

# Science Base Chapter:

## *Food Sustainability and Safety*

Subcommittee 5

# Subcommittee 5 Membership

Miriam Nelson  
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# SC 5 Scope

Address food and nutrition issues that will inform public health action and policies to promote the health of the population through sustainable diets and food safety.

# Introduction

## **Sustainable Diets**

Need for dietary guidance to include the wider issue of sustainability:

- Recognizes the significant impact of foods and beverages on environmental outcomes
  - From farm to plate to waste disposal
- Important to have alignment in dietary guidance that promotes *both* health and sustainability to ensure food security for future generations

# Introduction

## **Food Safety**

Topics chosen because of public health concern and very recent evidence available that updates the knowledge base on health aspects:

- Coffee/caffeine
- Aspartame

# Topics/Questions Addressed

## **Sustainable Diets**

### ***Dietary Patterns***

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

### ***Seafood***

- What are the comparative nutrient profiles of current farm-raised versus wild caught seafood?
- What are the comparative contaminant levels of current farm-raised versus wild caught seafood?
- What is the worldwide capacity to produce farm-raised versus wild-caught seafood that is nutritious and safe for Americans?

## **Food Safety**

- What is the relationship between usual coffee/caffeine consumption and health?
- What is the relationship between high-dose caffeine consumption and health?
- What is the relationship between aspartame consumption and health?
- What consumer behaviors prevent food safety problems? (Topic update from 2010 DGAC)

# Methodology

## **Sustainable Diets**

### ***Dietary Patterns***

- What is the relationship between population-level dietary patterns and long-term food sustainability? **Modified NEL Systematic Review**

### ***Seafood***

- What are the comparative nutrient profiles of current farm-raised versus wild caught seafood? **Data Analysis**
- What are the comparative contaminant levels of current farm-raised versus wild caught seafood? **Existing Reports**
- What is the worldwide capacity to produce farm-raised versus wild-caught seafood that is nutritious and safe for Americans? **Existing Reports**

## **Food Safety**

- What is the relationship between usual coffee/caffeine consumption and health? **Overview of Systematic Reviews/Meta-Analyses**
- What is the relationship between high-dose caffeine consumption and health? **Existing Systematic Reviews**
- What is the relationship between aspartame consumption and health? **Existing Reports**
- What consumer behaviors prevent food safety problems? **Topic update from 2010 DGAC**

# SC 5 Status Update

No substantive changes since the work was previously reported in a public meeting.

# Food Sustainability

# Major Conclusions and Recommendations

## Sustainability

### Dietary Patterns and Sustainability

*A dietary pattern higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in animal-based foods is more health promoting and is associated with lesser environmental impact than is the current average U.S. diet.*

- The U.S. population should be encouraged to move towards the dietary pattern noted above while decreasing overall total calories. This can be achieved through a variety of dietary patterns, including the Healthy U.S.-style Pattern, the Healthy Vegetarian Pattern, and the Healthy Mediterranean-style Pattern. Each of these patterns provides more plant-based foods and lower amounts of meat than are currently consumed by the U.S. population.

# Major Recommendations

## Dietary Patterns and Sustainability

- Sustainability considerations provide an additional rationale for following the Dietary Guidelines for Americans. The addition of environmental considerations to dietary guidance can be accomplished because of the compatibility and overlap between favorable health and environmental outcomes.
- Using sustainability messaging in communication strategies should be encouraged.
- Careful consideration will need to be made to ensure that sustainable diets are affordable for the entire U.S. population.

# Research Recommendations

## Dietary Patterns and Sustainability

1. Conduct research to determine whether sustainable diets are affordable and accessible to all sectors of the population and how this can be improved, including how policy strategies could influence the supply chain (all steps from farm to plate) to affect this improvement.
2. Develop, conduct, and evaluate in-depth analyses of U.S. domestic dietary patterns and determine the degree to which sustainability practices are important to food choice and how to increase public awareness of the impact of food choices on environmental outcomes.
3. Develop a robust understanding of how production practices, supply chain decisions, consumer behaviors, and waste disposal affect the environmental sustainability of various practices across the food components of MyPlate.
4. Determine the potential economic benefits and challenges to supply chain stakeholders in relationship to findings in Research Recommendation 3.

# Major Conclusions and Recommendations

## Sustainability

### Seafood – Nutrient Profiles

*For commonly consumed fish species in the U.S. (such as salmon, trout, bass, and cod) farmed-raised fish have as much or more omega-3 fatty acids EPA and DHA as the same species captured in the wild.*

*Recommended amounts of EPA and DHA can be obtained by consuming a variety of farm-raised fish, especially high-trophic species, such as salmon and trout.*

- The U.S. population should be encouraged to eat a wide variety of seafood that can be wild caught or farmed, as they are nutrient-dense foods that are uniquely rich sources of healthy fatty acids.

# Major Conclusions and Recommendations

## Sustainability

### Seafood – Contaminants

*For wild and farmed species, the risks of contaminants are similar and do not outweigh the health benefits of seafood consumption, such as decreased cardiovascular disease risk.*

- Based on risk/benefit comparisons, either farmed or wild-caught seafood are appropriate choices to consume to meet Dietary Guidelines for Americans for increased seafood consumption.

# Major Conclusions and Recommendations

## Sustainability

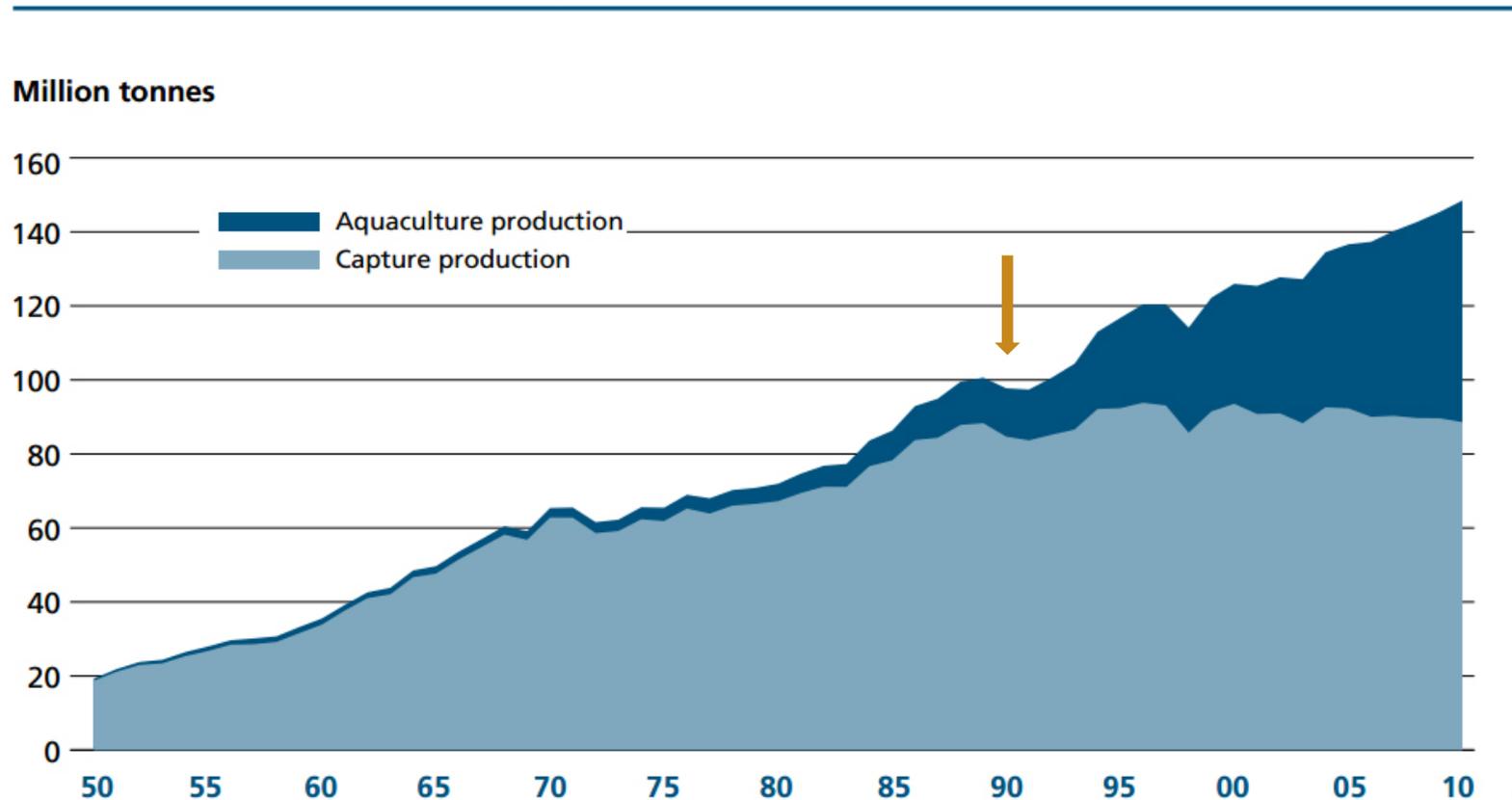
### Seafood – Sustainability

*Wild caught fish production has leveled off and farm raised production has increased to meet increasing demand. Expanded seafood production will need to rely on the continued rapid increase in farm-raised output worldwide.*

- Both wild caught and farmed seafood are major food sources available to support DGA recommendations to regularly consume a variety of seafood.
- Availability of these important foods is critical for future generations of Americans to meet their needs for a healthy diet.

# Comparison of fishery production and aquaculture, 1950-2010

## World capture fisheries and aquaculture production



# Research Recommendations

## Seafood Sustainability

1. Conduct research on methods to ensure the maintenance of nutrient profiles of high-trophic level farmed seafood and improve nutrient profiles of low-trophic farmed seafood concurrently with research to improve production efficacy.
2. Conduct research to develop methods to ensure contaminant levels in all seafood remain at levels similar to or lower than at present. Maintain monitoring of contaminant levels for capture fisheries to ensure that levels caused by pollution do not rise appreciably. This research should include developing effective rapid response approaches if the quality of seafood supply is acutely affected.

# Food Safety

# Major Conclusions and Recommendations

## Caffeine/Coffee

### Usual Caffeine – Chronic and Neurologic Diseases

*Consumption of coffee within the moderate range (3 to 5 cups/d or up to 400 mg/d caffeine) is not associated with increased risk of major chronic diseases or premature death.*

*Moderate coffee consumption is associated with reduced risk of type 2 diabetes and cardiovascular disease.*

*Moderate coffee consumption is also associated with reduced risk of liver and endometrial cancer.*

*Moderate caffeine consumption is also associated with reduced risk of Parkinson's disease.*

- Moderate coffee consumption, because coffee is the primary source of caffeine in the U.S., can be incorporated into a healthy lifestyle, along with other behaviors, such as refraining from smoking, consuming a nutritionally balanced diet, maintaining a healthy body weight, and being physically active. It should be noted that coffee as it is normally consumed frequently contains added calories from cream, milk, and added sugars. Care should be taken to minimize these caloric additions.

# Major Conclusions and Recommendations

## Caffeine

### Usual Caffeine – Pregnancy Outcomes

*Moderate caffeine intake in pregnant women is not associated with risk of preterm delivery.*

*Limited evidence suggests that moderate caffeine intake is associated with a small increased risk of miscarriage, stillbirth, low birth weight, and small for gestational age births.*

- Evidence supports current recommendations to limit caffeine intake during pregnancy as a precaution.
- Women who are pregnant or planning to become pregnant should be cautious and adhere to current recommendations of the American Congress of Obstetricians and Gynecologists regarding caffeine consumption, and not consume more than 200 mg caffeine per day (approximately two cups of coffee per day).

# Research Recommendations

## Caffeine/Coffee

1. Evaluate the effects of coffee on health outcomes in vulnerable populations, such as women who are pregnant (premature birth, low birth weight, spontaneous abortion).
2. Examine the effects of coffee on sleep patterns, quality of life, and dependency and addiction.
3. Evaluate the prospective association between coffee/caffeine consumption and cancer at different sites.
4. Examine prospectively the effects of coffee/caffeine on cognitive decline, neurodegenerative diseases, and depression.
5. Understand the mechanisms underlying the protective effects of coffee on diabetes and CVD.
6. Understand the association between coffee and health outcomes in individuals with existing CVD, diabetes, cancer, neurodegenerative diseases, or depressive symptoms.

# Major Conclusions and Recommendations

## Caffeine

### High Dose Caffeine – Energy Drinks

*Evidence on the effects of excessive caffeine intake on the health of adults or children (>400 mg/day for adults; undetermined for children and adolescents) is limited.*

*Some evidence links high caffeine intake in the form of energy drinks to certain adverse outcomes, such as caffeine toxicity and cardiovascular events.*

*Mixing alcohol with energy drinks can mask the effects of alcohol intoxication, so an individual may drink more and increase risk of alcohol-related adverse events.*

- The DGAC agrees with the American Academy of Pediatrics and the American Medical Association that until safety has been demonstrated, limited or no consumption of high-caffeine drinks, or other products with high amounts of caffeine, is advised for vulnerable populations, including children, adolescents, and young adults.
- High-caffeine energy drinks and alcoholic beverages should not be consumed together.

# Research Recommendations

## High Dose Caffeine

1. Define excessive caffeine intake and safe levels of consumption for children, adolescents, and young adults.
2. Determine the prevalence of excessive caffeine intake in children and adults beyond intake of energy drinks.
3. Examine the effect of excessive consumption of caffeine and energy drinks on health outcomes in both children and adults.
4. Conduct observational studies to examine the health effects of alcohol mixed with energy drinks.

# Major Conclusions and Recommendations

## Food Safety

### Aspartame

*The DGAC concurs with the European Food Safety Authority (EFSA) Panel on Food Additives that aspartame in amounts commonly consumed is safe and poses minimal health risk for healthy individuals without phenylketonuria (PKU).*

*More long-term human studies need to be conducted to further assess a possible association between aspartame and risk of some hematopoietic cancers (non-Hodgkin lymphoma and multiple myeloma).*

- If individuals choose to drink beverages that are sweetened with aspartame, they should stay below the aspartame Acceptable Daily Intake (ADI) of no more than 50 mg/kg/day (12-ounce diet beverage contains approximately 180 mg of aspartame).

# Research Recommendation

## Aspartame

- Examine the risks of aspartame related to some cancers, especially hematopoietic ones, and pregnancy outcomes.

# Major Conclusions and Recommendations

## Food Safety

### Food Safety Behaviors

- 2010 DGAC provided in-depth guidance on food-borne illness prevention. The Committee determined that the majority of the 2010 food safety guidance was current and this was carried forward with minor updates.

# Chapter Summary

## Sustainable Diets

A diet higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in total calories and animal based foods is more health promoting and is associated with less environmental impact than is the current U.S. diet.

A moderate amount of seafood is an important component of many of the dietary patterns associated with improved health and sustainability.

To supply enough fish, both farm-raised and wild caught fish will be needed. Farm-raised fish has as much EPA and DHA as wild-caught and the risks of contaminants do not outweigh the health benefits for either type.

# Chapter Summary

## Food Safety

Moderate coffee consumption (3 - 5 cups/d or up to 400 mg/d caffeine) is not associated with increased long-term health risks among healthy individuals and may provide health benefits associated with chronic disease risk.

Unfortunately, limited evidence is available to ascertain the safety of high caffeine intake, such as might occur with rapid consumption of large-sized energy drinks.

Concern is heightened when energy drinks are combined with alcoholic beverages.

At the level that the U.S. population consumes aspartame, it appears to be safe. However, some uncertainty continues about increased risk of hematopoietic cancers, indicating a need for more research.

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*Discussion*