Dairy's Role in Today's Global Nutrition Environment

Matthew Pikosky, PhD, RD

MI Dairy Industry Conference

May 16, 2019

NDC
NATIONAL DAIRY COUNCIL™

NATIONAL DAIRY COUNCIL™

Bringing to life the dairy community's shared vision of a healthy, happy, sustainable world, with science as our foundation

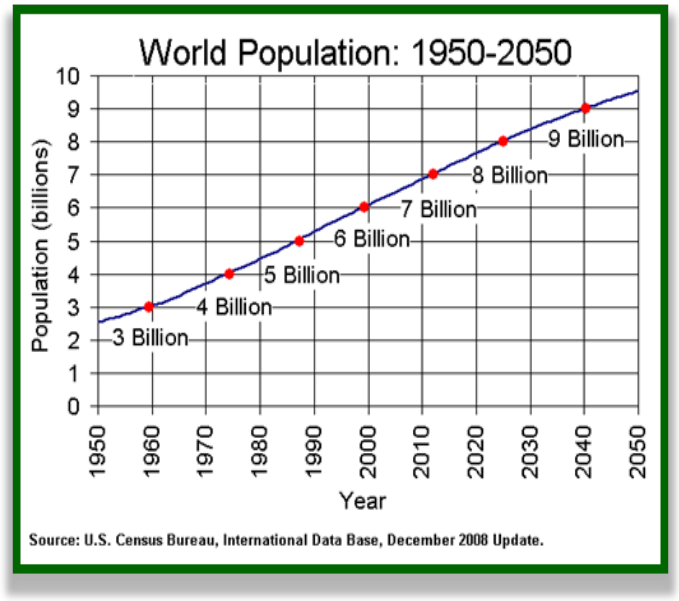
The U.S. Dairy Stewardship Commitment. http://commitment.usdairy.com/

Greatest Challenge of Our Generation:

Nourishing a Growing Global Population with Limited Natural Resources

Food production will need to increase by 70% to feed to world by 2050

Global middle class will triple by 2030



70% of the world population will live in cities by 2050

70% of suitable agricultural land is already in use

52% of world population could have severe water scarcity by 2050

2009, FAO's Director-General on How to Feed the World in 2050. Population and Development Review, 35: 837–839.

Malnutrition is in the crosshairs

The world faces a grave nutrition situation...

2 billion people lack key micronutrients like iron and vitamin A

155 million children are stunted

52 million children are wasted

2 billion adults are overweight or obese

41 million children are overweight

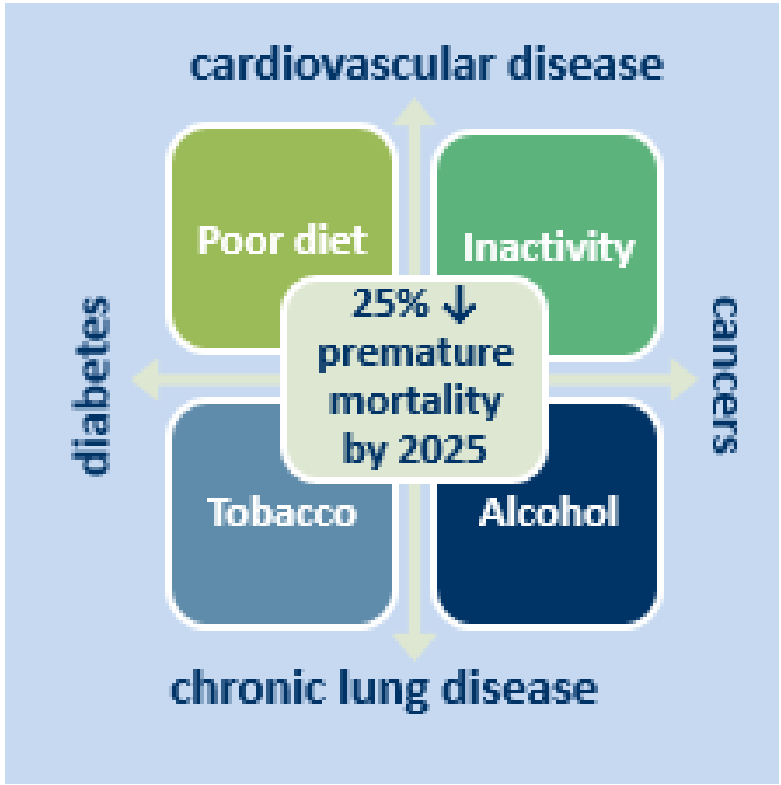
88% of countries face a serious burden of either two or three forms of malnutrition

And the world is off track to meet all global nutrition targets

The Global Nutrition Report http://www.sdg2advocacyhub.org/GNR2017

The rise of non-communicable diseases

Non-communicable diseases
are responsible for 3 out of 5 deaths worldwide




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
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
GOAL 2
END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE
SUSTAINABLE DEVELOPMENT GOALS
More at sustainabledevelopment.un.org/sdgsproposal
SUSTAINABLE DEVELOPMENT GOALS

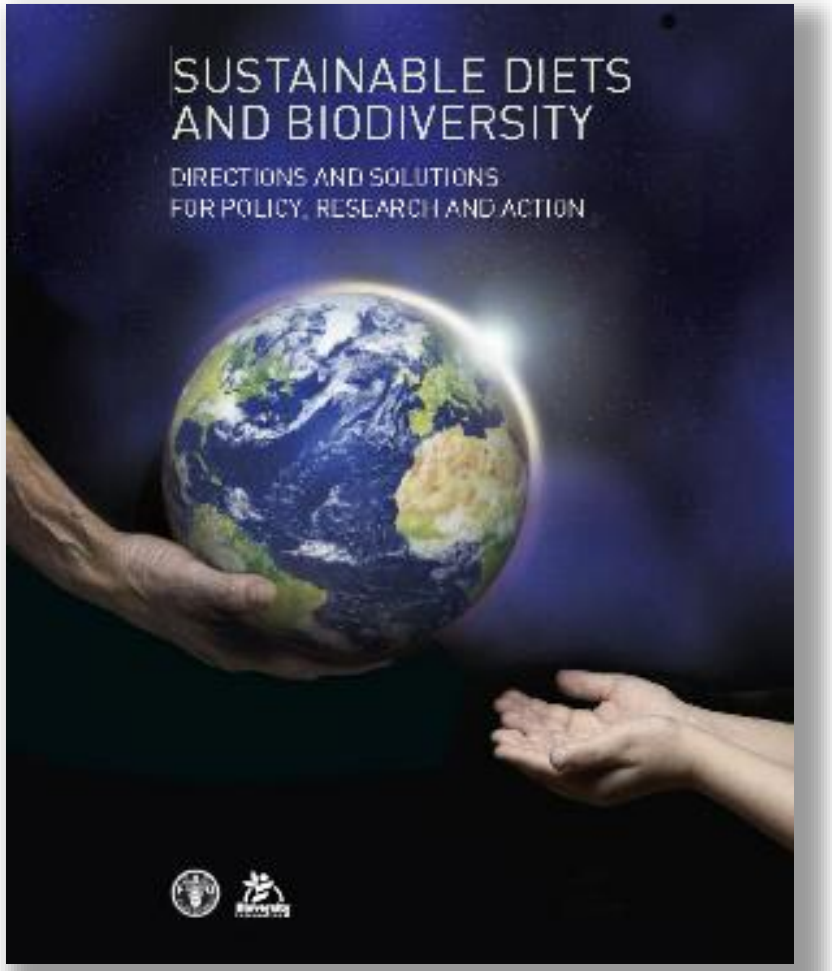
Sustainable diets as defined by FAO

"Sustainable Diets are those diets with low environmental impacts which

The ongoing science-based pursuit for solutions that provide affordable, accessible, nutrient-rich foods that can nourish the world's growing global population, while also protecting environmental resources.

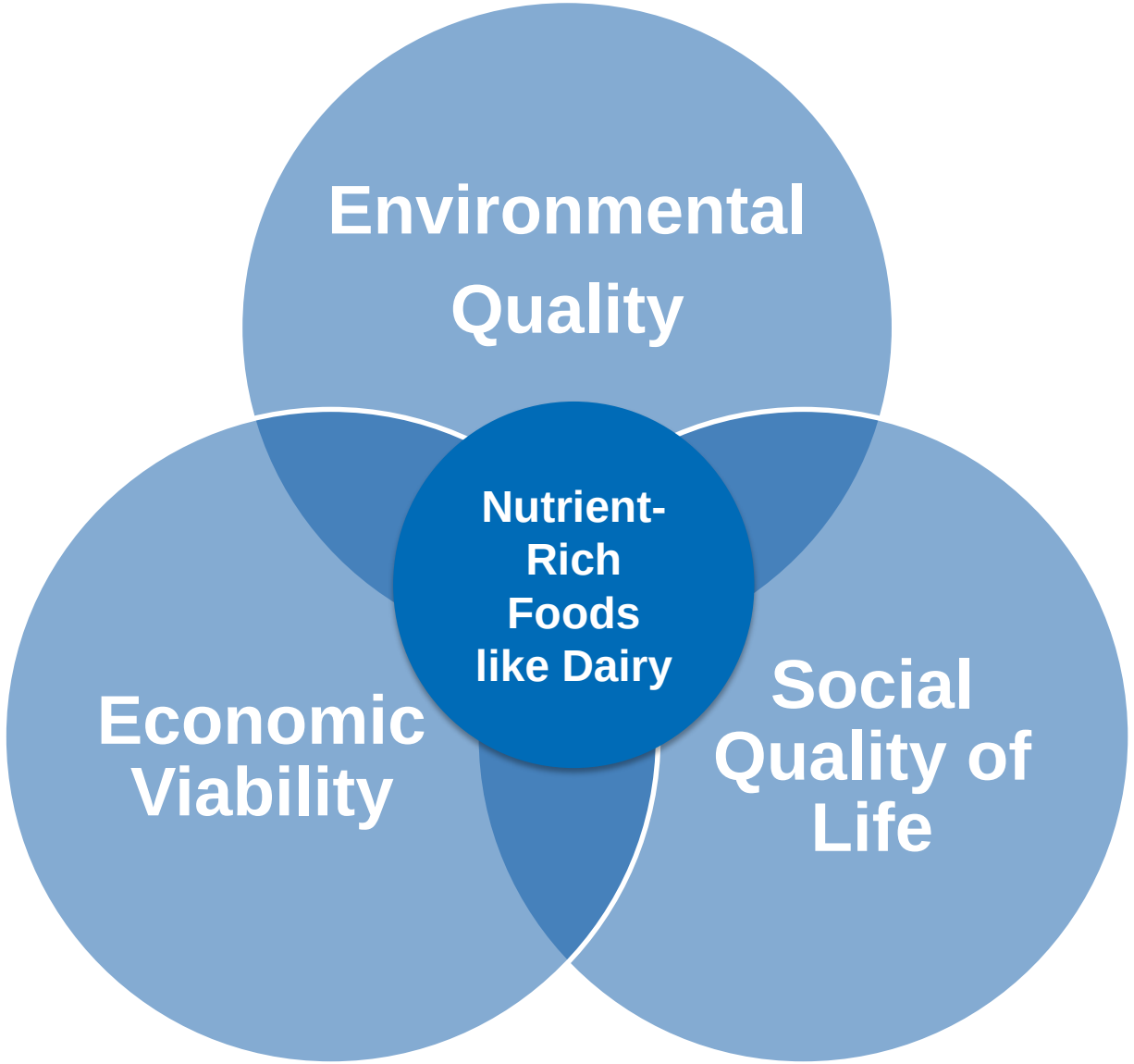
and healthy; while optimizing natural and human resources."

FAO and Biodiversity International 2012



Proceedings of the International Scientific Symposium, BIODIVERSITY AND SUSTAINABLE DIETS UNITED AGAINST HUNGER, 3–5 November 2010, FAO Headquarters, Rome

The dairy sector plays a critical role to help provide food security, environmental sustainability and economic prosperity worldwide



Social / Nutrition

Cheese*:
6 essential nutrients

Protein

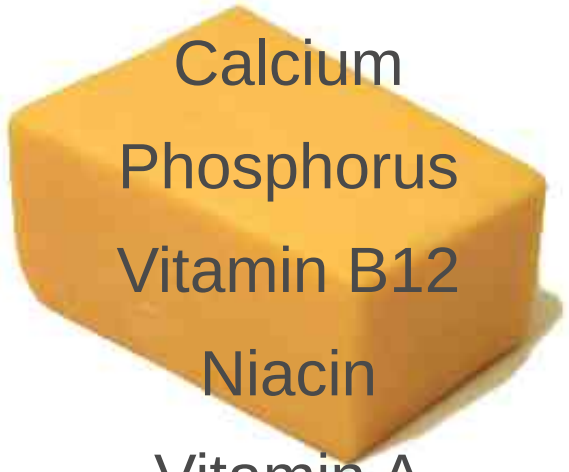
Calcium

Phosphorus

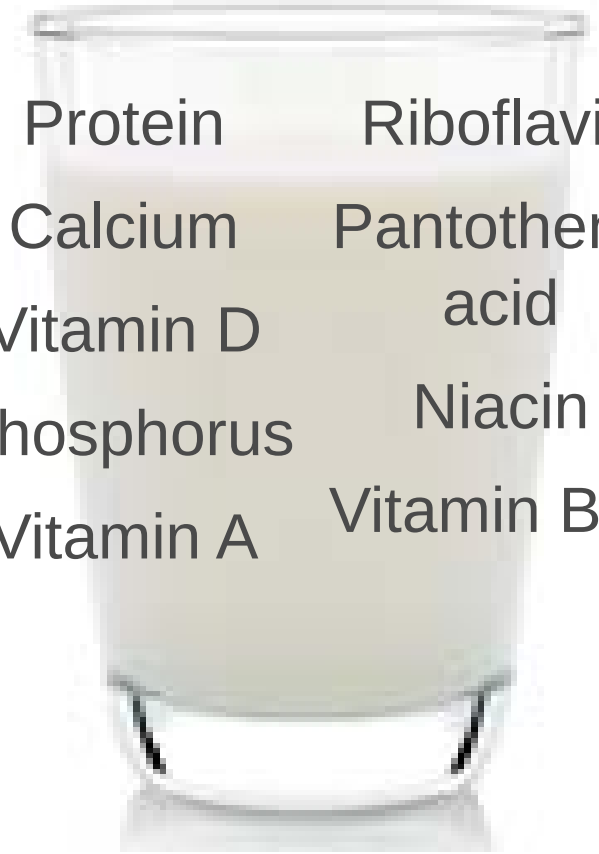
Vitamin B12

Niacin

Vitamin A



Milk:
9 essential nutrients



Protein

Calcium

Vitamin D

Phosphorus

Vitamin A

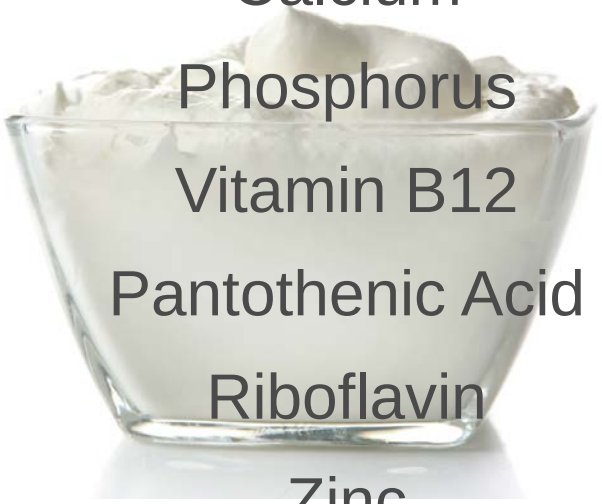
Riboflavin

Pantothenic acid

Niacin

Vitamin B12

Yogurt:
7 essential nutrients



Protein

Calcium

Phosphorus

Vitamin B12

Pantothenic Acid

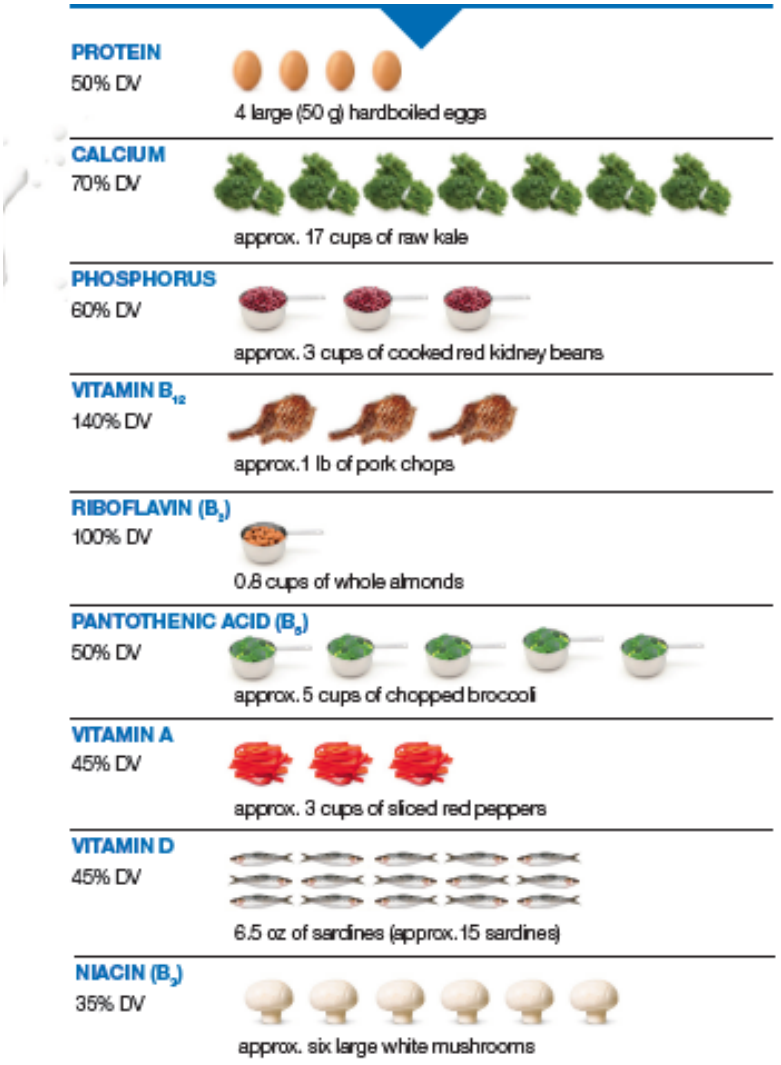
Riboflavin

Zinc

*Nutrients based on USDA Database for Cheddar #01009

3 Servings of Milk Deliver a Unique Nutrient Package

Three servings of milk provide the same level of nutrients found in these foods



"… the **amount** of many potential alternatives to provide sufficient calcium would provide **too many calories** and/or **be a large amount to consume daily**."

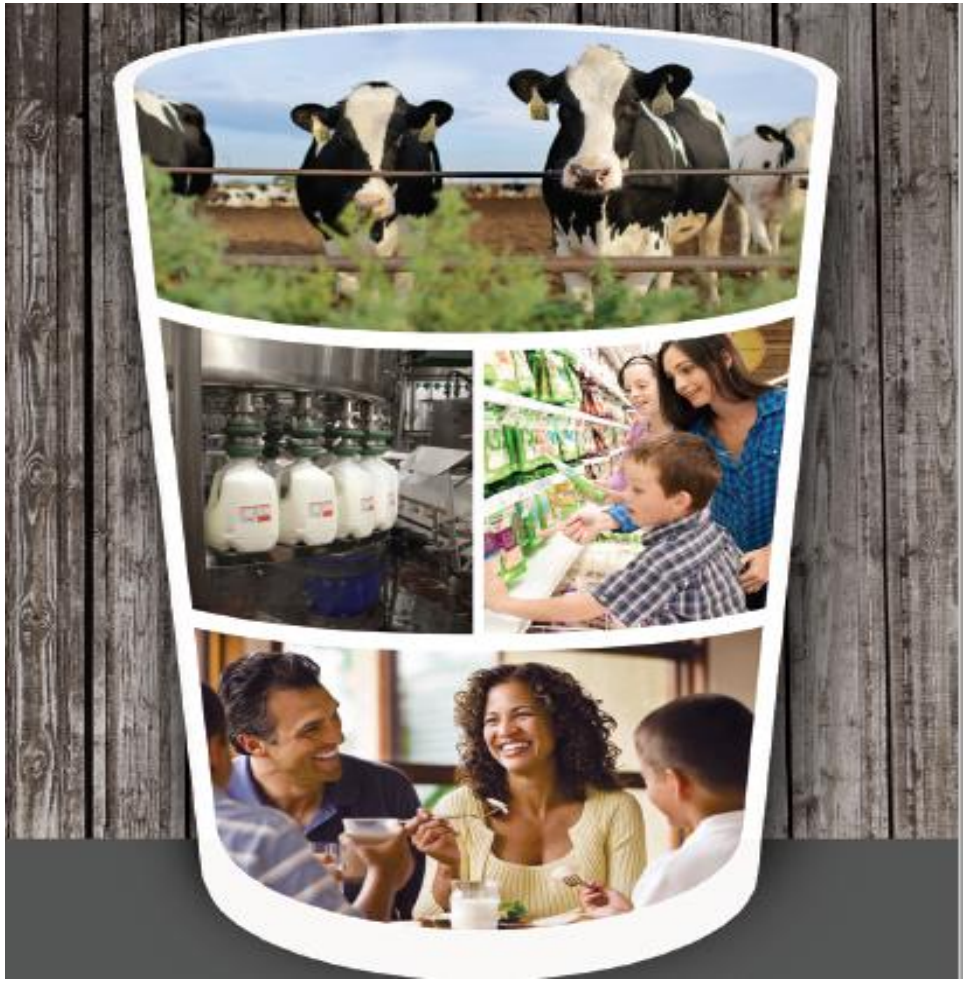
"…**bioavailability** of the calcium in vegetable products has not been addressed and **could pose a concern**."

2015 Dietary Guidelines Advisory Committee Report. Appendix E3.6

https://www.nationaldairycouncil.org/content/2018/three-servings-of-milk-deliver-a-unique-nutrient-package

Dairy Foods Contribute Essential Nutrients to Diets

56% Vitamin D
54% Calcium
29% Vitamin A
28% Phosphorus
27% Vitamin B12
24% Riboflavin
18% Protein
17% Zinc
14% Potassium



Data from NHANES 2011-2014 (n=15,829).
Citation:
National Dairy Council. NHANES 2011-2014. Data Source: Centers for Disease control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey Data. Hyattsville, MD: U.S. Department of Health and Human Services.http://www.cdc.gov/nchs/nhanes.htm.

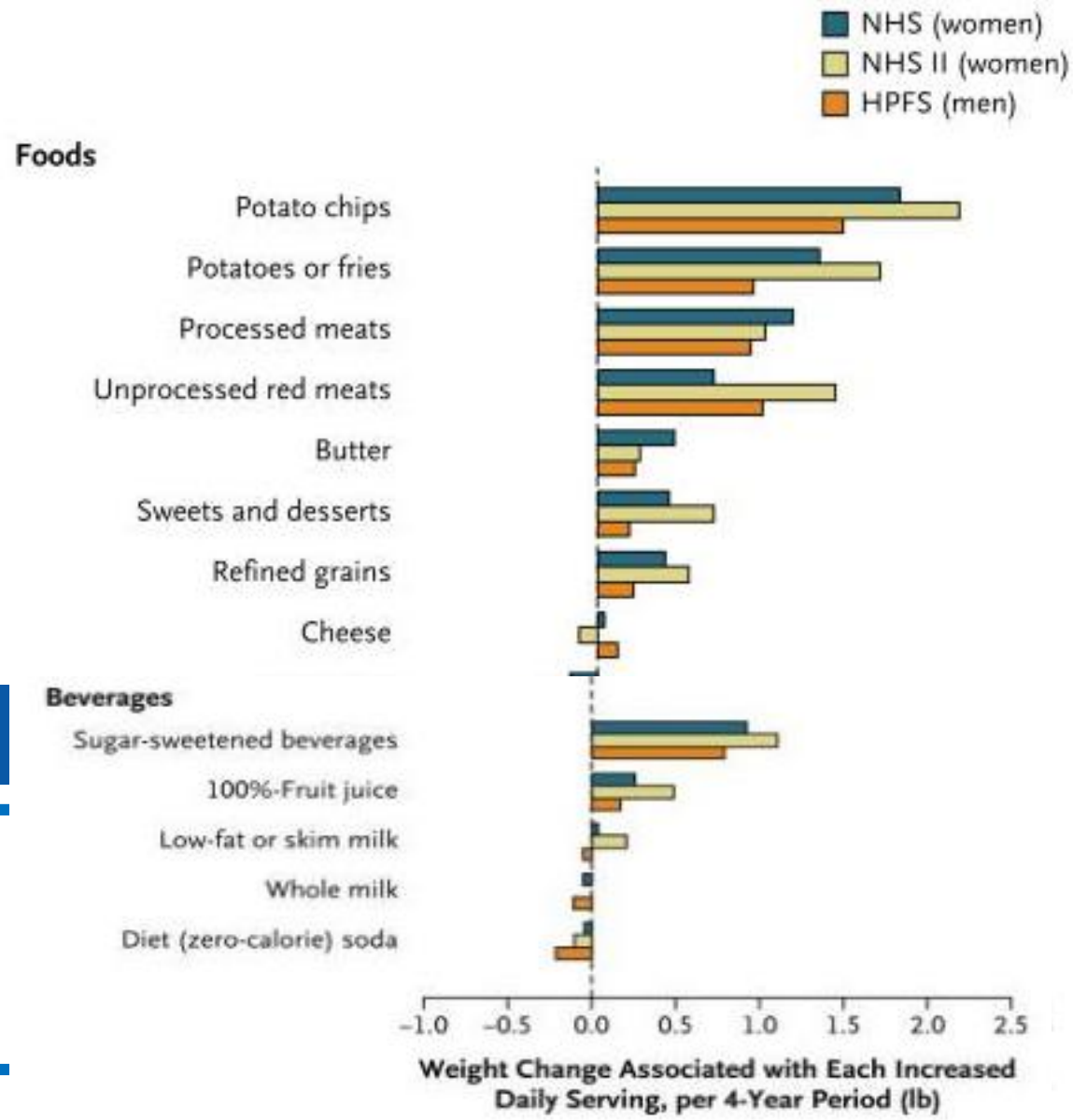
The NEW ENGLAND JOURNAL of MEDICINE

Changes in Diet and Lifestyle and Long-Term Weight Gain in Women and Men

Dariush Mozaffarian, M.D., Dr.P.H., Tao Hao, M.P.H., Eric B. Rimm, Sc.D., Walter C. Willett, M.D., Dr.P.H., and Frank B. Hu, M.D., Ph.D.

3 Cohort Studies (NHS I & II, HPFS)
>120,000 women and men

Each serving of yogurt/d was associated with -0.82 lb. weight change over a 4 year period

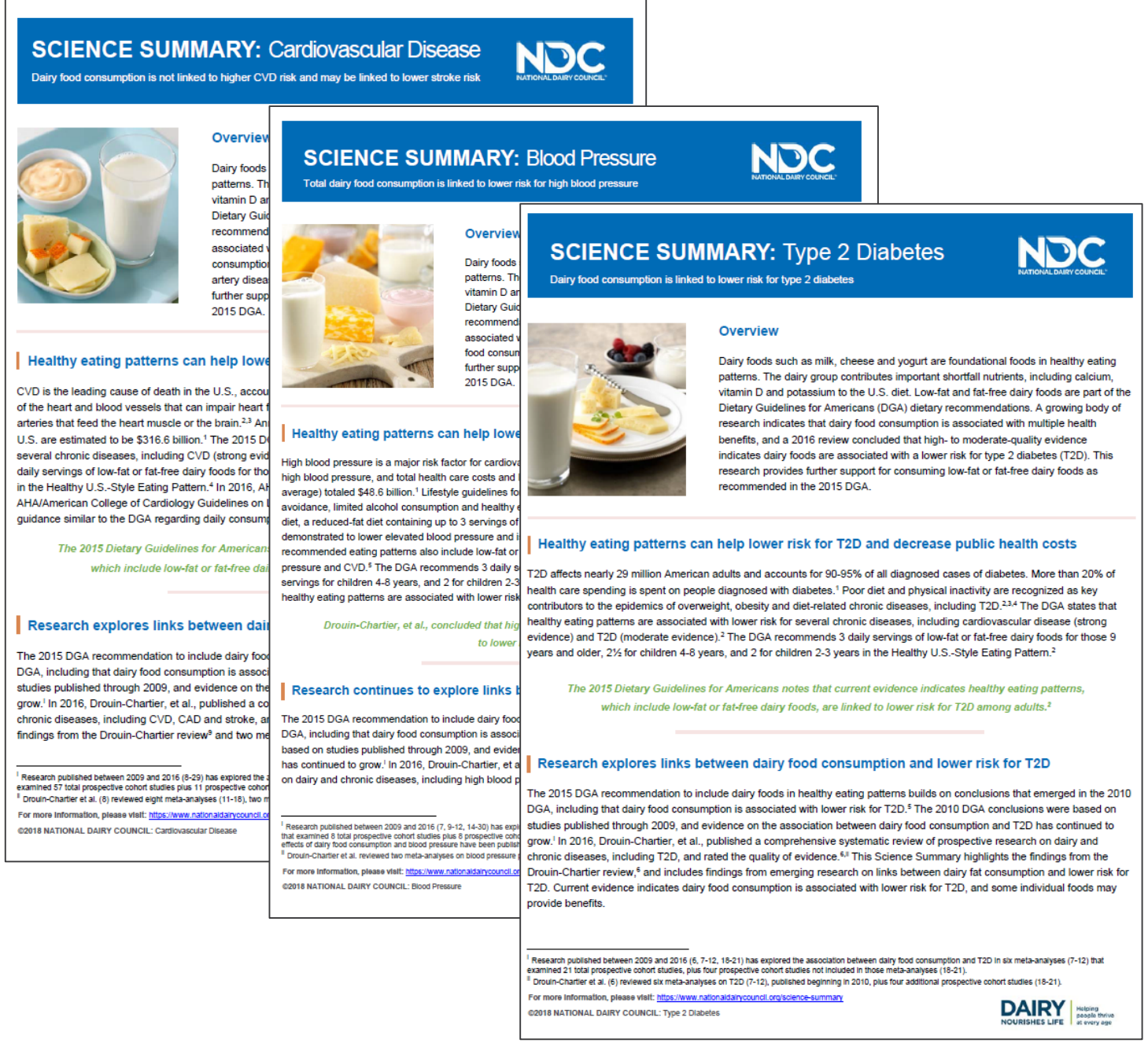


Mozaffarian D et al. *NEJM;* 2011. 364:2392-2404.

Preponderance of Evidence:

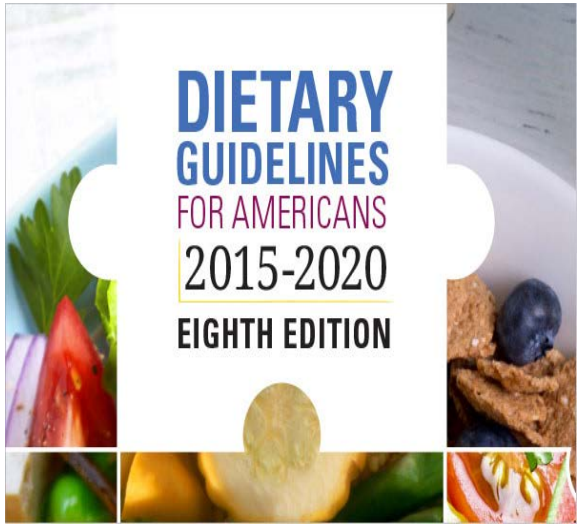
Dairy Food Consumption has a Neutral or Beneficial Association with Reduced Risk for Chronic Diseases

NDC Science Summary on Cardiovascular Disease, Blood Pressure and Type 2 Diabetes



2005, 2010, 2015* Dietary Guidelines Recommend 3 Daily Servings of Dairy Foods for Those ≥9 years

*3 servings for Americans 9 years an older in the Healthy U.S.-Style and Healthy Vegetarian Eating Patterns.



The 2015 DGA states that healthy eating patterns, including low-fat or fat-free dairy foods, are associated with reduced risk for several chronic diseases, including cardiovascular disease (strong evidence) and type 2 diabetes (moderate evidence). Research has also linked dairy intake to improved bone health, especially in children and adolescents.

Dietary Guidelines for Americans, 2015-2020

Environmental

In Only 70 Years, We've Reduced our Impact...

90% less land

65% less water

76% less manure

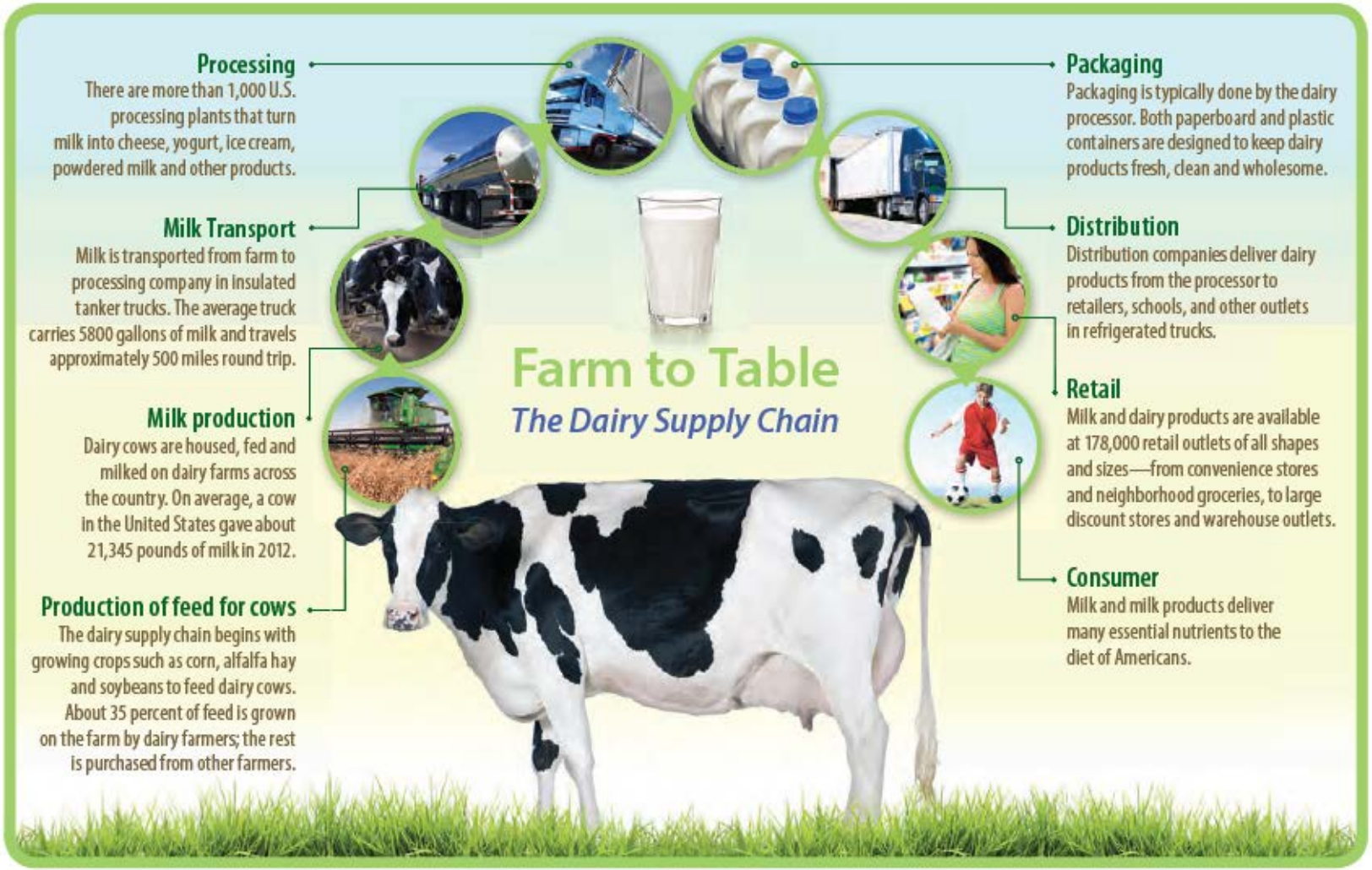
63% less GHG

The dairy community has a voluntary commitment to further reduce GHG 25% by 2020

US Dairy Stewardship Commitment

Capper J. Cady A. Bauman D. 2009. The environmental impact of dairy production; 1944 compared with 2007. Journal of Animal Science. 87:2160-2167

Dairy Life Cycle Assessment (LCA): Understanding dairy's impact from grass to glass



Dairy's environmental impact: Grounded in science

- Life cycle science establishes baseline environmental footprint for U.S. Dairy

- Peer-reviewed, published, and contributed to open-source National Agricultural Library

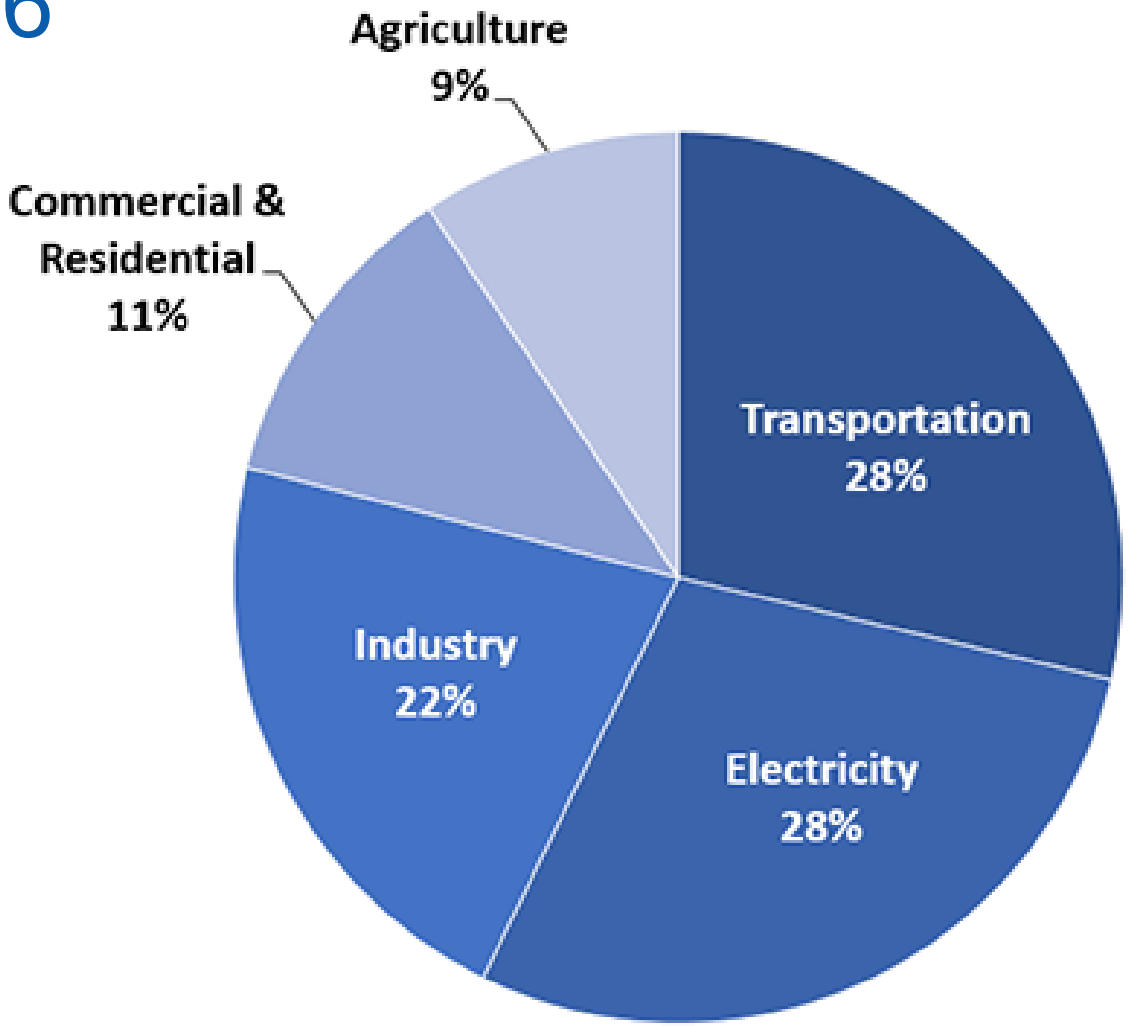
U.S. Dairy is:
- **2%** of U.S. GHG emissions
- **5.1%** total water withdrawal
- **3.7%** of total U.S. farmland

Dairy community has set a voluntary GHGe reduction goal of 25% by 2020

International Dairy Journal, Volume 31 Supplement 1 April 2013

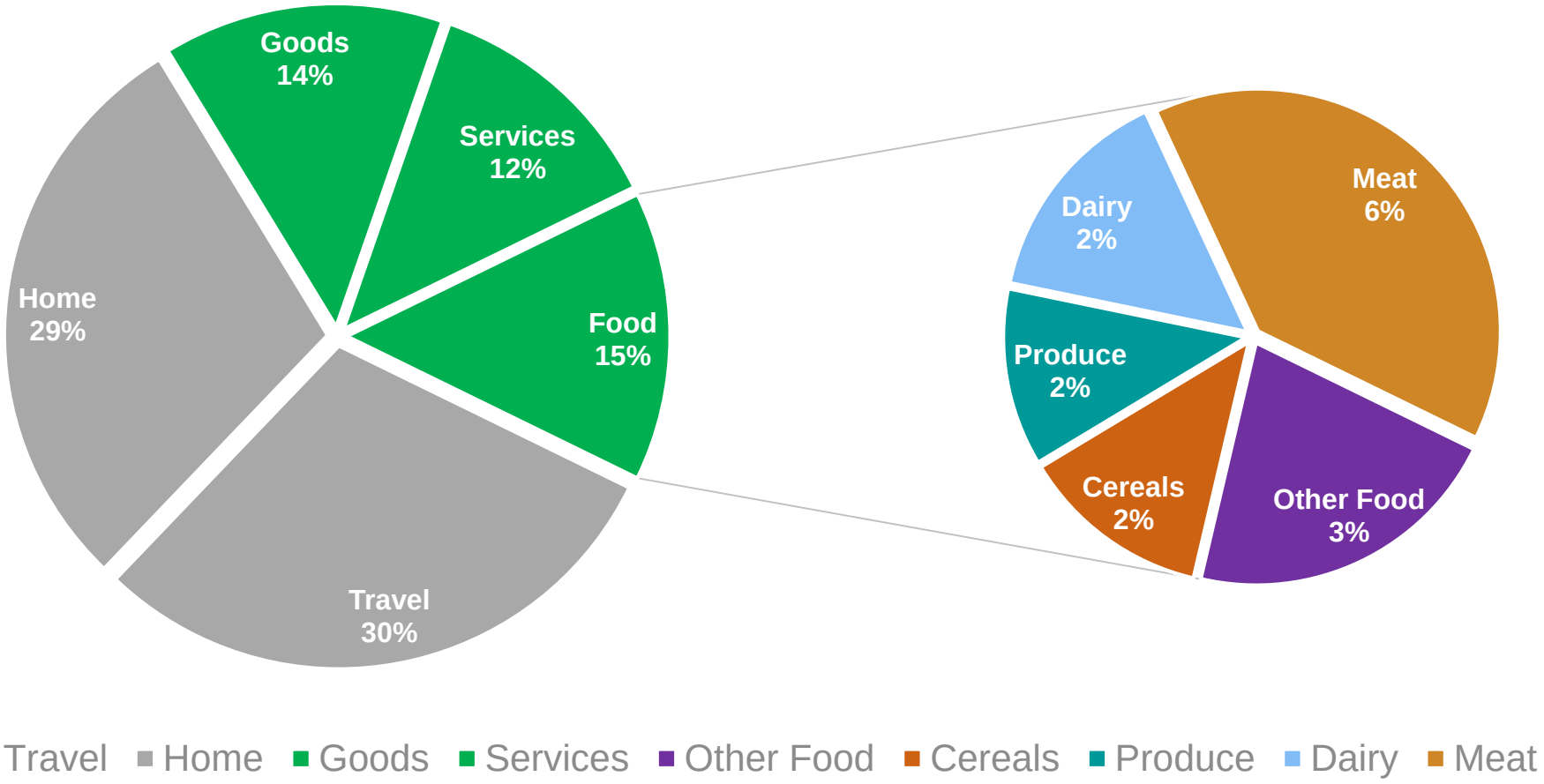
http://www.usdairy.com/sustainability/environmental-research

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2016



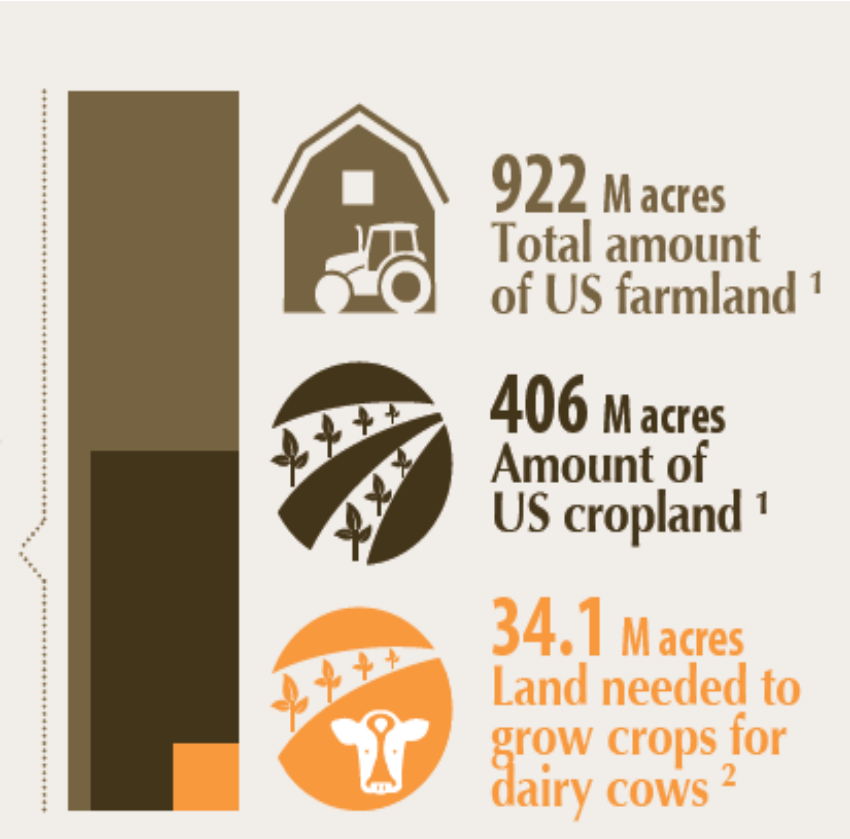
US Environmental Protection Agency (2018). US Inventory of Greenhouse Gas Emissions. https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

The Average U.S. Household Carbon Footprint



Christopher M. Jones and Daniel M. Kammen. Quantifying Carbon Footprint Reduction Opportunities for U.S. Households and Communities. *Environ. Sci. Technol.*, 2011, 45 (9), pp 4088–4095.

Dairy's land use is modest, particularly when the nutritional value of the food produced is considered

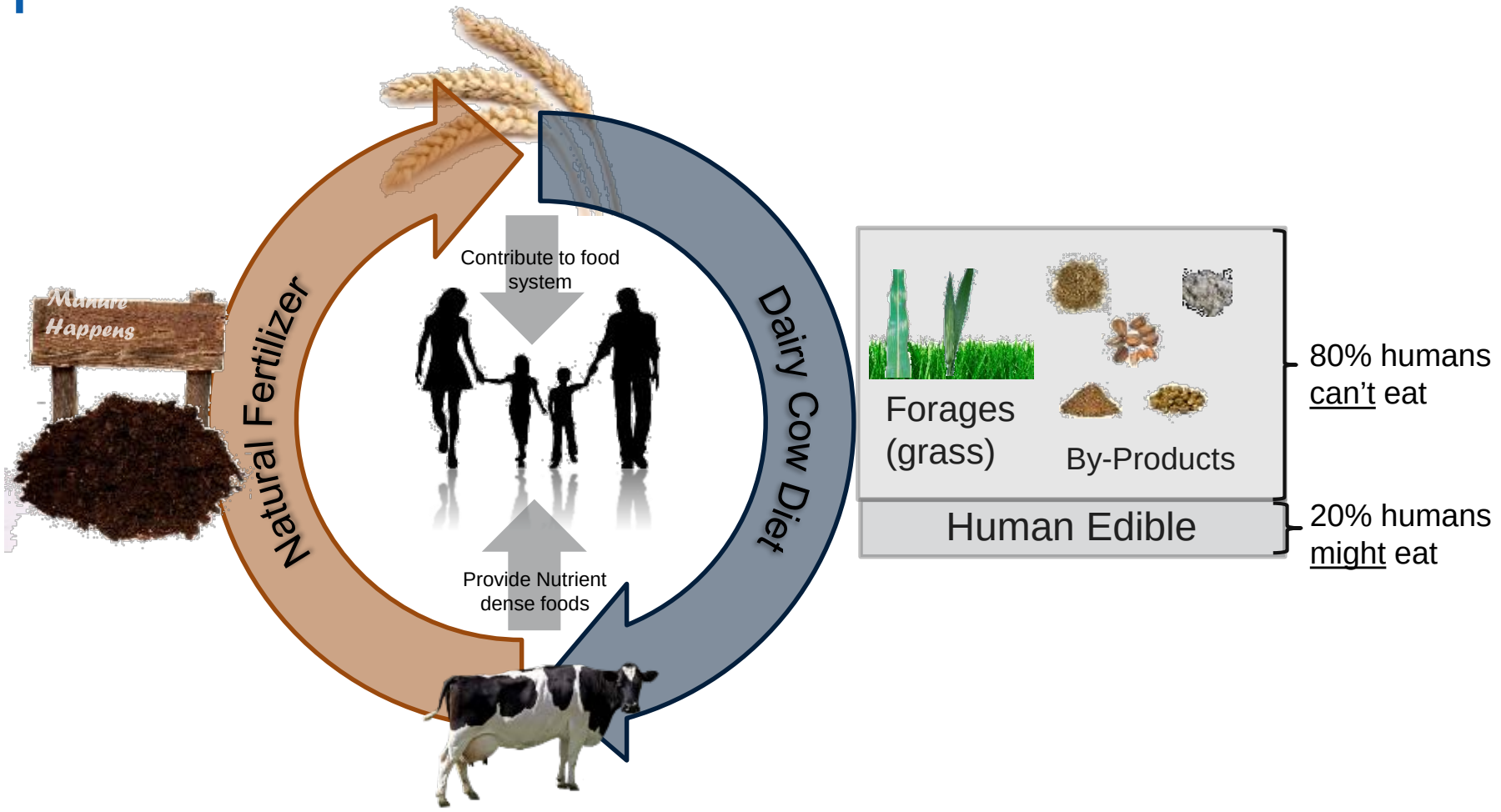


Dairy's daily contribution to the average American diet:

56% Vitamin D
54% Calcium
29% Vitamin A
28% Phosphorus
27% Vitamin B12
24% Riboflavin
18% Protein
17% Zinc
14% Potassium

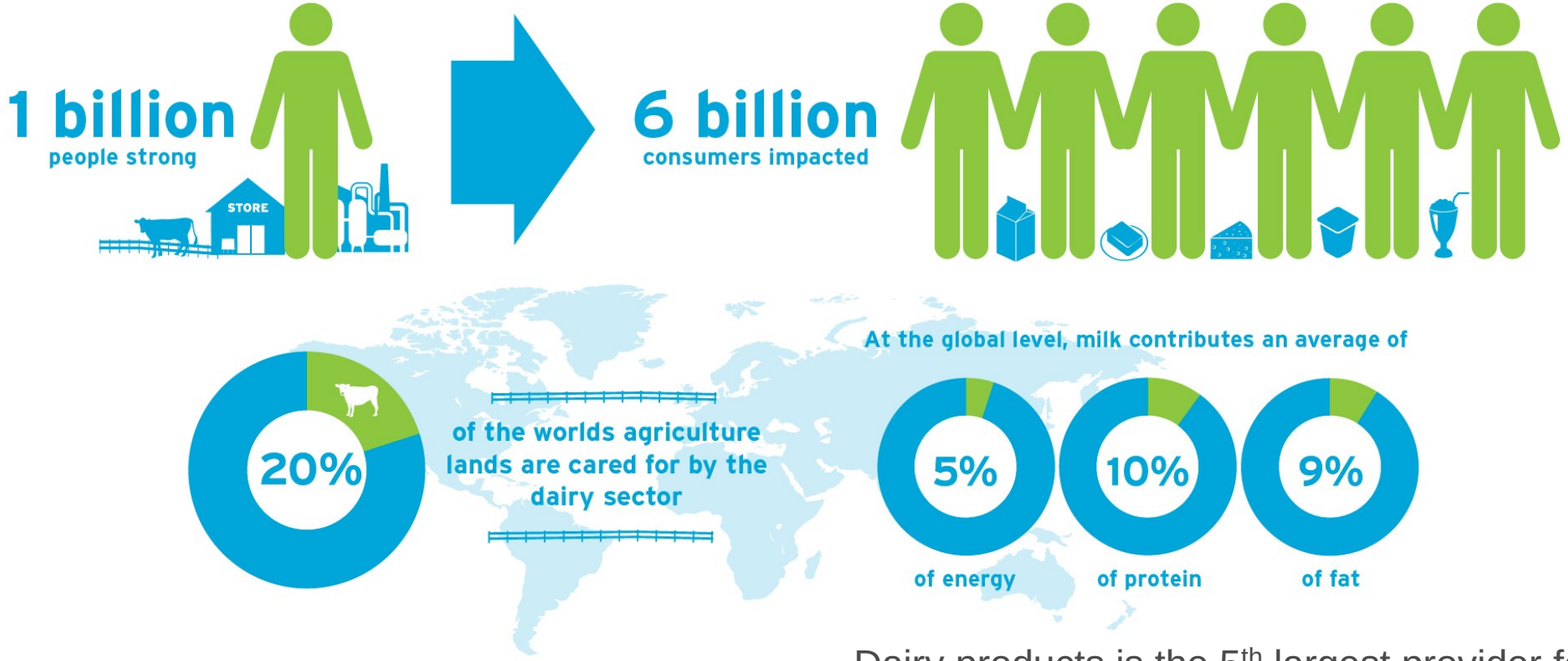
Henderson, A., Asselin, A., and Heller, M., et al., U.S. Fluid Milk Comprehensive LCA. University of Michigan &University of Arkansas, 2012
National Dairy Council. NHANES 2011-2014 - Table 1, Americans 2+ Years of Age (https://www.usdairy.com/science-and-research/dairys-role-in-the-diet)

Dairy cows contribute to the nutrient cycle of the food system



Economic

Global dairy is important contributor to economy and human wellbeing



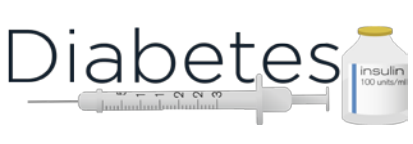
Dairy products is the 5th largest provider for energy, 3rd largest provider for protein and fat

Chronic disease is a major driver of health care costs

Obesity costs the US health care system $147 billion/year

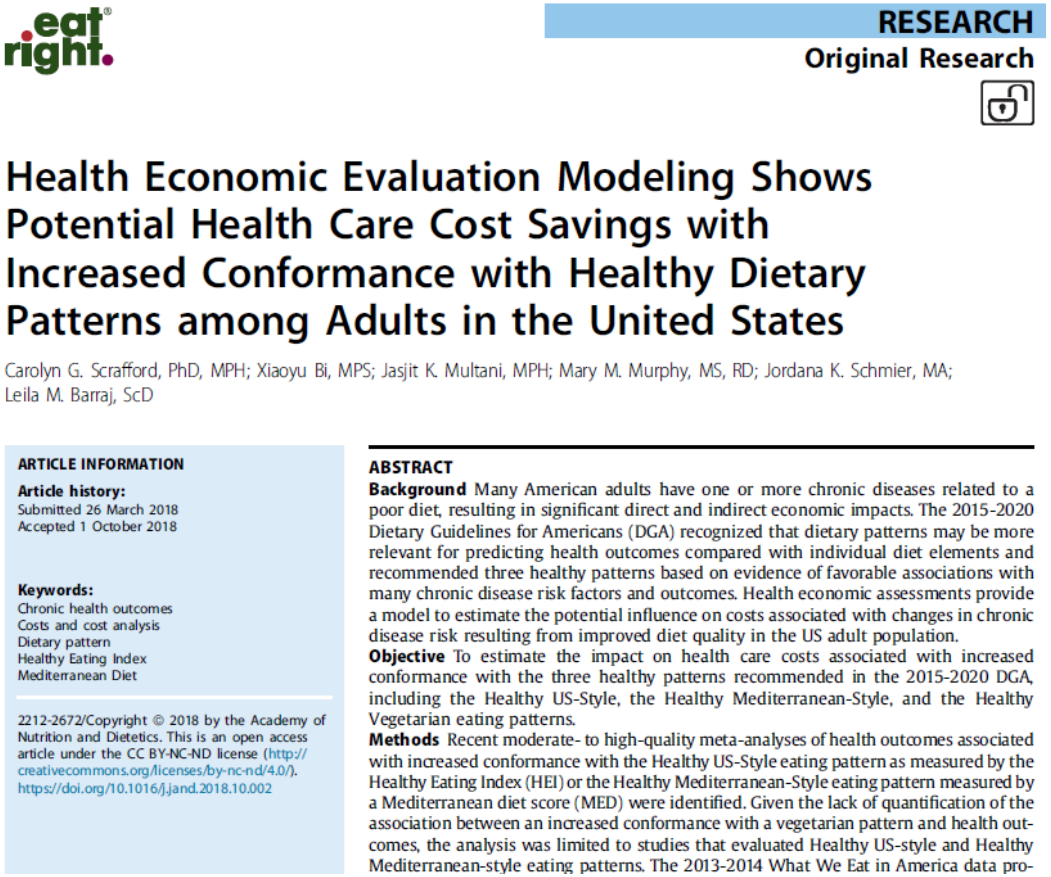
Heart disease and stroke cost our health care system $199 billion/year

The cost of cancer care is expected to reach ~ $174 billion by 2020



Diabetes costs the US health care system and employers $237 billion/year

Following healthy eating patterns is projected to save billions in healthcare costs.



RESEARCH
Original Research

Health Economic Evaluation Modeling Shows Potential Health Care Cost Savings with Increased Conformance with Healthy Dietary Patterns among Adults in the United States

Carolyn G. Scrafford, PhD, MPH; Xiaoyu Bi, MPS; Jasjit K. Multani, MPH; Mary M. Murphy, MS, RD; Jordana K. Schmier, MA; Leila M. Barraj, ScD

ARTICLE INFORMATION

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Costs and cost analysis
Dietary pattern
Healthy Eating Index
Mediterranean Diet

https://doi.org/10.1016/j.jand.2018.10.002

ABSTRACT

Background Many American adults have one or more chronic diseases related to a poor diet, resulting in significant direct and indirect economic impacts. The 2015-2020 Dietary Guidelines for Americans (DGA) recognized that dietary patterns may be more relevant for predicting health outcomes compared with individual diet elements and recommended three healthy patterns based on evidence of favorable associations with many chronic disease risk factors and outcomes. Health economic assessments provide a model to estimate the potential influence on costs associated with changes in chronic disease risk resulting from improved diet quality in the US adult population.

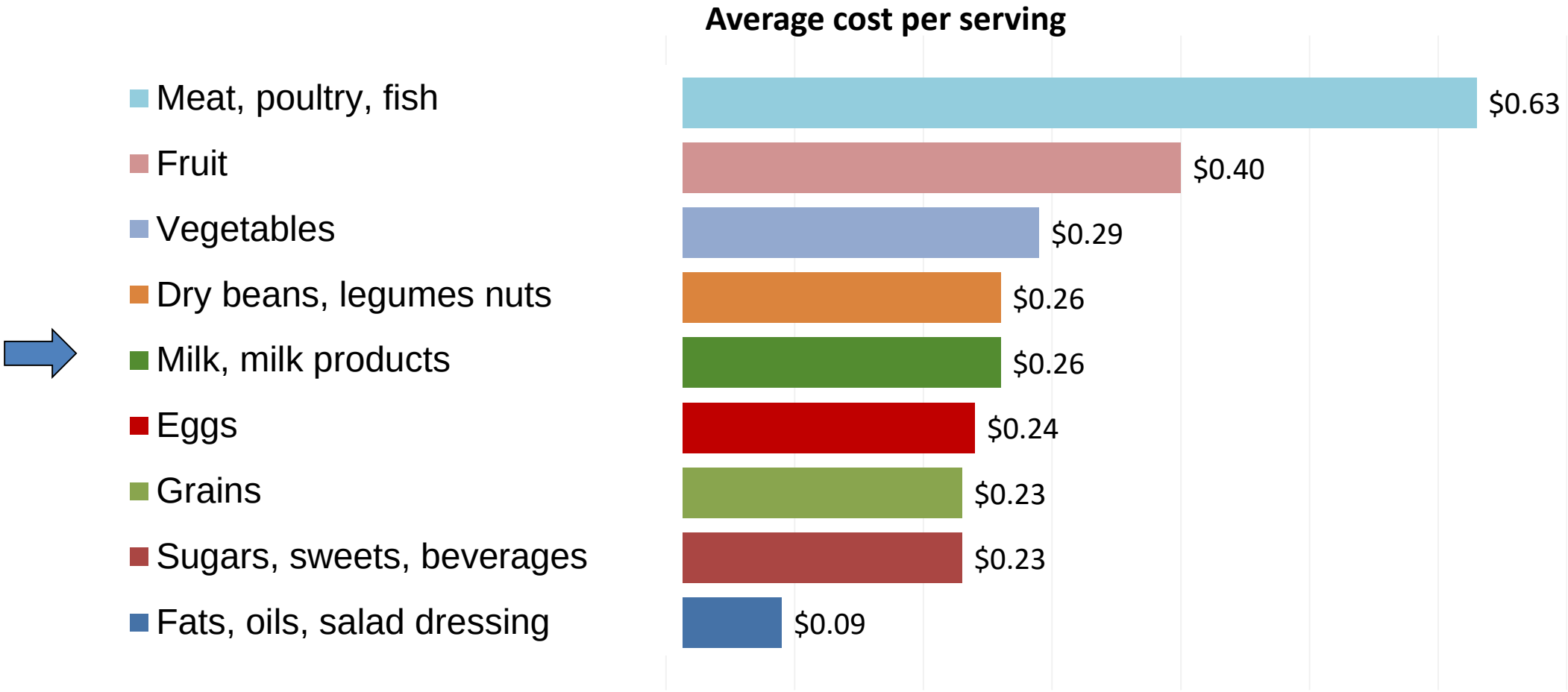
Objective To estimate the impact on health care costs associated with increased conformance with the three healthy patterns recommended in the 2015-2020 DGA, including the Healthy US-Style, the Healthy Mediterranean-Style, and the Healthy Vegetarian eating patterns.

Methods Recent moderate- to high-quality meta-analyses of health outcomes associated with increased conformance with the Healthy US-Style eating pattern as measured by the Healthy Eating Index (HEI) or the Healthy Mediterranean-Style eating pattern measured by a Mediterranean diet score (MED) were identified. Given the lack of quantification of the association between an increased conformance with a vegetarian pattern and health outcomes, the analysis was limited to studies that evaluated Healthy US-style and Healthy Mediterranean-style eating patterns. The 2013-2014 What We Eat in America data pro-

In this health economic evaluation, modeled increases in conformance with the Healthy US-Style and Healthy Mediterranean-Style eating patterns as measured by the Healthy Eating Index and the Mediterranean diet score, respectively, resulted in cost savings of more than $15 billion associated with the potential reduced risk of adverse chronic health outcomes including heart disease, cancer, type 2 diabetes, hip fractures, and Alzheimer's disease in the US adult population.

Scrafford et al., *J Acad Nutr Diet*. 2018

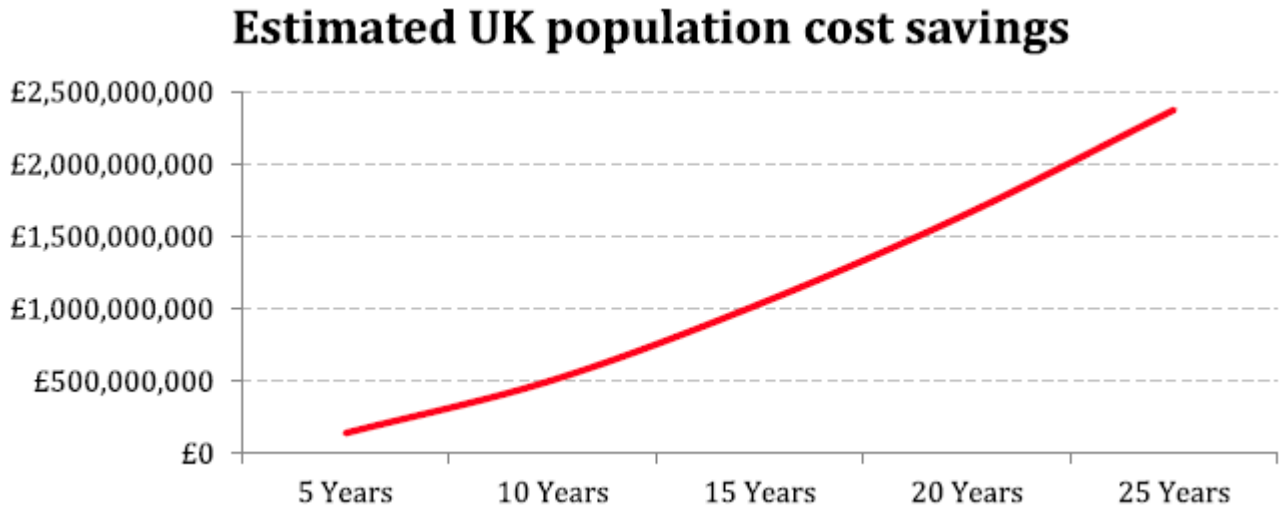
Each serving of dairy is affordable source of key nutrients



Values, 2001-2002 USDA CNPP database, Serving size, Reference Amount Customarily Consumed.

Drewnowski, 2010

Adequate dairy intake projected to reduce health care costs



Estimated cost of direct health care spending attributable to low dairy product consumption in 2010–2011 was AUD$2.0 billion [U.S. equivalent of $2.1 billion]

Doidge et al. J Nutr 2012: doe:10.3945/jn.111.154161

Increasing average yogurt consumption by 100g/d could result in 388,000 fewer people developing T2D, which could save the UK £2.3bn

Lenoir-Wijnkoop et al. *BMC Nutrition* (2016) 2:77

Bringing it all Together

Sustainable Diets are More than Carbon Footprint

LOW ENVIRONMENTAL IMPACTS

PROTECTIVE AND RESPECTFUL OF BIODIVERSITY AND ECOSYSTEMS

CONTRIBUTE TO FOOD AND NUTRITION SECURITY AND TO HEALTHY LIFE

CULTURALLY ACCEPTABLE

ACCESSIBLE

ECONOMICALLY FAIR AND AFFORDABLE

NUTRITIONALLY ADEQUATE

SAFE AND HEALTHY

OPTIMIZING NATURAL AND HUMAN RESOURCES

Removal of animal agriculture from US food system results in negligible differences in GHG emissions and a diet deficient in a number of essential nutrients.

A Modeling Study

Compared nutritional adequacy and greenhouse gas emissions from least-cost diets with and without animal-based foods

- 23% increase in total U.S. food supply, but mostly in the form of high-calorie crops like corn and soybeans.
- Need to eat more food to meet nutrient requirements due to the lower essential nutrient density in plant-based foods.
- Greater excess calories eaten by people.
- Deficiencies in the essential nutrients calcium, vitamins A and B12, and arachidonic, eicosapentaenoic (EPA) and docosahexaenoic (DHA) fatty acids.
- Plant-only diets unable to support the nutritional needs of the U.S. population in the long or short term without nutrient supplementation.
- A 2.6% reduction in total U.S. greenhouse gas emissions

White RR et al., Proc Natl Acad Sci USA, 2017

Summary / Conclusions

- The landscape with which food/diets are evaluated is evolving; Context of Sustainable Nutrition. Happening on a global scale.

- Dairy has a strong story to tell within the context of sustainable nutrition
  - o Social: Dairy foods provide essential nutrients, improve diet quality and reduce risk of chronic disease
  - o Environmental: U.S. dairy's environmental impact: 2% GHG, 5% water withdrawal, 4% land use
  - o Economic: Dairy industry fuels a global economy and improves health which reduced healthcare costs

  - The science in the area of sustainable nutrition continues to evolve; dairy is focused on continuous improvement and is well positioned to secure its value in this new dialogue now and in the future.

Thank you!

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