2015 DGAC: MEETING 3
March 14, 2014

Subcommittee 5:
Food Sustainability and Food Safety

Miriam Nelson
Steven Abrams
Thomas Brenna
Frank Hu

Barbara Millen

Scope: Food Safety

Systematically review the evidence for targeted food safety concerns at both the individual level and population scale.

Scope: Sustainability

To understand the link between food intake, sustainability and long-term food security. This will enable us to provide evidence to inform dietary guidance that supports a sustainable food system to ensure long-term food security.

Invited Experts and Consultants

Invited Experts

Individuals invited by the SC, usually on a one time basis, to provide their expertise to inform the SC's work. Invited experts do not participate in decisions at the SC level.

Consultant SC Members

Individuals sought by the SC to participate in SC discussions and decisions on an ongoing basis but are not members of the full DGAC. Like DGAC members, consultants complete training and have been reviewed and cleared through a formal process within the Federal government.

Invited Experts

- **Dr. Robert Brackett;** Vice President and Director, Institute for Food Safety and Health, Bedford Park, IL, Former FDA/CFSAN Director - Food Safety in the Context of Nutrition
- **Dr. Kate Clancy**; Food systems consultant, John Hopkins University School of Public Health - Dietary Guidelines and Sustainability
- **Dr. Kathleen Merrigan**; former USDA Deputy Secretary Food Systems & Sustainability - Food Sustainability
- **Dr. Andrew Zajac;** Division of Petition Review, Office of Food Additive Safety, FDA – Food Additives
- **Dr. Antonia Mattia;** Director, Division of Biotechnology & GRAS Notice Review, Office of Food Additive Safety, FDA - Caffeine
- **Dr. Amelia Arria;** Associate Professor, Department of Behavioral and Community Health and Director, Center on Young Adult Health and Development from the University of Maryland School of Public Health - Caffeine

Consultant SC Members

- **Dr. Michael Hamm;** C.S. Mott Professor of Sustainable Agriculture, Department of Resource Development, College of Agriculture and Natural Resources, Michigan State University
- **Dr. Timothy Griffin;** Director for the Agriculture and Environment Program and Associate Professor at the Friedman School of Nutrition Science and Policy at Tufts University

Key Topic Areas: Food Safety

- Update and bring forward findings from 2010 DGAC report related to individual food safety behavior
- Current, novel food safety issues
  - Usual coffee/caffeine consumption
  - High dose caffeine consumption
  - Aspartame

Topics: Food Safety

Update and bring forward findings from 2010 DGAC report related to individual food safety behavior (Part D. Section 8).

- Hand sanitation
- Cleaning refrigerators
- Separating food to minimize cross contamination
- Cooking and chilling food appropriately
- Avoiding risky foods
- Overall food safety behavior

Collaborating with other agencies to update and to reflect current guidance

Food Safety: Coffee/Caffeine

What is the relationship between usual coffee/caffeine consumption and health?

Overview of Systematic Reviews

Background

- Coffee is one of the most widely consumed beverages among Americans and represents a major source of caffeine
- The effects of coffee/caffeine consumption have not been evaluated by any prior Dietary Guidelines Advisory Committee
- The Committee reviewed systematic reviews and meta-analyses published since 1998 on coffee/caffeine and various health outcomes

Review of the Evidence

Total mortality
- 2 systematic reviews & meta-analyses

Cardiovascular disease (including stroke, coronary heart disease, atrial fibrillation, blood pressure, blood lipids)
- 15 systematic reviews & meta-analyses

Type 2 Diabetes
- 5 systematic reviews & meta-analyses

Cancer
- 22 systematic reviews & meta-analyses

Cognition and Parkinson's Disease
- 6 systematic reviews & meta-analyses

Pregnancy outcomes
- 2 systematic reviews & meta-analyses

Key Findings: Total mortality, CVD, and diabetes

- Moderate coffee consumption (1-6 cups/d) was inversely associated with total mortality, especially CVD mortality
- Moderate coffee consumption was inversely associated with CVD risk; lowest risk at 3-5 cups/d
  - No evidence of an association between long-term coffee consumption and increased BP; unfiltered but not filtered coffee increased blood lipids
- Coffee consumption was inversely associated with T2D risk in a dose-response manner (7% decrease for 1 cup/d)
  - Regular coffee and de-caffeinated coffee confered similar benefits
  - Ingestion of caffeine 200-500 mg acutely increased blood sugar among diabetic patients.

Key Findings: Cancer

- Coffee consumption was associated with a significantly lower risk of liver cancer and endometrial cancer
- A weak inverse association was observed for postmenopausal breast cancer, prostate cancer, pancreatic cancer, and colorectal cancer
- No association was observed for ovarian cancer.
- Confounding by smoking was observed for the association between coffee intake and lung cancer and bladder cancer

Caffeine and Chronic Disease *Draft* Conclusion Statement

A preponderance of evidence showed that moderate coffee consumption was associated with decreased risk of CVD and type 2 diabetes in healthy adults. There was no evidence that higher coffee consumption was associated with increased risk of CVD. There was consistent evidence that regular consumption of coffee was associated with lower risk of liver cancer and endometrial cancer; slightly inverse or null associations were observed for other cancer sites.

Key Findings: Cognitive function

- Some evidence suggests a protective effect of caffeine from different sources on cognitive impairment and Alzheimer's disease; high caffeine intake was associated with a 16% lower risk of various measures of cognitive decline/impairment.
- Consistent inverse association was found between higher caffeine intake and lower risk of Parkinson's Disease. Every 200 mg/day increment in caffeine intake was associated with a 17% lower risk of PD.

Caffeine & Neurodegenerative Disease *Draft* Conclusion Statement

Limited evidence indicated that caffeine consumption was associated with a modestly lower risk of cognitive decline or impairment and lower risk of Alzheimer's disease. However, there was consistent evidence of a protective association between caffeine intake and Parkinson's disease.

Key Findings: Pregnancy Outcomes

- No association between caffeine intake during pregnancy and risk of pre-term birth was observed in cohort or case-control studies, although there was a suggestion of slightly elevated risk in the second trimester in cohort studies
- Consumption of caffeine from various sources >150 mg/day was associated with increased risk of spontaneous miscarriage and low birth weight, but control for confounders such as maternal age, smoking, or alcohol was not possible.

Caffeine and Pregnancy Outcomes *Draft* Conclusion Statement

There was limited, inconsistent evidence on the relationship between caffeine consumption and pregnancy outcomes.

Caffeine and Health *Draft* Implications

Consumption of coffee/caffeine within the usual range is not associated with increased chronic diseases in healthy adults, but instead may confer benefits on multiple health outcomes, especially diabetes, CVD, some cancers, and Parkinson's Disease.

Moderate coffee/caffeine consumption can be incorporated into a healthy lifestyle when engaging in other healthy behaviors such as refraining from smoking, consuming a nutritionally balanced diet, and being physically active. But caution is needed for vulnerable populations such as pregnant women and adolescents.

Draft Research Recommendations

- Coffee/caffeine and cancer at different sites
- Coffee/caffeine and cognition, neurodegenerative diseases, and depression
- Mechanisms for protective effects on diabetes and CVD
- Vulnerable populations such as pregnant women (premature birth, low birth weight, spontaneous abortion)
- Individuals with existing CVD, diabetes, cancer, neurodegenerative diseases, or depressive symptoms
- Sleep patterns, quality of life, dependency/addiction

Food Safety: Aspartame

What is the relationship between aspartame consumption and health?

Expert Report

Review of the Evidence

European Food Safety Authority (EFSA)

Title: Scientific Opinion on the Re-evaluation of Aspartame as a Food Additive

EFSA Panel of Food Additive and Nutrient Sources added to Food

(2013)

Draft Key Findings

- Overall, intakes of aspartame are not associated with an increased risk of adverse outcomes in populations who do not have PKU
- Some concern requiring further investigation exists for some cancers, especially hematopoetic ones, but the data do not clearly identify a relationship
- The possibility that intakes amongst the higher exposure groups during pregnancy could be associated with preterm delivery requires further evaluation and research

Draft Key Findings

- Overall exposures up to 40 mg/kg/d do not pose safety concerns based on modeling of evidence-based safe blood levels in a dose-response model
- Intakes exceeding this amount are uncommon in the US population
- It must be emphasized that these findings do not apply to individuals with the disease PKU

2015 DGAC: MEETING 3

Food Safety: What's Next?

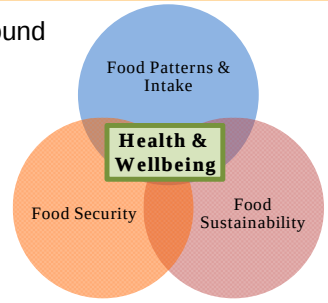
- High dose caffeine intake (focusing on vulnerable populations)

SC 5: Food Sustainability and Food Safety

2015 DGAC: MEETING 3

Food Sustainability

Background



SC 5: Food Sustainability and Food Safety

2015 DGAC: MEETING 3

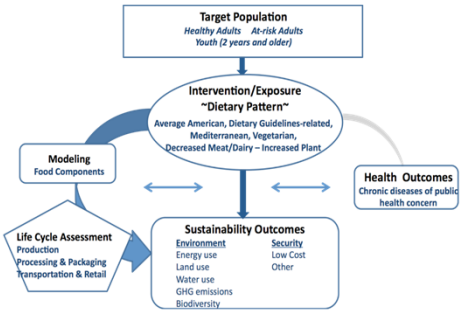
Food Sustainability: Dietary Patterns

What is the relationship between population-level dietary patterns and long-term food sustainability and related food security?

NEL Systematic Review

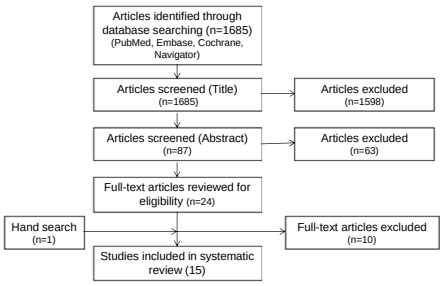
SC 5: Food Sustainability and Food Safety

Analytical Framework: Dietary Patterns and Sustainability



2015 DGAC: MEETING 3

Dietary Patterns and Sustainability Literature Search Results



SC 5: Food Sustainability and Food Safety

2015 DGAC: MEETING 3

Dietary Patterns and Sustainability Description of the Evidence

- Studies were conducted in the US, the UK, Germany, the Netherlands, France, Spain, Italy, Australia, New Zealand, and Brazil; also one regional and one global study
- Studies were carried out between 2003-2014
- Studies used primarily a modeling approach

SC 5: Food Sustainability and Food Safety

Dietary Patterns and Sustainability Description of the Evidence

Dietary Exposure

- Dietary patterns included:
  - Average diet for the respective country
  - Dietary guidelines-related diet for the respective country
  - Mediterranean diets
  - Western diets
  - Vegetarian, lacto-ovo vegetarian, and vegan diets
  - Diet "scenarios" that modeled replacement of meat and diary foods with plant-based foods
    - One study modeled 42 dietary patterns varying in total fat and meat servings in New York State

Dietary Patterns and Sustainability Description of the Evidence

Health Outcomes

- Health outcomes documented previously
  - Dietary guidelines-related pattern
  - Mediterranean dietary pattern
  - Vegetarian, lacto-ovo, and vegan patterns
- Diet quality assessed with *a priori* index related to health
  - Healthy Eating Index (HEI)
  - WHO Index
- Modeled health outcomes
  - DIETRON Model to estimate deaths delayed or averted for each dietary pattern

Dietary Patterns and Sustainability Description of the Evidence

Sustainability Outcomes

- Life Cycle Assessment:
  - Methodological framework for assessing environmental impacts of food components of dietary patterns
  - Life cycle for a food component typically includes agricultural production, processing and packaging, transportation and retail
- Environmental footprint:
  - GHG emissions
  - Agricultural land use
  - Energy consumption
  - Water consumption
  - Biodiversity

Dietary Patterns and Sustainability Description of the Evidence

Food Security Outcomes

- Cost difference between average dietary pattern and sustainable dietary pattern
- Assessed using a "food basket" constructed to reflect the weekly food purchasing of a hypothetical reference household including parents and two children
- Food baskets were also developed according to principles of dietary guidelines of respective countries

Food Sustainability: What's Next?

1. Background and conceptual model
2. Address fish sustainability in relation to dietary guidance
3. Identify research gaps for informing sustainability and food security

Discussion

Subcommittee 5:
Food Sustainability and Food Safety

Miriam Nelson
Steven Abrams
Thomas Brenna
Frank Hu

Barbara Millen