 1990-2016
Burden of Diseases, Injuries, and Risk Factors Among US States

The US Burden of Disease Collaborators

INTRODUCTION Several studies have measured health outcomes in the United States, but none have provided a comprehensive assessment of patterns of health by state.

OBJECTIVE To use the results of the Global Burden of Disease Study (GBD) to report trends in the burden of diseases, injuries, and risk factors at the state level from 1990 to 2016.

DESIGN AND SETTING A systematic analysis of published studies and available data sources estimates the burden of disease by age, sex, geography, and year.

MAIN OUTCOMES AND MEASURES Prevalence, incidence, mortality, life expectancy, healthy life expectancy (HALE), years of life lost (YLLs) due to premature mortality, years lived with disability (YLDs), and disability-adjusted life-years (DALYs) for 333 causes and 84 risk factors with 95% uncertainty intervals (UIs) were computed.

RESULTS Between 1990 and 2016, overall death rates in the United States declined from 745.2 (95% UI, 740.6 to 749.8) per 100 000 persons to 578.0 (95% UI, 569.4 to 587.1) per 100 000 persons. The probability of death among adults aged 20 to 55 years declined in 31 states and Washington, DC from 1990 to 2016. In 2016, Hawaii had the highest life expectancy at birth (81.3 years) and Mississippi had the lowest (74.7 years), a 6.6-year difference. Minnesota had the highest HALE at birth (70.3 years), and West Virginia had the lowest (63.8 years), a 6.5-year difference. The leading causes of DALYs in the United States for 1990 and 2016 were ischemic heart disease and lung cancer, while the third leading cause in 1990 was low back pain, and the third leading cause in 2016 was chronic obstructive pulmonary disease. Opioid use disorders moved from the 11th leading cause of DALYs in 1990 to the 7th leading cause in 2016, representing a 74.5% (95% UI, 42.8% to 93.9%) change. In 2016, each of the following 6 risks individually accounted for more than 5% of risk-attributable DALYs: tobacco consumption, high body mass index (BMI), poor diet, alcohol and drug use, high fasting plasma glucose, and high blood pressure. Across all US states, the top risk factors in terms of attributable DALYs were due to 1 of the 3 following causes: tobacco consumption (32 states), high BMI (10 states), or alcohol and drug use (8 states).

CONCLUSIONS AND RELEVANCE There are wide differences in the burden of disease at the state level. Specific diseases and risk factors, such as drug use disorders, high BMI, poor diet, high fasting plasma glucose level, and alcohol use disorders are increasing and warrant increased attention. These data can be used to inform national health priorities for research, clinical care, and policy.

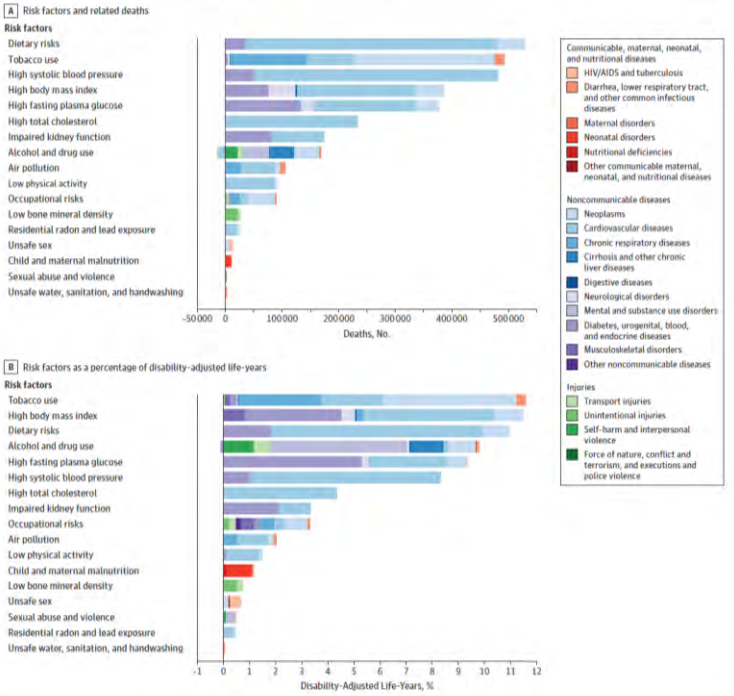
Editorial page 1438
Author Audio Interview
Supplemental content
CME Quiz at jamanetwork.com/learning and CME Questions page 1503

Group Information: The US Burden of Disease Collaborators are listed at the end of this article.

Corresponding Author: Christopher J. L. Murray, MD, DPhil, Institute for Health Metrics and Evaluation, University of Washington, 2301 5th Ave, Ste 600, Seattle, WA 98121 (cjlm@uw.edu).

JAMA. 2018;319(14):1444-1472. doi:10.1001/jama.2018.0158

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

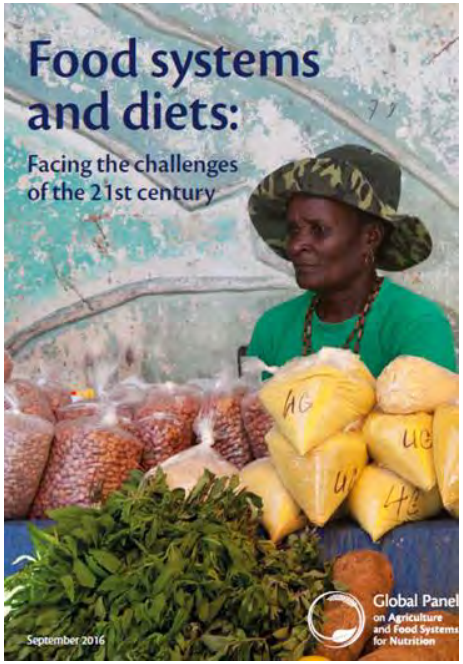


Negative values (where bars extend left of zero) indicate a protective effect.


SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

"THE BOTTOM LINE IS THAT FOOD SYSTEMS ARE FAILING US"

- *While the focus has been on low- and middle-income countries, the findings constitute a stark warning for all countries.*
- *…**food systems need to be harnessed so that they nourish rather than merely feed people.***
- *Decisions by large agri-businesses, manufacturers and retailers are playing a growing role, relative to the public sector, in the availability, affordability, safety and desirability of food.*
- ***The bottom line is that food systems are failing us.***
- *A 'high quality diet' lens must guide a rebalancing of funding allocations across the food system.*



Inflection Points *in* 2020...


The Economist
US-China relations in crisis
The dash to cash
Ethiopia's hidden war
How virus-testing works
MARCH 21ST–27TH 2020
CLOSED


BLACK
LIVES
MATTER

Insecurity

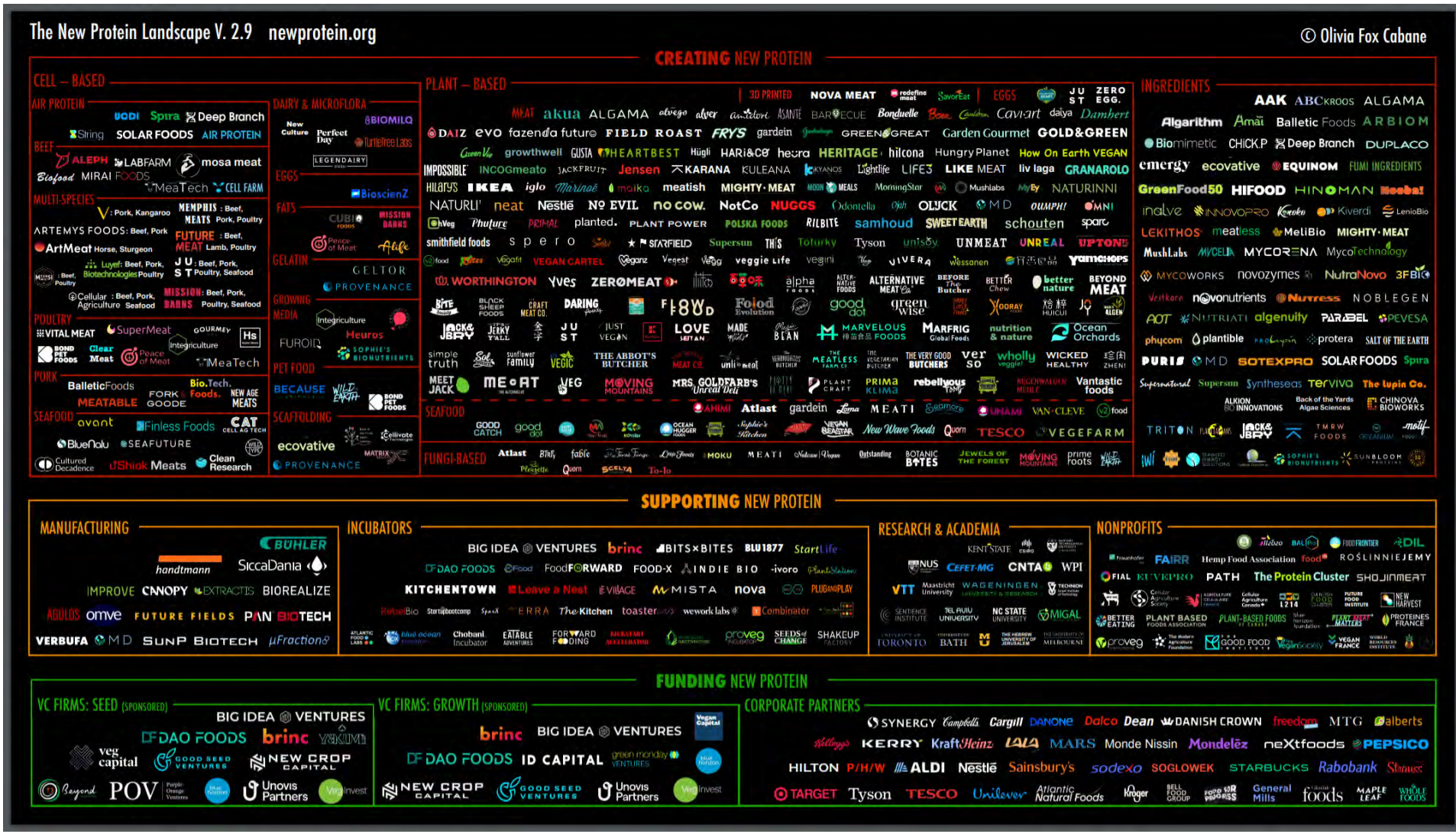
Inequality &
Inequity

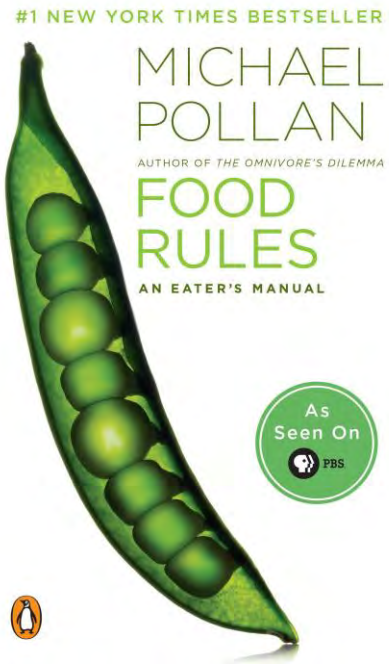
Infirm

Inexcusable

A Window Opening?

Source: Ian Roberts, Chief Technology Officer, Buhler Group; Buhler GO!2020; 06/16/20; https://gateway.on24.com/wcc/gateway/eliteBuhlerUS2/2269486


The New Protein Landscape V. 2.9 newprotein.org
© Olivia Fox Cabane
CREATING NEW PROTEIN
CELL – BASED
AIR PROTEIN
BEEF
MULTI-SPECIES
POULTRY
PORK
SEAFOOD
DAIRY & MICROFLORA
EGGS
FATS
GELATIN
GROWING MEDIA
PET FOOD
SCAFFOLDING
PLANT – BASED
MEAT
EGGS
SEAFOOD
FUNGI-BASED
INGREDIENTS
SUPPORTING NEW PROTEIN
MANUFACTURING
INCUBATORS
RESEARCH & ACADEMIA
NONPROFITS
FUNDING NEW PROTEIN
VC FIRMS: SEED (SPONSORED)
VC FIRMS: GROWTH (SPONSORED)
CORPORATE PARTNERS



Avoid food products that contain more than five ingredients.

There are 21 ingredients in an Impossible Burger that make it look and taste like meat.

Issued in Burlington, Massachusetts, on July 26, 2019.

Karen M. Grant,

Acting Manager, Engine and Propeller Standards Branch, Aircraft Certification Service.

[FR Doc. 2019–16329 Filed 7–31–19; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

21 CFR Part 73

[Docket No. FDA–2018–C–4464]

Listing of Color Additives Exempt From Certification; Soy Leghemoglobin

AGENCY: Food and Drug Administration, HHS.

ACTION: Final rule.

SUMMARY: The Food and Drug Administration (FDA or we) is amending the color additive regulations to provide for the safe use of soy leghemoglobin as a color additive in ground beef analogue products. We are taking this action in response to a color additive petition (CAP) submitted by Impossible Foods, Inc. (Impossible Foods or petitioner).

DATES: This rule is effective September 4, 2019. See section X for further information on the filing of objections. Submit either electronic or written objections and requests for a hearing on the final rule by September 3, 2019.

ADDRESSES: You may submit objections and requests for a hearing as follows. Please note that late, untimely filed objections will not be considered. Electronic objections must be submitted on or before September 3, 2019. The *https://www.regulations.gov* electronic filing system will accept comments until 11:59 p.m. Eastern Time at the end of September 3, 2019. Objections received by mail/hand delivery/courier (for written/paper submissions) will be considered timely if they are postmarked or the delivery service acceptance receipt is on or before that date.

Electronic Submissions

Submit electronic objections in the following way:

- *Federal eRulemaking Portal: https://www.regulations.gov.* Follow the instructions for submitting comments. Objections submitted electronically, including attachments, to *https://www.regulations.gov* will be posted to the docket unchanged. Because your objection will be made public, you are solely responsible for ensuring that your objection does not include any confidential information that you or a third party may not wish to be posted, such as medical information, your or anyone else's Social Security number, or confidential business information, such as a manufacturing process. Please note that if you include your name, contact information, or other information that identifies you in the body of your objection, that information will be posted on *https://www.regulations.gov.*
- If you want to submit an objection with confidential information that you do not wish to be made available to the public, submit the objection as a written/paper submission and in the manner detailed (see "Written/Paper Submissions" and "Instructions").

Written/Paper Submissions

Submit written/paper submissions as follows:

- *Mail/Hand Delivery/Courier (for written/paper submissions):* Dockets Management Staff (HFA–305), Food and Drug Administration, 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852.
- For written/paper objections submitted to the Dockets Management Staff, FDA will post your objection, as well as any attachments, except for information submitted, marked and identified, as confidential, if submitted as detailed in "Instructions."

Instructions: All submissions received must include the Docket No. FDA–2018–C–4464 for "Listing of Color Additives Exempt From Certification; Soy Leghemoglobin." Received objections, those filed in a timely manner (see **ADDRESSES**), will be placed in the docket and, except for those submitted as "Confidential Submissions," publicly viewable at *https://www.regulations.gov* or with the Dockets Management Staff between 9 a.m. and 4 p.m., Monday through Friday.

- Confidential Submissions—To submit an objection with confidential information that you do not wish to be made publicly available, submit your objections only as a written/paper submission. You should submit two copies total. One copy will include the information you claim to be confidential with a heading or cover note that states "THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION." We will review this copy, including the claimed confidential information, in our consideration of comments. The second copy, which will have the claimed confidential information redacted/blacked out, will be available for public viewing and posted on *https://www.regulations.gov.* Submit both copies to the Dockets Management Staff. If you do not wish your name and contact information to be made publicly available, you can provide this information on the cover sheet and not in the body of your comments and you must identify this information as "confidential." Any information marked as "confidential" will not be disclosed except in accordance with 21 CFR 10.20 and other applicable disclosure law. For more information about FDA's posting of comments to public dockets, see 80 FR 56469, September 18, 2015, or access the information at: *https://www.gpo.gov/fdsys/pkg/FR-2015-09-18/pdf/2015-23389.pdf.*

Docket: For access to the docket to read background documents or the electronic and written/paper comments received, go to *https://www.regulations.gov* and insert the docket number, found in brackets in the heading of this document, into the "Search" box and follow the prompts and/or go to the Dockets Management Staff, 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852.

FOR FURTHER INFORMATION CONTACT: Ellen Anderson, Center for Food Safety and Applied Nutrition, Food and Drug Administration, 5001 Campus Dr., College Park, MD 20740–3835, 240–402–1309.

SUPPLEMENTARY INFORMATION:

I. Introduction

In a notice published in the **Federal Register** of December 13, 2018 (83 FR 64045), we announced that we filed a color additive petition (CAP 9C0314) submitted by Impossible Foods, Inc., c/o Exponent, Inc., 1150 Connecticut Avenue NW, Suite 1100, Washington, DC 20036. The petition proposed to amend the color additive regulations in part 73 (21 CFR part 73), "Listing of Color Additives Exempt from Certification" to provide for the safe use of soy leghemoglobin as a color additive in ground beef analogue products such that the amount of soy leghemoglobin protein does not exceed 0.8 percent by weight of the uncooked ground beef analogue product. For the purposes of this final rule, the term "ground beef analogue products" refers to plant-based or other non-animal derived ground beef-like food products. The petition describes soy leghemoglobin protein as the principal reddish brown coloring component of a stabilized mixture, referred to as soy leghemoglobin preparation. We are establishing soy leghemoglobin as the common or usual name for this color additive and note

Impossible Burger ingredient keeps F.D.A. safety status

Photo: Impossible Foods, Inc.

12.18.2019

By

Jeff Gelski (/authors/5-jeff-gelski)

WASHINGTON – The Food and Drug Administration continues to assert that soy leghemoglobin remains safe for use as a color additive in ground beef analogue products, which includes plant-based Impossible Burgers. The F.D.A. on Dec. 17 said it concluded objections raised by the Center for Food Safety did not justify a hearing or provide a basis for revoking the safety assessment.

Impossible Foods, Inc., Redwood City, Calif., in 2018 filed a color additive petition for the safe use of soy leghemoglobin as a color additive in ground beef analogue products such that the amount does not exceed 0.8% by weight of the uncooked product. The F.D.A. in the Aug. 1 issue of the

What is “cultivated meat”?

frontiers in Nutrition

REVIEW
published: 07 February 2020
doi: 10.3389/fnut.2020.00007

The Myth of Cultured Meat: A Review

Sghaier Chriki[1] and Jean-François Hocquette[2]**

[1] ISARA, Agroecology and Environment Unit, Lyon, France, [2] INRAE, University of Clermont Auvergne, Vetagro Sup, UMR Herbivores, Saint-Genès-Champanelle, France

To satisfy the increasing demand for food by the growing human population, cultured meat (also called *in vitro*, artificial or lab-grown meat) is presented by its advocates as a good alternative for consumers who want to be more responsible but do not wish to change their diet. This review aims to update the current knowledge on this subject by focusing on recent publications and issues not well described previously. The main conclusion is that no major advances were observed despite many new publications. Indeed, in terms of technical issues, research is still required to optimize cell culture methodology. It is also almost impossible to reproduce the diversity of meats derived from various species, breeds and cuts. Although these are not yet known, we speculated on the potential health benefits and drawbacks of cultured meat. Unlike conventional meat, cultured muscle cells may be safer, without any adjacent digestive organs. On the other hand, with this high level of cell multiplication, some dysregulation is likely as happens in cancer cells. Likewise, the control of its nutritional composition is still unclear, especially for micronutrients and iron. Regarding environmental issues, the potential advantages of cultured meat for greenhouse gas emissions are a matter of controversy, although less land will be used compared to livestock, ruminants in particular. However, more criteria need to be taken into account for a comparison with current meat production. Cultured meat will have to compete with other meat substitutes, especially plant-based alternatives. Consumer acceptance will be strongly influenced by many factors and consumers seem to dislike unnatural food. Ethically, cultured meat aims to use considerably fewer animals than conventional livestock farming. However, some animals will still have to be reared to harvest cells for the production of *in vitro* meat. Finally, we discussed in this review the nebulous status of cultured meat from a religious point of view. Indeed, religious authorities are still debating the question of whether *in vitro* meat is *Kosher* or *Halal* (e.g., compliant with Jewish or Islamic dietary laws).

Keywords: cultured meat, *in vitro* meat, muscle cells, livestock farming, consumer perception, vegetarian, ethics

OPEN ACCESS

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Specialty section:
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Published: *07 February 2020*

Citation:
Chriki S and Hocquette J-F (2020) The Myth of Cultured Meat: A Review. Front. Nutr. 7:7. doi: 10.3389/fnut.2020.00007

INTRODUCTION: CONTEXT OF ANIMAL FARMING TODAY

The global population, 7.3 billion today, is expected to surpass 9 billion by 2050. The Food and Agriculture Organization (FAO) has forecast that in 2050, 70% more food will be needed to fulfill the demand of the growing population, which is a great challenge due to resource and arable land limitations. Even if meat consumption is decreasing in developed countries, its global consumption is increasing because consumers are generally unwilling to reduce their meat consumption, in particular in developing countries such as in China, India, and Russia (1). These populations becoming more middle-class, they are looking for more luxury products, such as meat or other animal products (e.g., cheese, dairy products).

USDA U.S. DEPARTMENT OF AGRICULTURE

Secretary Perdue Issues USDA Statement on Plant Breeding Innovation

Press Release
Release No. 0070.18

Contact: USDA Press
Email: press@oc.usda.gov

(Washington, D.C., March 28, 2018) – U.S. Secretary of Agriculture Sonny Perdue today issued a statement providing clarification on the U.S. Department of Agriculture's (USDA) oversight of plants produced through innovative new breeding techniques which include techniques called genome editing.

Under its biotechnology regulations, USDA does not regulate or have any plans to regulate plants that could otherwise have been developed through traditional breeding techniques as long as they are not plant pests or developed using plant pests. This includes a set of new techniques that are increasingly being used by plant breeders to produce new plant varieties that are indistinguishable from those developed through traditional breeding methods. The newest of these methods, such as genome editing, expand traditional plant breeding tools because they can introduce new plant traits more quickly and precisely, potentially saving years or even decades in bringing needed new varieties to farmers.

"With this approach, USDA seeks to allow innovation when there is no risk present," said Secretary Perdue. "At the same time, I want to be clear to consumers that we will not be stepping away from our regulatory responsibilities. While these crops do not require regulatory oversight, we do have an important role to play in protecting plant health by evaluating products developed using modern biotechnology. This is a role USDA has

played for more than 30 years, and one I will continue to take very seriously, as we work to modernize our technology-focused regulations."

"Plant breeding innovation holds enormous promise for helping protect crops against drought and diseases while increasing nutritional value and eliminating allergens," Perdue said. "Using this science, farmers can continue to meet consumer expectations for healthful, affordable food produced in a manner that consumes fewer natural resources. This new innovation will help farmers do what we aspire to do at USDA: do right and feed everyone."

USDA is one of three federal agencies which regulate products of food and agricultural technology. Together, USDA, the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA) have a Coordinated Framework for the Regulation of Biotechnology that ensures these products are safe for the environment and human health. USDA's regulations focus on protecting plant health; FDA oversees food and feed safety; and EPA regulates the sale, distribution, and testing of pesticides in order to protect human health and the environment.

USDA continues to coordinate closely with its EPA and FDA partners to fulfill oversight responsibilities and provide the appropriate regulatory environment. This ensures the safety of products derived from new technologies, while fostering innovation at the same time.

#

U.S. FOOD & DRUG ADMINISTRATION

Dr. Dan Voytas
Chief Science Officer
Calyxt, Inc.
600 Country Road D West
Suite 8
Minneapolis, MN 55112

RE: Biotechnology Notification File No. BNF 000164

Dear Dr. Voytas:

This letter addresses Calyxt Inc.'s consultation with the Food and Drug Administration (FDA) (Center for Food Safety and Applied Nutrition (CFSAN) and Center for Veterinary Medicine) on FAD2KO soybean. According to information Calyxt has provided, this soybean has increased levels of oleic acid and decreased levels of linoleic acid as a result of mutations in the fatty acid desaturase genes *FAD2-1A* and *FAD2-1B*. The administrative record for this consultation has been placed in a file designated BNF 000164. This file will be maintained in the Office of Food Additive Safety in CFSAN.

As part of bringing this consultation to closure, Calyxt submitted to FDA a summary of its safety and nutritional assessment of FAD2KO soybean, which FDA received on November 14, 2017. Calyxt submitted additional information, which FDA received on August 30, 2018. These communications informed FDA of the steps taken by Calyxt to ensure that this product complies with the legal and regulatory requirements that fall within FDA's jurisdiction. Based on the safety and nutritional assessment Calyxt has conducted, it is our understanding that Calyxt has concluded that human food derived from FAD2KO soybean is as safe as high oleic soybean-derived human food currently on the market. Calyxt notes that oil from FAD2KO soybean is similar to other high oleic oils, and that the name "high oleic soybean oil" is an appropriate common or usual name for oil from FAD2KO soybean.[1] Calyxt anticipates that meal derived from FAD2KO soybean is the only material from the new soybean variety that would be used in animal food and Calyxt has concluded that meal derived from FAD2KO soybean is not materially different in composition, safety, and other relevant parameters from soybean-derived meal currently on the market. Use of FAD2KO soybean in human food and FAD2KO soybean meal in animal food does not raise issues that would require premarket review or approval by FDA.

It is Calyxt's responsibility to obtain all appropriate clearances, including those from the United States Environmental Protection Agency and the United States Department of Agriculture, before marketing human or animal food derived from FAD2KO soybeans.

[1] The fatty acid profile of oil from FAD2KO soybeans is consistent with other high oleic soybean oils and meets the specification for high oleic soybean oil in the Food Chemicals Codex, Edition 11, 2018.

U.S. Food and Drug Administration
5001 Campus Drive
College Park, MD 20740
www.fda.gov

Based on the information Calyxt has presented to FDA, we have no further questions concerning human food ingredients derived from FAD2KO soybean and animal food derived from FAD2KO soybean meal at this time. However, as you are aware, it is Calyxt's continuing responsibility to ensure that foods marketed by the firm are safe, wholesome, and in compliance with all applicable legal and regulatory requirements.

A copy of the text of this letter responding to BNF 000164, as well as a copies of the text of FDA's memoranda summarizing the information in BNF 000164, are available for public review and copying at http://www.fda.gov/bioconinventory.

Sincerely,

Dennis M. Keefe -S

Digitally signed by Dennis M. Keefe -S
Date: 2019.02.26 10:30:24 -05'00'

Dennis M. Keefe, Ph.D.
Director
Office of Food Additive Safety
Center for Food Safety
and Applied Nutrition

Annals of Internal Medicine

REVIEW

Red and Processed Meat Consumption and Risk for All-Cause Mortality and Cardiometabolic Outcomes

A Systematic Review and Meta-analysis of Cohort Studies

Dena Zeraatkar, MSc; Mi Ah Han, MD, PhD; Gordon H. Guyatt, MD, MSc; Robin W.M. Vernooij, PhD; Regina El Dib, PhD; Kevin Cheung, MD, MSc; Kirolos Milio, BSc; Max Zworth, BASc; Jessica J. Bartoszko, HBSc; Claudia Valli, MSc; Montserrat Rabassa, PhD; Yung Lee, BHSc; Joanna Zajac, PhD; Anna Prokop-Dorner, PhD; Calvin Lo, BHSc; Malgorzata M. Bala, PhD; Pablo Alonso-Coello, MD, PhD; Steven E. Hanna, PhD; and Bradley C. Johnston, PhD

Background: Dietary guidelines generally recommend limiting intake of red and processed meat. However, the quality of evidence implicating red and processed meat in adverse health outcomes remains unclear.

Purpose: To evaluate the association between red and processed meat consumption and all-cause mortality, cardiometabolic outcomes, quality of life, and satisfaction with diet among adults.

Data Sources: EMBASE (Elsevier), Cochrane Central Register of Controlled Trials (Wiley), Web of Science (Clarivate Analytics), CINAHL (EBSCO), and ProQuest from inception until July 2018 and MEDLINE from inception until April 2019, without language restrictions, as well as bibliographies of relevant articles.

Study Selection: Cohort studies with at least 1000 participants that reported an association between unprocessed red or processed meat intake and outcomes of interest.

Data Extraction: Teams of 2 reviewers independently extracted data and assessed risk of bias. One investigator assessed certainty of evidence, and the senior investigator confirmed the assessments.

Data Synthesis: Of 61 articles reporting on 55 cohorts with more than 4 million participants, none addressed quality of life or satisfaction with diet. Low-certainty evidence was found that a reduction in unprocessed red meat intake of 3 servings per week is associated with a very small reduction in risk for cardiovascular mortality, stroke, myocardial infarction (MI), and type 2 diabetes. Likewise, low-certainty evidence was found that a reduction in processed meat intake of 3 servings per week is associated with a very small decrease in risk for all-cause mortality, cardiovascular mortality, stroke, MI, and type 2 diabetes.

Limitation: Inadequate adjustment for known confounders, residual confounding due to observational design, and recall bias associated with dietary measurement.

Conclusion: The magnitude of association between red and processed meat consumption and all-cause mortality and adverse cardiometabolic outcomes is very small, and the evidence is of low certainty.

Primary Funding Source: None. (PROSPERO: CRD42017074074)

Ann Intern Med. 2019;171:203-210. doi:10.7326/M19-0655 **Annals.org**
For author affiliations, see end of text.
This article was published at Annals.org on 1 October 2019.

Growing evidence shows an increased risk for cardiometabolic disease associated with the consumption of red and processed meat. Although previous systematic reviews reported positive associations between red meat intake and all-cause mortality (1), cardiovascular mortality (2), and stroke (3) and between processed meat consumption and all-cause mortality (1, 4), cardiovascular mortality (2), stroke (3), coronary heart disease (5), and type 2 diabetes (5), results have not been consistent. One review did not find an association between unprocessed red meat and all-cause mortality (4), and another found no association with cardiovascular disease (5). Although Aune and colleagues (6) reported a relationship between red meat intake and type 2 diabetes, Micha and colleagues (5) did not detect this association in a review published 1 year later.

Methodological limitations in previous reviews included failure to address risk of bias of primary studies (for example, references 3 and 6), lack of evaluation of certainty of evidence (for example, references 2 to 6), and failure to consider the magnitude of observed effect (for example, references 2 to 6). These limitations may have affected the credibility of recommendations issued by governments and authoritative organizations regarding red and processed meats.

As part of NutriRECS (Nutritional Recommendations and accessible Evidence summaries Composed of Systematic reviews), a new initiative to establish trustworthy dietary recommendations that meet internationally accepted standards for guideline development, we developed guidelines addressing red and processed meat consumption (7). To inform these recommendations, we conducted 5 systematic reviews of the evidence (8–11). Here, we present results from a systematic review of cohort studies addressing the association between red and processed meat consumption and all-cause mortality, cardiometabolic outcomes, quality of life, and satisfaction with diet among adults.

See also:
Related articles 711, 721, 732, 742, 756
Editorial comment 767
Web-Only
Supplement

This article has been corrected. The specific correction appears on the last page of this document. The original version (PDF) is available at www.annals.org.

Red and Processed Meats and Health Risks: How Strong Is the Evidence?

Frank Qian,[1,2] Matthew C. Riddle,[3] Judith Wylie-Rosett,[4] and Frank B. Hu[1,5,6]

Diabetes Care 2020;43:265–271 | https://doi.org/10.2337/dci19-0063

Prevailing dietary guidelines have widely recommended diets relatively low in red and processed meats and high in minimally processed plant foods for the prevention of chronic diseases. However, an ad hoc research group called the Nutritional Recommendations (NutriRECS) consortium recently issued "new dietary guidelines" encouraging individuals to continue their current meat consumption habits due to "low certainty" of the evidence, difficulty of altering meat eaters' habits and preferences, and the lack of need to consider environmental impacts of red meat consumption. These recommendations are not justified, in large part because of the flawed methodologies used to review and grade nutritional evidence. The evidence evaluation was largely based on the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) criteria, which are primarily designed to grade the strength of evidence for clinical interventions especially pharmacotherapy. However, the infeasibility for conducting large, long-term randomized clinical trials on most dietary, lifestyle, and environmental exposures makes the criteria inappropriate in these areas. A separate research group proposed a modified and validated system for rating the meta-evidence on nutritional studies (NutriGRADE) to address several limitations of the GRADE criteria. Applying NutriGRADE, the evidence on the positive association between red and processed meats and type 2 diabetes was rated to be of "high quality," while the evidence on the association between red and processed meats and mortality was rated to be of "moderate quality." Another important limitation is that inadequate attention was paid to what might be replacing red meat, be it plant-based proteins, refined carbohydrates, or other foods. In summary, the red/processed meat recommendations by NutriRECS suffer from important methodological limitations and involve misinterpretations of nutritional evidence. To improve human and planetary health, dietary guidelines should continue to emphasize dietary patterns low in red and processed meats and high in minimally processed plant foods such as fruits and vegetables, whole grains, nuts, and legumes.

Consumption of red meats (meats of mammalian origin including beef, pork, and lamb) and processed meats (meats transformed through salting, curing, fermentation, smoking, or other processes to enhance flavor or improve preservation) has been increasing rapidly worldwide (1–3). These trends can have major health and environmental consequences. Considerable evidence from long-term prospective cohort studies has demonstrated that diets high in red and processed meats are associated with increased risk of type 2 diabetes (T2D), cardiovascular disease (CVD), cancer (particularly colorectal cancer), and all-cause mortality (4–6). Similarly, such evidence along with the evidence from short-term intervention trials strongly suggests that replacing red and processed meats with plant-based protein sources (including

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[4]Department of Epidemiology & Population Health, Albert Einstein College of Medicine, The Bronx, NY
[5]Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA
[6]Channing Division of Network Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA

Corresponding author: Frank B. Hu, frank.hu@channing.harvard.edu

Sustainable diets are
nutrient-rich, safe, affordable, accessible, socially and culturally appropriate, and appealing – and with low impact on the environment.

Source: Adam Drewnowski, PhD, ASN 2020 (used with permission)

Director, Center for Public Health Nutrition,
Professor of Epidemiology, University of Washington, Seattle, WA, USA
Director, UW Center for Obesity Research

The future of food

Healthy and sustainable diets	Metrics	Key concepts
Nutrient-rich	Nutrient profiling models	(Re)formulation of product portfolios requires data on nutrient composition and health outcomes. Plant proteins, bioactives, dietary ingredients.
Affordable	Nutrition economics	Cost per calorie versus cost per nutrient (the "right" calories) Food cost in relation to incomes; lower prices for ultra-processed foods. Need for global food prices databases.
Accessible	Physical/economic access	Is it food deserts or economic access to foods? Transportation, delivery, remote access
Appealing	Satisfaction, well-being	Foods have a social value, support cultural and social identity, cooking at home will be transformative.
Planet friendly	Energy, water, land use, biodiversity	Environmental impact needs to be calculated per 2000 kcal or per nutrient requirement and not per cost of 1 kg of food, any food. Values will be very different.

Source: Adam Drewnowski, PhD, ASN 2020 (used with permission)

sustainability

MDPI

Meeting Report

Proceedings of a Workshop on Characterizing and Defining the Social and Economic Domains of Sustainable Diets

Kevin Comerford [1,*], Channing Arndt [2], Adam Drewnowski [3], Polly Ericksen [4], Tim Griffin [5], Mary Hendrickson [6], John Ingram [7] and Jill Nicholls [8]

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4 Sustainable Livestock Systems, International Livestock Research Institute (ILRI), Nairobi 00100, Kenya; p.ericksen@cgiar.org
5 Nutrition, Agriculture, and Sustainable Food Systems, Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy, Tufts University, Boston, MA 02111, USA; timothy.griffin@tufts.edu
6 Rural Sociology, University of Missouri, Columbia, MO 65211, USA; HendricksonM@missouri.edu
7 Environmental Change Institute, University of Oxford, Oxford OX1 3QY, UK; john.ingram@eci.ox.ac.uk
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Received: 14 March 2020; Accepted: 18 May 2020; Published: 20 May 2020

check for updates

Abstract: Global challenges associated with a growing demand for food in the face of finite natural resources and climate change have prompted concerns about the sustainability of our current food systems. As formulated by the Food and Agriculture Organization, the four principal domains of sustainable diets are health, economics, society, and the environment. While emphasizing the environmental cost and health impacts of current diets, the research literature has virtually ignored the vital economic and social aspects of sustainability. Without these components, critical inputs for decision-making about global challenges related to climate change and a growing demand for food are missing. National Dairy Council convened experts in sociology, economics, human nutrition, food systems science, food security, environmental health, and sustainable agriculture for a one-day workshop to define the social and economic domains of sustainability in service of better characterizing food-based dietary guidance that is both healthy and sustainable. The consensus recommendations were to (1) select social and economic indicators to complement the existing environmental and health ones, (2) better define appropriate concepts, terms, and measures to foster discussion across scientific disciplines, (3) reframe the focus on sustainable diets towards the goal of "achieving healthy dietary patterns from sustainable food systems", and (4) complement the four domains, and incorporate the notions of geography, time, and cross-cutting considerations into sustainability frameworks. This publication summarizes the presentations, discussions, and findings from the 2019 workshop, and aims to catalyze further action to advance sustainability research and practice in the context of food-based dietary guidance and the Sustainable Development Goals.

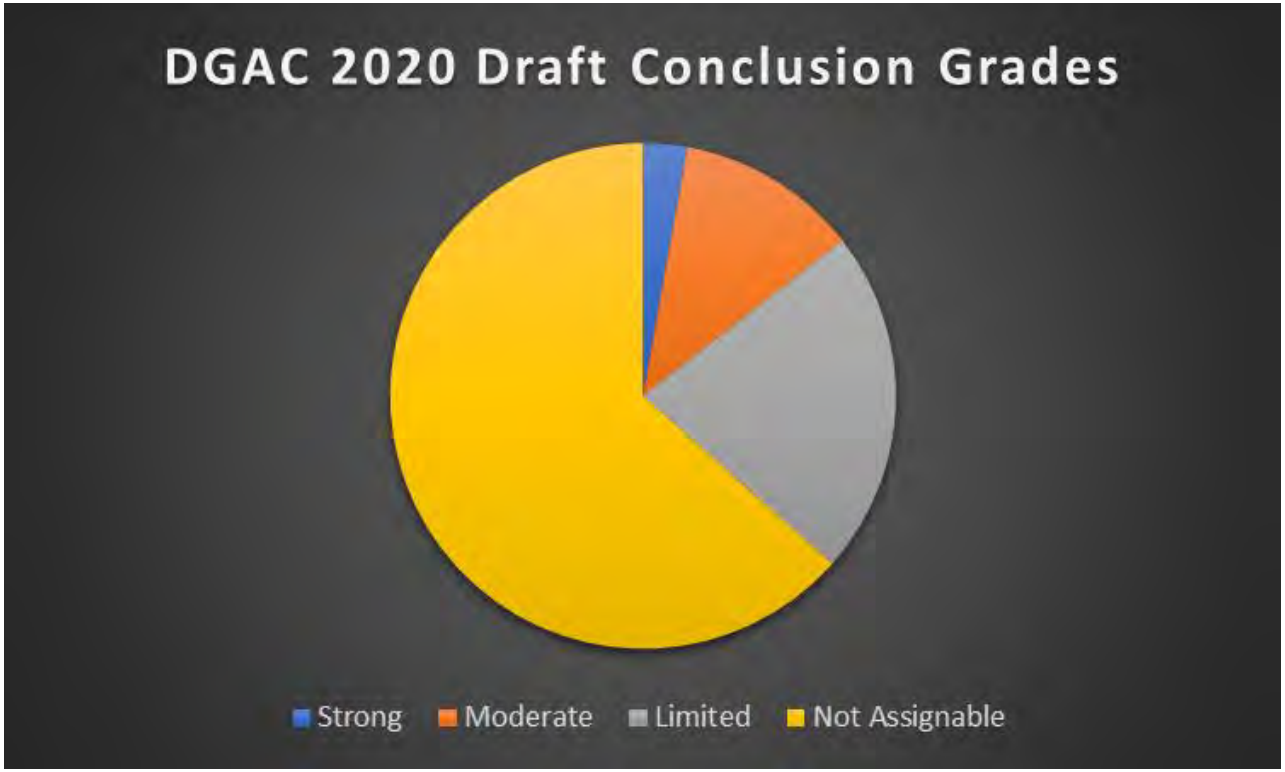
Keywords: sustainable diets; sustainable food systems; social domain; economic domain

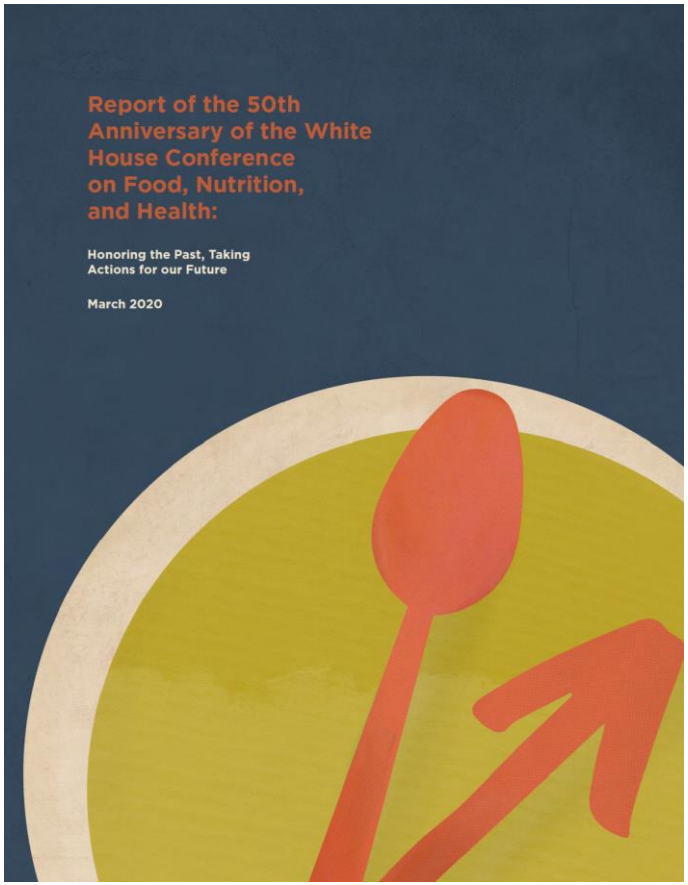
1. Introduction

The Food and Agriculture Organization of the United Nations (FAO) has defined "sustainable diets" as those with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations [1]. The four domains of sustainability, health, economics,

Nutrition Evidence Systematic Review Grading Rubric

	Strong	Moderate	Limited	Grade Not Assignable
Risk of bias	Across the body of evidence, there is a ***strong*** likelihood that the design and conduct of the studies has prevented or minimized bias such that the reported results are the true effects of the intervention/ exposure, and plausible bias and/or potential limitations are unlikely to alter the results	Across the body of evidence, there is a ***moderate*** likelihood that the design and conduct of the studies has prevented or minimized bias such that the reported results are the true effects of the intervention/ exposure, and plausible bias and/or potential limitations are unlikely to alter the results	Across the body of evidence, there is a ***limited*** likelihood that the design and conduct of the studies has prevented or minimized bias such that the reported results may not be the true effects of the intervention/ exposure, and plausible bias and/or potential limitations may have altered the results	A ***grade is not assignable*** for this element because it cannot be adequately assessed
Consistency	The body of evidence demonstrates findings with ***strong*** consistency in direction and magnitude of effect; or, any inconsistencies in findings can be explained by methodological differences	The body of evidence demonstrates findings with ***moderate*** consistency in direction and magnitude of effect; some of the inconsistencies in findings can be explained by methodological differences	The body of evidence demonstrates findings with ***limited*** consistency in direction and magnitude of effect; few of the inconsistencies in findings can be explained by methodological differences	A ***grade is not assignable*** for this element because it cannot be adequately assessed
Directness	The body of evidence demonstrates ***strong*** directness, such that studies are designed to directly examine the relationships among intervention/exposure, comparator, and outcomes of primary interest in the systematic review question	The body of evidence demonstrates ***moderate*** directness, such that some studies are designed to directly examine the relationships among intervention/exposure, comparator, and/or outcomes of primary interest in the systematic review question	The body of evidence demonstrates ***limited*** directness, such that few studies are designed to directly examine the relationships among intervention/exposure, comparator, and/or outcomes of primary interest in the systematic review question	A ***grade is not assignable*** for this element because it cannot be adequately assessed
Precision	The body of evidence demonstrates ***strong*** precision based on a substantial number of sufficiently-powered studies with a narrow assessment of variance	The body of evidence demonstrates ***moderate*** precision based on an adequate number of sufficiently-powered studies with a narrow assessment of variance	The body of evidence demonstrates ***limited*** precision based on an inadequate number of sufficiently-powered studies with a narrow assessment of variance	A ***grade is not assignable*** for this element because it cannot be adequately assessed
Generalizability	The body of evidence demonstrates ***strong*** generalizability to the U.S. population of interest with regard to: a) the participant characteristics b) the intervention/exposure and outcomes studied	The body of evidence demonstrates ***moderate*** generalizability to the U.S. population of interest with regard to: a) the participant characteristics b) the intervention/exposure and outcomes studied	The body of evidence demonstrates ***limited*** generalizability to the U.S. population of interest with regard to: a) the participant characteristics b) the intervention/exposure and outcomes studied	A ***grade is not assignable*** for this element because it cannot be adequately assessed


DGAC 2020 Draft Conclusion Grades
Strong
Moderate
Limited
Not Assignable



Tufts

Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy

Food & Nutrition Innovation Council

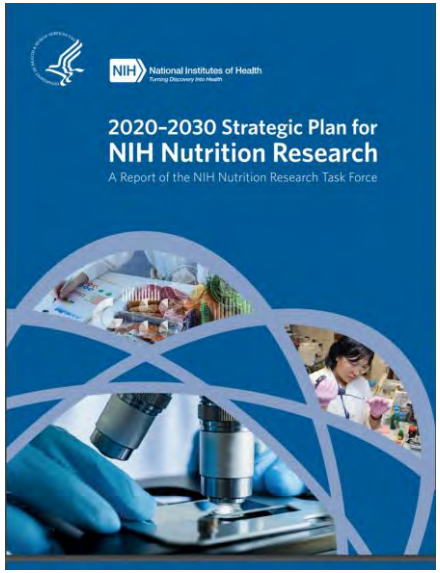
Call to Advance Federal Nutrition Research

Suboptimal diet is a leading cause of poor health and preventable healthcare spending in the U.S. and globally. The science of nutrition is rapidly evolving, and a new significant coordinated investment, leadership, and strategy in federal nutrition research could more than pay for itself through better health, equity, military readiness, and sustainability. To accelerate solutions, the Innovation Council calls for a new national evaluation and strategy development for a major coordinated federal nutrition research effort.

Such a new coordinated federal nutrition research effort could include:

- Robust new leadership, strategy, and funding to advance and further harmonize the current federal infrastructure and investment in nutrition research and build new intra-governmental collaborations.
- Additive and synergistic funding and actions with existing NIH efforts and other federal agencies and departments.
- A new structure and leadership within NIH, such as a new Institute, Center, or major cross-agency initiative focused on nutrition.
- A focus on foundational basic science to accelerate transformative discoveries in nutrition, including related to the gut microbiome, epigenetics and metabolomics, development across the life course from conception to healthy aging, military readiness and treatment of battlefield injuries, and personalized nutrition.
- Coordinated and synergistic basic and translational research with existing NIH efforts and other federal agencies and departments on nutrition and major diseases afflicting Americans, including obesity, diabetes, cancers, cardiovascular disease, dementia and neurodegenerative diseases, allergies and autoimmune diseases, sarcopenia and bone health, macular degeneration and other eye diseases, and depression and other psychiatric disorders.
- Focus on efficiently advancing the role of nutrition as a key part of a comprehensive and holistic solution to these diseases.
- Research on "food is medicine" approaches to reduce health care costs.

Significant Opportunities to Advance Scientific Knowledge



Objective 2-6. Leverage Behavioral and Implementation Science to Initiate and Sustain Healthy Eating Behaviors

Making and sustaining dietary changes is often difficult due to the influence and interactions (and even convergence) of numerous factors spanning biological, psychosocial, sociocultural, and environmental domains that create and shape an individual's "food environment." Thus, to be effective, nutrition interventions must target multiple levels of the food environment. Recognizing the role of this context and need to better understand how to bring Precision Nutrition interventions to scale, implementation science is an important priority in this Plan to equitably move evidence-based interventions into practice. Interdisciplinary teams can employ multiple designs and methodologies beyond randomized controlled trials of efficacy to conduct this research (e.g., sequential multiple assignment randomized trials and related hybrid study designs).

NIH Strategic Plan p 14

Public Perception of Science

In these times of unprecedented scientific and information progress, there is an increasing distrust of science and politicization of scientific discoveries. This may be because of diminished understanding of science by the general public, failure of scientists to communicate effectively, and increasing confirmation bias of information systems.

USDA Science Blueprint p9

Dietary Quality by Life stage

How Healthy Is the American Diet?

Data source for Healthy Eating Index scores: What We Eat in American, National Health and Nutrition Examination Survey. (Undated data are from 2015-2016).

DGA Dietary Guidelines for Americans

Part D Chapter 1: Current Intakes of Foods, Beverages, and Nutrients
2020 Dietary Guidelines Advisory Committee: *Meeting 6*

https://issuu.com/iusph/docs/iu_sph_it_s_about_knowing

Thank You

bill@laydenenterprises.com

Nutrition Educators Have a Pivotal Role in Shaping the New Food Future

Bee Marks Communications Symposium

What Do All These Groups Have in Common?


Farmers


Health Professionals


Culinary Experts


Individuals & families

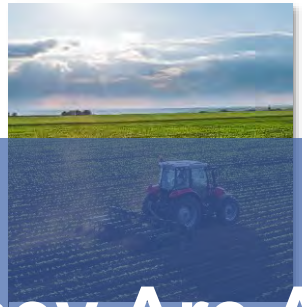

Processors


Government


Researchers


Retailers

What Do All These Groups Have in Common?



They Are All Food Systems Stakeholders

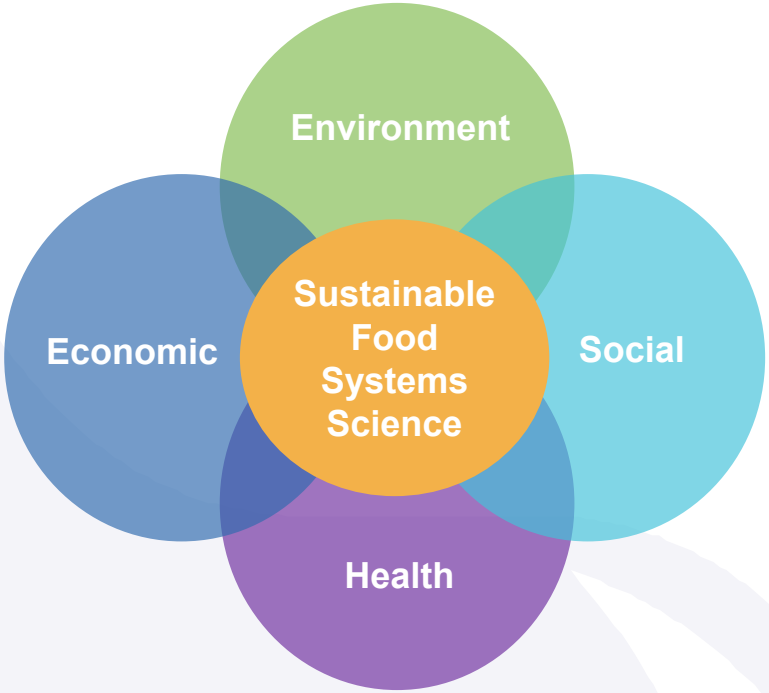
Processors

Government

Researchers

Retailers

Sustainable Food Systems Encompass Four Domains



Environment

- Land Use, Water Use, Greenhouse Gas Emissions, Biodiversity

Health

- Dietary Patterns, Nutrient Adequacy

Economic

- Livelihoods/Profits, Productivity, Affordability, Costs of Food Production, Wages

Social

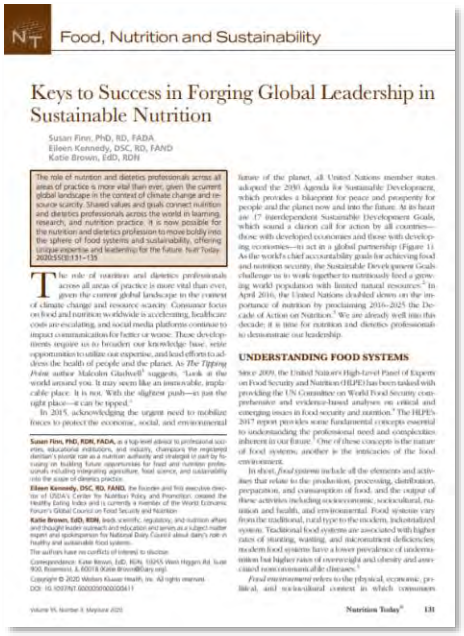
- Community food security, Taste & Enjoyment of Food, Inclusive food distribution channels, Cultural identity, Accessibility

Drewnowski. *Frontiers in Nutrition*, 2018
Comerford et al. *Sustainability,* 2020

Nutrition Educators Have a Pivotal Role to Play

> **Shared values and goals connect** nutrition and dietetics professionals across the world in learning, research and nutrition practice. It is now possible for the nutrition and dietetics profession to **move boldly into the sphere of food systems and sustainability**, offering unique expertise and leadership for the future.

-- Susan Finn, PhD, RDN, FADA
Eileen Kennedy, DSC, RDN, FAND
Katie Brown, EdD, RDN


Food, Nutrition and Sustainability

Keys to Success in Forging Global Leadership in Sustainable Nutrition

Susan Finn, PhD, RD, FADA
Eileen Kennedy, DSC, RD, FAND
Katie Brown, EdD, RDN

The role of nutrition and dietetics professionals across all areas of practice is more vital than ever, given the current global landscape in the context of climate change and resource scarcity. Consumer focus on food and nutrition worldwide is accelerating, healthcare costs are escalating, and social media platforms continue to impact communication for better or worse. These developments require us to broaden our knowledge base, seize opportunities to utilize our expertise, and lead efforts to address the health of people and the planet. As *The Tipping Point* author Malcolm Gladwell[1] suggests, "Look at the world around you. It may seem like an immovable, implacable place. It is not. With the slightest push—in just the right place—it can be tipped."

UNDERSTANDING FOOD SYSTEMS

Nutrition Today 131

Keys to success in forging global leadership in sustainable nutrition. *Nutr Today*, 2020

Craving Connection

Opportunity Areas for Greater Collaboration

Ensuring Food Security

Eliminating Food Waste

Empowering Youth & Next Generation

Uniting Around Food Security to Launch the Future of Food Initiative

HUNGER + HEALTH | FEEDING AMERICA

"We're all working in our different channels. It's good to get out and talk with each other. More of us need to step outside. It's special to have untraditional stakeholders at the same table. This ***provides the opportunity to be innovative and think about all the resources available****. By talking with individuals from other channels, we're able to be innovative to create solutions."*

– Jerod Mathews,
Feeding America

Kroger & Feeding America Join Forces for Zero Hunger, Zero Waste

Addressing food insecurity while fighting food waste

Kroger FRESH FOR EVERYONE™ FEEDING AMERICA

*"It's very ambitious **and we know we can't do it alone.** In stores, on a national level, 40% of the food that's grown gets thrown into a landfill. Even though it's cheaper to throw in a landfill, in the long run, there are benefits to donating and finding alternatives. We're now donating to food banks across the state. We're working with companies to utilize waste as fertilizer and some becomes animal feed."*

– Eric Halvorson,
Manager of Corporate Affairs
Kroger Central Division

Starting Small to Make a Big Impact: Grounds for All

Composting institutional waste wasn't available on a large scale, so Folino and his colleagues started a campus-wide composting program that collects coffee grounds

Michael Folino, MBA, RDN, LD
Former Associate Director, Nutrition Services,
Wexner Medical Center

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Image from: https://wexnermedical.osu.edu/healthy-community/sustainability-in-nutrition-services

Youth Perspective on the Future of Food

"Although youth care about food and the environment, **they don't know much about how the two are connected**, where their food comes from, or why it matters. But they are hungry to know more."

https://www.genyouthnow.org/reports/genyouth-insights-spring-2020-youth-and-future-of-food

University Level Engagement for Next Gen Nutrition Professionals

FROM THE ACADEMY

eat right.

Development and Implementation of a Sustainable, Resilient, and Healthy Food and Water Systems Curriculum for Dietetic Interns

Amy Knobloch-Fahn, PhD, MPH, MS, RDN; Lisa Medlow, RDN, LD

IN JUNE 2012, THE ACADEMY OF Nutrition and Dietetics Foundation partnered with Feeding America and National Dairy Council for the "Future of Food Initiative." This initiative has helped increase awareness of issues related to food insecurity and food waste to Academy members through the development of educational webinars, infographics, and toolkits. Furthermore, this initiative has resulted in a variety of collaborative programs and research projects for the development of solutions and resources for food-insecure populations across the country.

The issue of sustainable food systems has been a topic of importance to the Academy for several years before the announcement of the Future of Food Initiative. In 2005, a motion was passed to appoint a sustainable food systems task force. The task force was charged with defining the role of Academy members in the issue of sustainable food systems. In 2007, the task force published a sustainable food systems primer[1] that helped define sustainable food systems and opportunities for nutrition and dietetics professionals working in a variety of settings. This primer helped lay the foundation of future activities and opportunities in sustainable food systems within the profession.[2]

As the recognition of the importance of sustainable food systems grew in the profession, so did the recognition of the need for integration of sustainable food systems in dietetics education programs. In 2011, a survey of dietetic internship directors found that while 50% of dietetic internship directors reported incorporating activities related to sustainable food systems in their programs, 43% of respondents had a strong interest in developing activities but lacked time and other resources to develop and implement.[3]

In 2016, the Academy Foundation received a grant from the National Dairy Council to develop a 120-hour supervised practice curriculum for implementation into supervised practice settings. This article describes the process of developing and pilot testing the curriculum.

DEVELOPMENT OF CURRICULUM

In order to develop a comprehensive curriculum with input from sustainable food system practice experts that would be feasible in supervised practice settings, the Academy Foundation collaborated with representatives from the Nutrition and Dietetic Educators and Preceptors Practice Group for input and feedback throughout the process. Fifty-one key stakeholders representing different sectors in sustainable food systems were invited to participate in an introductory webinar that took place in February 2016. The purpose of the webinar was to provide an overview of work already done in sustainable food systems and to gather input and ideas about the needs of future nutrition and dietetics practitioners in this area. Thirty stakeholders participated in the introductory webinar, providing initial feedback on the educational needs of future practitioners.

All stakeholders agreed that sustainable food systems are a critical component of dietetics education. Stakeholders developed the following

FSK* 6.1: Knowledge of how to identify science-based information from multiple disciplines and sources (eg, government, national/international NGO† publication, alternative literature sources).
FSK 6.2: Understanding of privacy of customer's personal information, including the protection of personal health information where applicable.
FSK 6.3: Knowledge of how to identify sustainable, resilient, and healthy food and water systems relevant databases.
FSK 6.4: Understanding of ethical and professional integrity when integrating sustainable, resilient, and healthy food systems principles into practice (eg, dietetic credentialing and/or licensure protocol, organizational policies, performance standards).
FSK 6.5: Understanding of safe, resilient, and healthy food and water systems.
FSK 6.6: Understanding of production, processing, marketing, procurement and waste management standards that support sustainable, resilient, and healthy food and water systems.
FSK 6.7: Understanding of the importance of transparency within food and water systems.

Figure 1. New knowledge standards for healthy and sustainable food and water systems curriculum. *FSK—Food Systems Knowledge. †NGO—nongovernmental organization.

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https://eatrightfoundation.org/why-it-matters/public-education/future-of-food/sfs/

*Jennifer is **teaching the next generation of food system leaders to think broadly,** so they can transform food systems with unique innovations at both the local and global level.*

Jennifer van de Ligt, PhD
Integrated Food Systems Leadership Program
University of Minnesota

UNIVERSITY OF MINNESOTA

Charting a Path Forward for Nutrition Professionals

eat right.

FROM THE ACADEMY

Cultivating Sustainable, Resilient, and Healthy Food and Water Systems: A Nutrition-Focused Framework for Action

Marie L. Spiker, PhD, MSPH, RDN; Amy Knoblock-Hahn, PhD, MPH, MS, RDN; Katie Brown, EdD, RDN; Janice Giddens, MS, RDN; Amanda S. Hege, MPH, RDN, LD; Kevin Sauer, PhD, RDN, LD, FAND; Diane M. Enos, MPH, RDN, FAND; Alison Steiber, PhD, RDN

UNDERSTANDING FOOD AND water systems is critically important for the practice of nutrition and dietetics. This is especially true as growing populations, rising per capita demand for nutrient-rich foods, and climate change pose mounting challenges for meeting global nutrition targets.

Food and water systems include the resources, people, and activities involved in the production, processing, packaging, distribution, purchasing, preparation, consumption, discard, and safety of food and water, as well as the complex relationships among these processes.[1-3] The concept of sustainable, resilient, and healthy food and water systems (henceforth "sustainable food systems") describes systems where "individuals have equitable and optimal access to food and water; both now and in the future."[4,5] Sustainability is multidimensional, with sustainable food systems at the intersection of multiple domains including nutrition and health; environmental stewardship; economic vitality; and social, cultural, and ethical capital.[4]

Sustainability considers both the long-term viability of the food system and current issues, such as the global burden of hunger and malnutrition,[6] unequal economic access to nutritious foods,[7] high rates of food loss and waste,[8] the precariousness of freshwater supplies for agricultural irrigation,[9] and equity issues for food systems workers.[10,11] Registered dietitian nutritionists (RDNs) and nutrition and dietetics technicians, registered (NDTRs) are trained to address the nutritional manifestations of these issues, and can also lead and support collaborative efforts along the spectrum of prevention[12] to address underlying issues that affect current and future populations.

The vision of the Academy of Nutrition and Dietetics ("Academy") is "a world where all people thrive through the transformative power of food and nutrition."[13] The Academy's Strategic Plan includes a commitment to a global, system-wide impact and collaboration "to solve the greatest food and nutrition challenges now and in the future."[14] In this light, the actions needed to support sustainable food and water systems are not a specialized practice area, they are central to the profession. Figure 1 describes key Academy publications that demonstrate the evolution of thinking within this area.

The importance of nutrition within sustainable food systems also aligns with global agendas, including the United Nations Sustainable Development Goals. Goal 2 of the Sustainable Development Goals is to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture."[6,15] Nutrition is critically linked to the success of all 17 Sustainable Development Goals, as it intersects water and other natural resources, livelihoods, and education. A global scope is appropriate, given that many food systems issues cross geopolitical borders. For example, policies or consumer trends in one country may affect food production or prices in another, and the effects of food systems on water quality or greenhouse gases may extend far beyond one's country of practice.

The challenges of sustainable food systems require the development of workforce capacity and collaboration across sectors.[16,17] RDNs and NDTRs are key connectors who work in diverse roles throughout the food system, from production to consumption, and throughout health care, public health, and community settings. This article provides a framework for action for how RDNs and NDTRs—individually, as a profession, and in collaboration with other sectors—can cultivate sustainable food systems.

FRAMEWORK FOR ACTION

This framework for action was developed from a roundtable meeting of experts and subsequent stakeholder input. The 2-day roundtable, titled "Sustainable Food Systems: Creating a Nutrition-Focused Framework for Action," was convened in November 2018 by the Academy of Nutrition and Dietetics Foundation ("Foundation") as part of the Future of Food initiative, which is funded through an educational grant from the National Dairy Council.[18] The 24 participants included credentialed nutrition and dietetics practitioners and external stakeholders representing expertise in clinical nutrition, foodservice, community nutrition, agriculture, food supply chains, environmental science, economics, racial equity, and food policy.

Before the roundtable, participants reviewed foundational work in this area, including the Academy publications in Figure 1 and the United Nations High Level Panel of Experts conceptual framework of food systems.[3] The roundtable included in-person presentations, virtual remarks, and a series of small-group discussions led by a trained facilitator. Participants identified "entry points"

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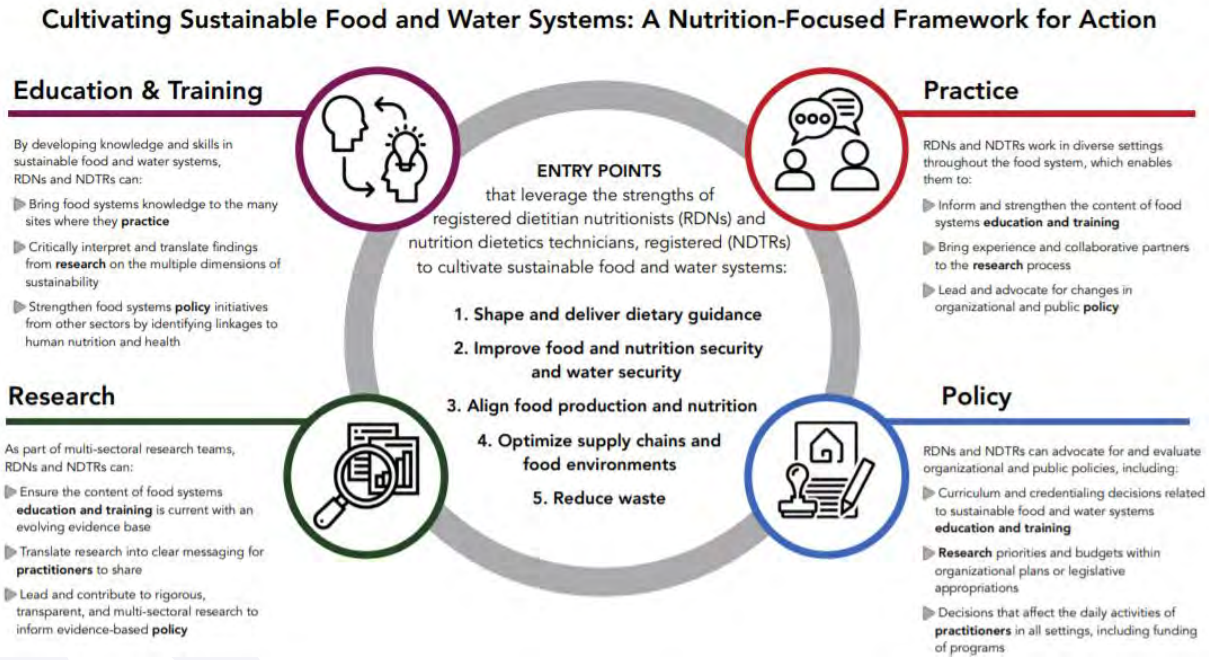


http://tinyurl.com/CultivatingSFS

Nourish Dialogue Dinners:

Facilitating conversation, building relationships and creating momentum for ongoing engagement

Collecting Insights Coast to Coast

25 locations across the U.S.

Nourish Dialogue Dinners

Bringing Together Diverse Perspectives

Food Supply Chains

Farmers, Food Processors and Manufacturers, Agribusiness, CPGs, Retailers, Corporate Professionals

Food Environments, Food Access

Food Service Directors, Hunger Relief Professionals, Government/Policy Professionals

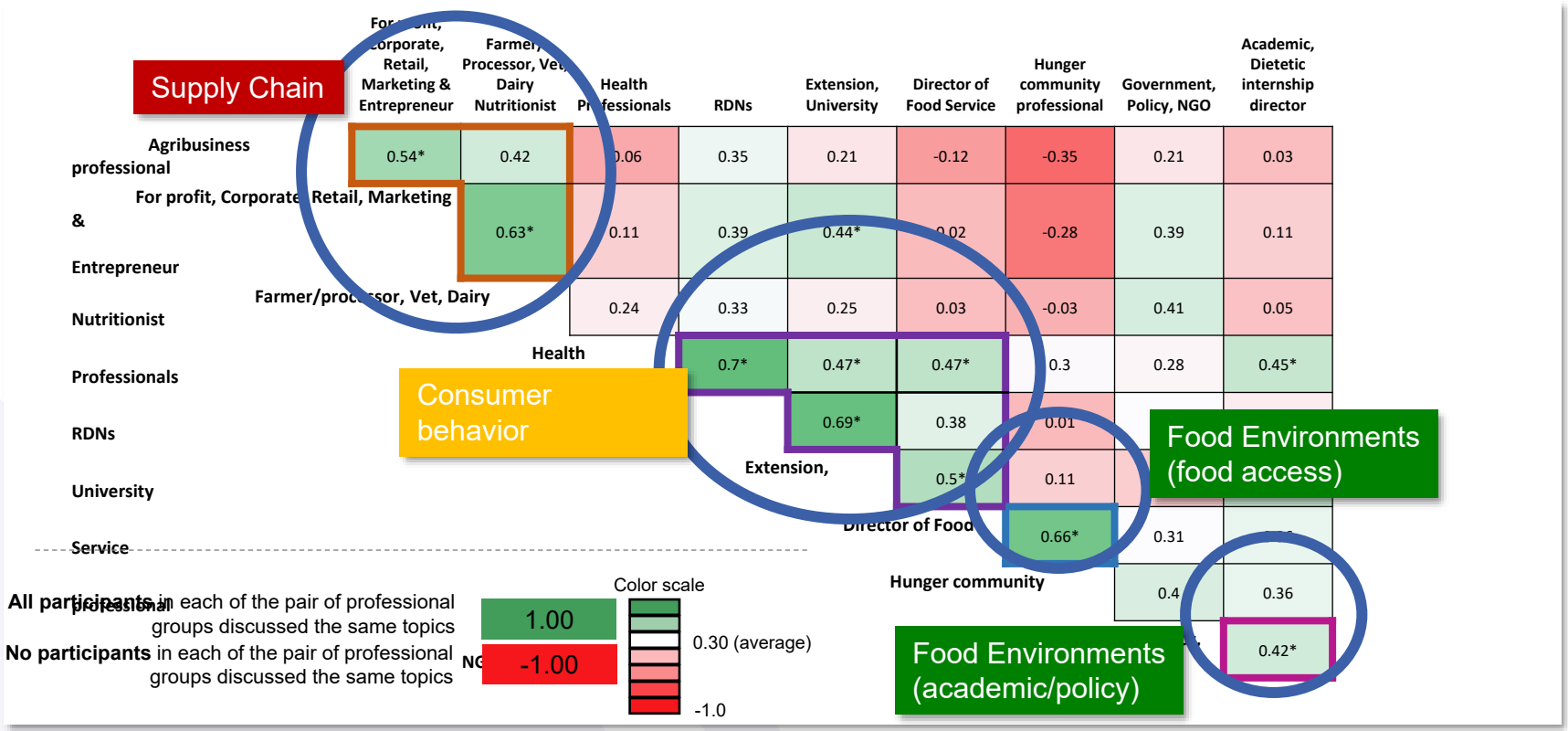
Nutrition/Health Education

Physicians, Dietitians, Nurse Practitioners, Fitness Professionals, Culinary Experts, Academic Faculty, University Extension Specialists

Questions Used to Drive Discussion

1. *What does food mean to you?*
2. *What's one of the ways your work contributes to improved nutrition, health outcomes or sustainable food systems?*
3. *What's a challenge you face in your work in supporting health or sustainable food systems?*
4. *What's a promising way that your area of expertise (your profession/field) is evolving to better support nutrition, health outcomes and/or sustainable food systems?*
5. *How could practitioners across the food system collaborate to have a greater impact on nutrition, health and sustainable food systems?*
6. *What has made an impression on you from this discussion and what's a way you'd like to continue this discussion after you leave here?*

Overlapping Interests Across Professional Groups



* indicates statistical significance at 95% confidence

Call to Action #1: Publicize the real story about agriculture and farming

Share examples of farmers' commitment to environmental stewardship and connect people to where their food comes from.

Providing the Real Story on Agriculture

Lauren Twigge, MCN, RDN, LD
Registered Dietitian
@TheDairyDietitian

Jennifer Heltzel
Dairy Farmer
Piney Mar Farm

Lauren uses social media channels "to be food positive" and ***provide the real story about food production, sustainability and health and nutrition****.*

To help the next generation connect to agriculture, she ***offers virtual farm tours for NYC school groups to interact with ag without leaving their classrooms****.*

Call to Action #2: Increase programs and practices that support access to healthy and sustainable food

Continue innovation in food assistance programs and provide more foods with higher nutritional value.

Engage diverse partners and stakeholders across the food system for greater collective impact.

Connecting Dots Between Stakeholders

Peter Allison
Farm to Institution New England (FINE)

*Oversees a six-state network of nonprofit, public and private entities working together to transform the food system by **increasing the amount of local food served** in regional schools, hospitals, colleges and other institutions.*

Kathleen Merrigan, PhD
Swette Center for Sustainable Food Systems, Arizona State University

*To prepare future policy makers to drive food system transformation, Kathleen takes students on an immersive food production tour, **engaging diverse partners and stakeholders to serve as stops along the way**.*

Only the Beginning

"There aren't many places where you can have open conversations in pre-competitive space for the general good of everyone. We're all thinking about the same beginning and end of food — where it comes from and where it ends up — and seeing the same issues. I would like to talk about what we can all do in the middle to make it better."

- Amy Carter, MA, RD, CD, CDE
Director of Outpatient Nutrition, Eskenazi Health, Nourish Dialogue Dinner attendee

Katie Brown, EdD, RDN

Senior Vice President,
Sustainable Nutrition

National Dairy Council

@Katiebrownrdn