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?
Disclosures
Experience

1986

1994

1995
Former Clients Served*

2006-2016

*Includes only clients that have authorized public disclosure.
Back in 2019...
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.
The future of food and agriculture

Trends and challenges

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.
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
Percent of Adults and Youth with Obesity, 1988–2016

Source: NHANES


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/tables/obesity/ob226_table.pdf.

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

Zachary J. Ward, M.P.H., Sava N. Becich, Ph.D., Angela L. Cate, M.D., Jennifer L. Barrett, M.P.H., Catherine M. Goble, M.P.H., Charline Mai, M.P.H., Michael W. Long, Sc.D., and Steven L. Gortmaker, Ph.D.

ABSTRACT

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 measurements reported by persons themselves that underestimate the prevalence of obesity, especially severe obesity.

METHODS

We developed methods to correct 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 4,344,238 adults (18 years of age or older) who participated in the Behavioral Risk Factor Surveillance System Survey (1990-1994 and 1999-2002) were obtained and corrected for the state-specific self-reporting bias by the use of measured data from 352,181 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 2002, adjusting for age, gender, and marital status. We evaluated the accuracy of our approach using data from 1990 through 2000 to predict 2010 outcomes.

RESULTS

The findings from our approach suggest that high predictive accuracy that by 2009 nearly 1 in 2 adults will have obesity (40.9%), 95% confidence interval (CI), 40.3% to 41.5), and the prevalence will be higher than 50% in 25 states and not below 30% in any state. By the year 2009, 1 in 4 adults is predicted to have severe obesity (34.5%, 95% CI, 33.9% to 35.1), and the prevalence will be higher than 25% in 20 states. We predict that, nationally, severe obesity is likely to become the most common BMI category among women (37.4%, 95% CI, 36.3% to 38.4), non-Hispanic black adults (34.7%, 95% CI, 32.9% to 35.6), and low-income adults (37.8%, 95% CI, 36.2% to 39.0).

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 National Heart, Lung, and Blood Institute.)
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).

Centers for Medicare & Medicaid Services, 2018
American Heart Association, Heart Disease and Stroke Statistics, 2018
The Milken Institute, America’s Obesity Crisis, 2018
Burden of Diseases, Injuries, and Risk Factors Among US States

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

OBJECTIVES
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.

METHODS
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 (YLL) due to premature mortality, years lived with disability (YLD), and disability-adjusted life-years (DALY) for 313 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 74.5 to 74.1 per 100,000 persons to 73.8 to 74.7, while DALYs decreased from 43.8 to 42.9. 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 lower back pain, and the third leading cause in 2016 was chronic obstructive pulmonary disease. Opioid use disorders were the 11th leading cause of DALYs in 1990 but the 9th leading cause in 2016, representing a 54.5% (95% UI, 42.9% to 69.4%) change. In 2016, each of the following 8 risks individually accounted for more than 3% of risk-attributable DALYs: tobacco consumption, high body mass index (BMI), poor diet, alcohol and drug use, high fasting plasma glucose, high blood pressure, and high body mass index (BMI). Tobacco use, 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 (31 states), or alcohol and drug use (8 states).

CONCLUSIONS AND RELEVANCE
There are wide differences in the burden of diseases 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.

Figure 3. Number of Deaths and Percentage of Disability-Adjusted Life-Years Related to the 17 Leading Risk Factors in the United States, 2016

Table 3. Risk Factors as a Percentage of Disability-Adjusted Life-Years

Risk Factors
- Tobacco use
- High body mass index
- Poor diet
- Alcohol and drug use
- High fasting plasma glucose
- High blood pressure
- Atherosclerotic cardiovascular disease
- Diabetes, type 2
- Other chronic lower respiratory disease
- Other chronic diseases

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

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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
“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...
A Window Opening?
Our protein supply chain needs urgent attention.

- **Plant-Based Diet**: Plant proteins -50% Environmental impact
- **Upcycling of Waste**: Insects 70% Nutrient recycling from waste
- **New Aquatic Sources**: Algae 6x More protein per hectare
- **Animal Free Protein**: Animal-free -50% Carbon footprint

**Additional benefits**:
- Reduce CO₂ footprint of meat & reduce AMR
- Create viable meat alternatives (taste, texture, nutrition, cost)
- Produce viable dairy alternatives
- Change our diets

Source: Ian Roberts, Chief Technology Officer, Buhler Group; Buhler GO!2020; 06/16/20;
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.
Impossible Burger ingredient keeps F.D.A. safety status

Photo: Impossible Foods, Inc.
12.18.2019

By
Jeff Gelski (author: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

https://www.foodbusinessnews.net/articles/10797/impossible-burger-ingredient-keeps-fda-safety-status
What is “cultivated meat”?

The Myth of Cultured Meat: A Review

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 notorious 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

INTRODUCTION: CONTEXT OF ANIMAL FARMING TODAY

The global population, 7.5 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 China, India, and Russia (1). These populations belonging more middle-class, they are looking for more luxurious products, such as meat or other animal products (e.g., cheese, dairy products).
Secretary Perdue Issues USDA Statement on Plant Breeding Innovation

(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.

#

USDA is an equal opportunity provider, employer and lender;
Dr. Dan Voytas
Chief Science Officer
Calyst, Inc.
6500 Country Road D West
Suite 8
Minneapolis, MN 55112

RE: Biotechnology Notification File No. BNF 000164

Dear Dr. Voytas:

This letter addresses Calyst 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 Calyst 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 gene FAD2-α and FAD2-β. 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, Calyst submitted to FDA a summary of its safety and nutritional assessment of FAD2KO soybean, which FDA received on November 14, 2017. Calyst submitted additional information, which FDA received on August 30, 2018. These communications informed FDA of the steps taken by Calyst 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 Calyst has conducted, it is our understanding that Calyst has concluded that human food derived from FAD2KO soybean is as safe as high oleic soybean-derived human food currently on the market. Calyst 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. Calyst anticipates that meal derived from FAD2KO soybean is the only material from the new soybean variety that would be used in animal food and Calyst 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 Calyst'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.

* 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 Calyst 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 Calyst'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/foodinventory.

Sincerely,

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

Digitally signed by
Dennis M. Keefe, Ph.D
Date: 2019.02.20
10:25:24 -05'00'
Red and Processed Meat Consumption and Risk for All-Cause Mortality and Cardiometabolic Outcomes

A Systematic Review and Meta-analysis of Cohort Studies

Dino Zarrouk, MSc, Mi Ah Han, MD, PhD; Gordon H. Guyenet, MD, MSc; Robin W.H. Verschoor, PhD; Regina Sti Eib, PhD; Kevin Cheung, MD, MSc; Eskin Miles, MSc; Max Zeeder, MSc; Jannes J. Bartolome, MSc; Galvão Valls, MSc; Javier J. Sánchez-Villegas, MSc, PhD; Martínez-Bouso, MSc, PhD; Constanza M. Álvarez-Espinosa, MD; Fabio Alcain-Acosta, MD; Steven E. Hanna, PhD; and Bradley C. Johnson, 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: MEDLINE (Epub), Cochrane Central Register of Controlled Trials (Wiley), Web of Science (Clarivate Analytics), CINHAL (EBSCO), and ProQuest from inception until July 2019 and MEDLINE from inception until April 2019, without language restrictions, as well as bibliographies of included articles.

Study Selection: Cohort studies with at least 1000 participants that reported an association between unprocessed red or processed meat intake and all-cause mortality, cardiometabolic outcomes, quality of life, and satisfaction with diet among adults.

Data Synthesis: Of 21 articles reporting on 16 cohorts with more than 6 million participants, none addressed quality of life or satisfaction with diet. Low-quality 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. A reduction in processed meat intake of 3 servings per week was associated with a very small reduction in risk for all-cause mortality, cardiovascular mortality, stroke, MI, and type 2 diabetes.

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

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

Primary Funding Source: None

Provenance: Original research

Accepted May 6, 2019

This article was first published as a Research Letter in Annals of Internal Medicine on February 21, 2019. T he authors declared no con flict of interest. This issue was published online first May 6, 2019.

As part of NutRECC (Nutritional Recommendations andaccessible 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 in the context of chronic disease prevention. The guidelines were derived from systematic reviews of scientific evidence for associations between red and processed meat consumption and all-cause mortality, cardiovascular outcomes, quality of life, and satisfaction with diet among adults.

Methodological limitations in previous reviews included failure to address risk of bias of primary studies (for example, references 2 and 3), lack of evaluation of certainty of evidence (for example, references 2 to 6), and failure to consider the magnitude of observed effects (for example, references 2 to 4). These limitations may have affected the credibility of recommendations issued by governments and authoritative organizations regarding red and processed meats.

See also:
Revised articles: 711, 721, 732, 742, 756
Editorial comment: 767

Supplement

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

Dino Zarrouk,1,2,4,9 Matthew C. cilento3,4,2,9

1Johannes Gutenberg University Mainz, Mainz, Germany; 2Bayerische Landesanstalt für Gesundheit, Land Baden-Württemberg, Stuttgart, Germany; 3Health Maintenance Organization, Bethesda, MD; 4Department of Nutritional Sciences, University of Saskatchewan, Saskatoon, Canada

Consumption of red meat, lean and processed meats, leads to increased oxidative stress, inflammation, and chronic diseases. These effects can lead to increased oxidative stress, inflammation, and chronic diseases. These effects can lead to reduced cognitive function, increased risk of chronic diseases, and increased risk of cancer. The link between red and processed meats and chronic diseases remains unclear. However, a growing body of evidence suggests that replacing red and processed meats with plant-based protein sources (including beans, lentils, and legumes) may provide a healthier diet.

Conclusion: The evidence linking red and processed meats to increased risk of chronic diseases remains unclear. However, a growing body of evidence suggests that replacing red and processed meats with plant-based protein sources may provide a healthier diet.

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3Department of Epidemiology & Preventive Medicine, University of Pennsylvania, Philadelphia, PA
4Department of Epidemiology & Preventive Medicine, University of California, San Francisco, CA

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Department of Agricultural Economics, University of California, Davis, CA


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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

<table>
<thead>
<tr>
<th>Healthy and sustainable diets</th>
<th>Metrics</th>
<th>Key concepts</th>
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</thead>
<tbody>
<tr>
<td>Nutrient-rich</td>
<td>Nutrient profiling models</td>
<td>(Re)formulation of product portfolios requires data on nutrient composition and health outcomes. Plant proteins, bioactives, dietary ingredients.</td>
</tr>
<tr>
<td>Affordable</td>
<td>Nutrition economics</td>
<td>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.</td>
</tr>
<tr>
<td>Accessible</td>
<td>Physical/economic access</td>
<td>Is it food deserts or economic access to foods? Transportation, delivery, remote access</td>
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<tr>
<td>Appealing</td>
<td>Satisfaction, well-being</td>
<td>Foods have a social value, support cultural and social identity, cooking at home will be transformative.</td>
</tr>
<tr>
<td>Planet friendly</td>
<td>Energy, water, land use, biodiversity</td>
<td>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.</td>
</tr>
</tbody>
</table>

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

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

Kevin Conner1, *, John Combs, Adam Drewnowski2,3, Polly Erickson4, Tim Griffee5, and Jill Nicholls6

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5 Nutrition, Agriculture, and Sustainable Food Systems, Gerald Leroy, and Dorothy R. Frieden School of Nutrition Science and Policy, Tulane University, Boston, MA 02111, USA; jadile@ilri.org
6 Environmental Change Institute, University of Oxford, Oxford OX1 3QZ, UK; john.combs@oxford.ox.ac.uk

Received: 14 March 2020; Accepted: 18 May 2020; Published: 20 May 2020

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 social and economic 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 held to define the social and economic domains of sustainability in terms 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) refine 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

<table>
<thead>
<tr>
<th>Risk of bias</th>
<th>Strong</th>
<th>Moderate</th>
<th>Limited</th>
<th>Grade Not Assignable</th>
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<tbody>
<tr>
<td>Across the body of evidence, there is a <strong>strong</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.</td>
<td>Across the body of evidence, there is a <strong>moderate</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.</td>
<td>Across the body of evidence, there is a <strong>limited</strong> 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.</td>
<td><strong>A grade is not assignable</strong> for this element because it cannot be adequately assessed.</td>
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<td>The body of evidence demonstrates findings with <strong>strong</strong> consistency in direction and magnitude of effect; or, any inconsistencies in findings can be explained by methodological differences.</td>
<td>The body of evidence demonstrates findings with <strong>moderate</strong> consistency in direction and magnitude of effect; some of the inconsistencies in findings can be explained by methodological differences.</td>
<td>The body of evidence demonstrates findings with <strong>limited</strong> consistency in direction and magnitude of effect; few of the inconsistencies in findings can be explained by methodological differences.</td>
<td><strong>A grade is not assignable</strong> for this element because it cannot be adequately assessed.</td>
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<tr>
<td>The body of evidence demonstrates <strong>strong</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.</td>
<td>The body of evidence demonstrates <strong>moderate</strong> directness, such that some studies are designed to directly examine the relationships among intervention/exposure, comparator, and outcomes of primary interest in the systematic review question.</td>
<td>The body of evidence demonstrates <strong>limited</strong> directness, such that few studies are designed to directly examine the relationships among intervention/exposure, comparator, and outcomes of primary interest in the systematic review question.</td>
<td><strong>A grade is not assignable</strong> for this element because it cannot be adequately assessed.</td>
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</tr>
<tr>
<td>The body of evidence demonstrates <strong>strong</strong> precision based on a substantial number of sufficiently-powered studies with a narrow assessment of variance.</td>
<td>The body of evidence demonstrates <strong>moderate</strong> precision based on an adequate number of sufficiently-powered studies with a narrow assessment of variance.</td>
<td>The body of evidence demonstrates <strong>limited</strong> precision based on an inadequate number of sufficiently-powered studies with a narrow assessment of variance.</td>
<td><strong>A grade is not assignable</strong> for this element because it cannot be adequately assessed.</td>
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</tr>
<tr>
<td>The body of evidence demonstrates <strong>strong</strong> generalizability to the U.S. population of interest with regard to: a) the participant characteristics b) the intervention/exposure and outcomes studied.</td>
<td>The body of evidence demonstrates <strong>moderate</strong> generalizability to the U.S. population of interest with regard to: a) the participant characteristics b) the intervention/exposure and outcomes studied.</td>
<td>The body of evidence demonstrates <strong>limited</strong> generalizability to the U.S. population of interest with regard to: a) the participant characteristics b) the intervention/exposure and outcomes studied.</td>
<td><strong>A grade is not assignable</strong> for this element because it cannot be adequately assessed.</td>
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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 affecting Americans, including obesity, diabetes, cancers, cardiovascular disease, dementia and neurodegenerative diseases, allergies and autoimmune diseases, sarcopenia and bone health, muscular 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).
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?

U.S. Scores Over Time

56 57 59 60 59 59

The Healthy Eating Index Score shows that Americans do not align their eating choices with the Dietary Guidelines. (on a scale from 0-100)

U.S. Scores by Age Group

61 52 52 58 64

Ages 2-5  Ages 6-11  Ages 12-17  Ages 18-64  Ages 65+

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

Part D Chapter 1: Current Intakes of Foods, Beverages, and Nutrients
2020 Dietary Guidelines Advisory Committee: Meeting 6
IT'S ABOUT KNOWING

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

- Culinary Experts
- Retailers
- Farmers
- Processors
- Individuals
- Health Professionals
- Researchers
- Government

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

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

Agriculture  Retail  Researchers & Educators  Healthcare Providers  Consumers  Policy Makers
Opportunity Areas for Greater Collaboration

- Ensuring Food Security
- Eliminating Food Waste
- Empowering Youth & Next Generation
“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

“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

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.”

I heard about it and want to know more

I never thought of it before, but want to know more

University Level Engagement for Next Gen Nutrition Professionals

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

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.

Charting a Path Forward for Nutrition Professionals

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

By developing knowledge and skills in sustainable food and water systems, RDNs and NDTRs can:

- Brief food systems knowledge to the many sites where they practice
- Critically interpret and translate findings from research on the multiple dimensions of sustainability
- Strengthen food systems policy initiatives from other sectors by identifying linkages to human nutrition and health

ENTRY POINTS that leverage the strengths of registered dietitian nutritionists (RDNs) and nutrition dietetics technicians, registered (NDTRs) to cultivate sustainable food and water systems:

1. Shape and deliver dietary guidance
2. Improve food and nutrition security and water security
3. Align food production and nutrition
4. Optimize supply chains and food environments
5. Reduce waste

Policy

 RDNs and NDTRs can advocate for and evaluate organizational and public policies, including:

- Curriculum and credentialing decisions related to sustainable food and water systems education and training
- Research priorities and budgets within organizational plans or legislative appropriations
- Decisions that affect the daily activities of practitioners in all settings, including funding of programs

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

<table>
<thead>
<tr>
<th></th>
<th>For profit, Corporate, Retail, Marketing &amp; Entrepreneur</th>
<th>Farmer/processor, Vet, Dairy Nutritionist</th>
<th>Health Professionals</th>
<th>RDNs</th>
<th>Extension, University</th>
<th>Director of Food Service</th>
<th>Hunger community professional</th>
<th>Government, Policy, NGO</th>
<th>Academic, Dietetic internship director</th>
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<tbody>
<tr>
<td>Agribusiness professional</td>
<td>0.54*</td>
<td>0.42</td>
<td>0.06</td>
<td>0.35</td>
<td>0.21</td>
<td>-0.12</td>
<td>-0.35</td>
<td>0.21</td>
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<td>0.11</td>
<td>0.39</td>
<td>0.44*</td>
<td>0.02</td>
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<td>University</td>
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<td>0.31</td>
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<tr>
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<td>0.66*</td>
<td>0.31</td>
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<tr>
<td>Hunger community professional</td>
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</tbody>
</table>

* indicates statistical significance at 95% confidence

**Color scale**

- 1.00 (Red) indicates strong overlap in interests across professional groups.
- 0.30 (Grey) indicates an average overlap.
- -1.00 (Green) indicates no overlap, or even disagreement, in interests across professional groups.
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

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.

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

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