Dietary Patterns & Chronic Disease

- Patterns of intake associated with lower risk of chronic disease including cardiovascular disease, diabetes, and some cancers, and limited evidence for lower development of neurocognitive disease and depression, have these foods in common.
  - vegetables
  - whole fruits
  - seafood
  - whole grains
  - nuts
- Learning objectives:
  - Learn the most effective dietary patterns revealed to date for chronic disease risk reduction.
  - Integrate results from analysis of dietary patterns and the evolving U.S. oil and fat supply to make best practice recommendations for habitual oil and fat intake.
  - Navigate seafood options to consider best choices, especially for pregnant and nursing moms who benefit from the wide range of nutrients in seafood.
Dietary Guidelines for Americans

Purpose
- Food-based recommendations
- Ages 2 and older
- Prevention *not treatment* of chronic disease
- Based on the preponderance of current scientific and medical knowledge

Target Audience
- Policymakers, nutrition educators, and health professionals

Released
- Every 5 years
- Jointly by the U.S. Departments of Health and Human Services (HHS) and Agriculture (USDA)

35 years of Dietary Guidelines

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>2005</td>
<td>2010</td>
<td></td>
</tr>
</tbody>
</table>

McGinnis, Jan 2014

DIETARY GUIDELINES PROCESS

**ADVISORY COMMITTEE REVIEWS SCIENCE AND PRODUCES ADVISORY REPORT**
- SPRING 2013 – FALL 2014
- Winter 2015

**HHS/USDA JOINTLY DEVELOP AND RELEASE DIETARY GUIDELINES FOR AMERICANS, 2015 POLICY DOCUMENT**
- Winter 2015
- SPRING – FALL 2015

**POLICY IS PUT INTO PRACTICE**
- END OF 2015
- 2016 AND BEYOND

The 2015 Dietary Guidelines Advisory Committee
- Identifies topic areas and reviews current scientific evidence
- Receives and considers public comments and holds public meetings
- Drafts advisory report

HHS/USDA
- Publishes Committee’s advisory report
- Solicits public and Federal agency comment
- Begins writing Guidelines
- Submits Guidelines for scientific and policy review
- Releases Dietary Guidelines for Americans, 2015

Government, nutrition, and health professionals
- Translates Dietary Guidelines into policies, programs, and materials to reach the public

*The advisory report contains the Committee’s scientific review and findings for HHS/USDA. It is not the Dietary Guidelines for Americans, 2015 final draft of the Guidelines*

Available at www.DietaryGuidelines.gov

Approach to Examining the Evidence

Original Systematic Reviews

Review of Existing Reports

Food Pattern Modeling

Data Analyses

Scientific Report of the 2015 Dietary Guidelines Advisory Committee

Advisory Report to the Secretary of Health and Human Services and the Secretary of Agriculture

Pre-Pub
February 2015
Major Themes

• **The Problem and the Gap**
  – Current dietary intakes are suboptimal and have caused poor health and higher chronic disease rates.

• **The Dietary Patterns**
  – Focus is on a healthy overall dietary pattern, rather than individual food groups or nutrients.
  – A healthy dietary pattern can be achieved in many ways—there is not one “healthy” pattern.

• **The Individual and the Population**
  – Interventions to change individual lifestyles, changes in the food and physical activity environments, and changes in policies and standards.

• **The Long-term View**
  – Compared to the current U.S. diet, a diet higher in plant-based foods and lower in animal-based foods is more health promoting and associated with lesser environmental impact.

Major Findings

**Food and Nutrient Intakes, and Health: Current Status and Trends**

<table>
<thead>
<tr>
<th>Shortfall Nutrients/ Nutrients of Public Health Concern</th>
<th>Vitamins A, D, E, and C, folate, calcium, magnesium, fiber, and potassium are shortfall nutrients relative to their EAR or AI. Calcium, vitamin D, fiber and potassium, and iron for adolescent and adult females are nutrients of public health concern for underconsumption. Sodium and saturated fat are overconsumed and at a level that poses a health risk.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol</td>
<td>The DGAC did not bring forward the recommendation for cholesterol because available evidence shows no appreciable relationship between consumption of dietary cholesterol and serum cholesterol, consistent with the conclusions of the AHA/ACC report.</td>
</tr>
</tbody>
</table>
Major Findings
Food and Nutrient Intakes, and Health: Current Status and Trends

| Food Group Intakes | Compared to recommended amounts in the USDA Food Patterns, the majority of the U.S. population has low intakes of vegetables, fruits, whole grains, and dairy. They are important sources of the shortfall nutrients. Population intake is too high for refined grains and added sugars. |
| Health Conditions | Obesity and many other health conditions with a nutritional origin are highly prevalent. |

Major Findings
Food and Nutrient Intakes, and Health: Current Status and Trends

In general, the ranges of intake in dietary patterns with positive health benefits are similar to those recommended by the USDA Food Patterns, but amounts of some specific food groups vary across the various diet pattern types. A healthful diet can be achieved by following any of these dietary patterns.

- Healthy U.S.-style Pattern,
- Healthy Mediterranean-style Pattern,
- Healthy Vegetarian Pattern
Table D1.32. Composition of three USDA Food Patterns (Healthy U.S.-Style, Healthy Vegetarian, and Healthy Mediterranean-style) at the 2000 calorie level. Daily or weekly amounts from selected food groups, subgroups, and components.

<table>
<thead>
<tr>
<th>Food group</th>
<th>Healthy US-style Pattern</th>
<th>Healthy Vegetarian Pattern</th>
<th>Healthy Med-style Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>2 c per day</td>
<td>2 c per day</td>
<td>2 ½ c per day</td>
</tr>
<tr>
<td>Vegetables</td>
<td>2 ½ c per day</td>
<td>2 ½ c per day</td>
<td>2 ½ c per day</td>
</tr>
<tr>
<td>-Legumes</td>
<td>1 ½ c per wk</td>
<td>3 c per wk</td>
<td>1 ½ c per wk</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>3 oz eq per day</td>
<td>3 oz eq per day</td>
<td>3 oz eq per day</td>
</tr>
<tr>
<td>Dairy</td>
<td>3 c per day</td>
<td>3 c per day</td>
<td>2 c per day</td>
</tr>
<tr>
<td>Protein Foods</td>
<td>5 ½ oz eq per day</td>
<td>3 ½ oz eq per day</td>
<td>6 ½ oz eq per day</td>
</tr>
<tr>
<td>-Meat</td>
<td>12 ½ oz eq /wk</td>
<td>--</td>
<td>12 ½ oz eq /wk</td>
</tr>
<tr>
<td>-Poultry</td>
<td>10 ½ oz eq /wk</td>
<td>--</td>
<td>10 ½ oz eq /wk</td>
</tr>
<tr>
<td>-Seafood</td>
<td>8 oz eq /wk</td>
<td>--</td>
<td>15 oz eq /wk</td>
</tr>
<tr>
<td>-Eggs</td>
<td>3 oz eq /wk</td>
<td>3 oz eq /wk</td>
<td>3 oz eq /wk</td>
</tr>
<tr>
<td>-Nuts/seeds</td>
<td>4 oz eq /wk</td>
<td>7 oz eq /wk</td>
<td>4 oz eq /wk</td>
</tr>
<tr>
<td>-Processed soy</td>
<td>½ oz eq /wk</td>
<td>8 oz eq /wk</td>
<td>½ oz eq /wk</td>
</tr>
<tr>
<td>Oils</td>
<td>27 g per day</td>
<td>27 g per day</td>
<td>27 g per day</td>
</tr>
</tbody>
</table>

Source: Appendix E.3. Developing Vegetarian and Mediterranean-style Food Patterns
Major Findings
Dietary Patterns, Food and Nutrients, and Health Outcomes

**Definition of Dietary patterns:**
The quantities, proportions, variety or combinations of different foods and beverages in diets, and the frequency with which they are habitually consumed.

**Health Outcomes Examined in relation to Dietary Patterns:**
Cardiovascular disease, body weight, type 2 diabetes, cancer, congenital anomalies, neurological and psychological illnesses, and bone health

### Part D. Chapter 2

<table>
<thead>
<tr>
<th><strong>Dietary Patterns and Health Outcomes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Common characteristics of dietary patterns associated with beneficial health outcomes include:</td>
</tr>
<tr>
<td>-- Higher intake of vegetables, fruits, whole grains, low or non-fat dairy, seafood, legumes, and nuts</td>
</tr>
<tr>
<td>-- Moderate intake of alcohol (among adults)</td>
</tr>
<tr>
<td>-- Lower consumption of red and processed meat, and low intake of sugar sweetened foods and drinks, and refined grains</td>
</tr>
</tbody>
</table>

Following a dietary pattern associated with reduced risk of CVD, obesity and overweight will have additional positive benefits on health.

Dietary patterns can be achieved in many ways and should be tailored to the individual.
## Major Findings
### Dietary Patterns, Food and Nutrients, and Health Outcomes

| Alcohol | Moderate alcohol intake can be a component of a healthy dietary pattern, and if alcohol is consumed, it should be consumed in moderation, and only by adults.  
It is not recommended that anyone begin drinking or drink more frequently on the basis of potential health benefits.  
There are many circumstances in which people should not drink alcohol.  
Because of the substantial evidence clearly demonstrating the health benefits of breastfeeding, occasionally consuming an alcoholic drink does not warrant stopping breastfeeding. However, women who are breastfeeding should be very cautious about drinking alcohol, if they choose to drink at all. |

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## Major Findings
### Individual Diet and Physical Activity Behavior Change

| Individual Level Change | In order for policy recommendations to be fully implemented, motivating and facilitating behavioral change at the individual level is required. These behaviors can also be supported by federal programs to alleviate the consequences of household food insecurity and promote retention of healthy eating habits by immigrants. |
| Behavior Change Strategies | A number of promising behavior change strategies can be used to favorably affect a range of health-related outcomes and to enhance the effectiveness of interventions. These include:  
-- reducing screen time  
-- reducing the frequency of eating out at fast food restaurants  
-- increasing frequency of family shared meals  
-- self-monitoring of diet and body weight  
-- effective food labeling to target healthy food choices |
Major Findings
Food Environment and Settings

Multi-Component Interventions
The Committee’s findings revealed the power of multi-component interventions over single component interventions in schools, child care settings, and worksites for improving dietary intake and body weight status.

Environmental and Settings Strategies
Key strategies included increasing opportunities for physical activity, improving nutrition standards, point of purchase information, nutrition education, parent engagement, nutrition curriculum and environmental modifications.
To reduce disparity gaps in low resource and underserved communities, more solution-oriented strategies need to be implemented and evaluated.

Early Care and Education
Moderate evidence suggests that multi-component obesity prevention approaches implemented in child care settings improve weight-related outcomes in preschoolers. A combination of dietary and physical activity interventions is effective for preventing or slowing excess weight gain and reducing the proportion of young children ages 2 to 5 years who become overweight or obese.
Major Findings
Food Environment and Settings

Schools

Moderate evidence indicates that multi-component school-based approaches can increase daily vegetable and fruit consumption in children in grades kindergarten through 8th. Sufficient school-based studies have not been conducted with youth in grades 9 to 12. Vegetable and fruit consumption individually, as well as in combination, can be targeted with specific school-based approaches.

Strong evidence demonstrates that implementing school policies for nutrition standards to improve the availability, accessibility, and consumption of healthy foods and beverages sold outside the school meal programs (competitive foods and beverages) and (or) reducing or eliminating unhealthy foods and beverages are associated with improved purchasing behavior and result in higher quality dietary intake by children while at school.

Worksite

Moderate evidence indicates that multi-component worksite approaches can increase vegetable and fruit consumption of employees.

Moderate and consistent evidence indicates that worksite nutrition policies, alone and in combination with environmental changes and/or individual-level nutrition and health improvement strategies, can improve the dietary intake of employees. Multi-component interventions appear to be more effective than single-component interventions.
## Major Findings
### Food Environment and Settings

| **Food Access** | Emerging evidence suggests that the relationship between access to farmers’ markets/produce stands and dietary intake and quality is favorable. The body of evidence regarding access to other food outlets, such as supermarkets, grocery stores, and convenience/corner stores, and dietary intake and quality is limited and inconsistent.  
Limited but consistent evidence suggests that the relationship between access to convenience stores and weight status is unfavorable, with closer proximity and greater access being associated with significantly higher body mass index (BMI) and/or increased odds of overweight or obesity. |
|---|---|

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## Major Findings
### Food Sustainability and Safety

| **Sustainable Diets** | Compared to the current U.S. diet, a diet higher in plant-based foods and lower in calories and animal-based foods is more health promoting and is associated with lesser environmental impact (greenhouse gas emissions and energy, land, and water use).  
A diet that is more environmentally sustainable than the average U.S. diet can be achieved without excluding any food groups. |
| **Seafood** | To supply enough seafood to support meeting dietary recommendations, both farm-raised and wild caught seafood will be needed. For commonly consumed fish species in the US, such as salmon, trout, bass, and cod, farm-raised seafood has as much or more EPA and DHA per serving as wild caught. |

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*Part D. Chapter 4*

*Part D. Chapter 5*
Major Findings
Food Sustainability and Safety

Caffeine/Coffee
Moderate coffee consumption (3-5 cups/day) is not associated with increased risk of chronic diseases and can be incorporated into a healthy lifestyle.

There is concern about high caffeine energy drinks in children and adolescents; however, evidence on the health effects of excessive caffeine intake in adults and children is limited.

High-caffeine energy drinks and alcohol should not be consumed together.

Aspartame
At the level that the U.S. population consumes aspartame, it appears to be safe.
1980 Guidelines

- **Eat a Variety of Foods**
  - “The greater the variety, the less likely you are to develop either a deficiency or an excess of any single nutrient. Variety also reduces your likelihood of being exposed to excessive amounts of contaminants in any single food item.”

- **Maintain Ideal Weight**
  - “If you are too fat, your chances of developing some chronic disorders are increased….To lose weight, you must take in fewer calories than you burn. …fewer calories or increase your activity”

- **Avoid Too Much Fat, Saturated Fat, and Cholesterol**
  - “There is controversy about what recommendations are appropriate for healthy Americans: …reduction in our current intake of total fat, saturated fat, and cholesterol is sensible.”

- **Eat Foods with Adequate Starch and Fiber**
  - “If you limit your fat intake, you should increase your calories from carbs…Complex carb foods are better than simple carbs…”

  McGinnis, Jan 2014

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1980 Guidelines

- **Avoid Too Much**
  - **Sugar**
    - “Major health hazard… is tooth decay.”
    - “Contrary to widespread opinion, too much sugar…does not seem to cause diabetes…no convincing evidence that sugar causes heart attacks or blood vessel disease.”
  - **Sodium**
    - “The major hazard of excessive sodium is for persons who have high blood pressure.”
    - “Since most Americans eat more sodium than is needed, consider reducing your sodium intake.”

- **If you Drink Alcohol, Do so in Moderation**
  - “Alcoholic beverages tend to be high in calories and low in other nutrients. Even moderate drinkers may need to drink less if they wish to achieve ideal weight.
  - One or two drinks daily appears to cause no harm in adults.

  McGinnis, Jan 2014
**2010 Key Recommendations**

**BALANCING CALORIES TO MANAGE WEIGHT**

- Prevent and/or reduce overweight and obesity through improved eating and physical activity behaviors.
- Control total calorie intake to manage body weight. For people who are overweight or obese, this will mean consuming fewer calories from foods and beverages.
- Increase physical activity and reduce time spent in sedentary behaviors.
- Maintain appropriate calorie balance during each stage of life—childhood, adolescence, adulthood, pregnancy and breastfeeding, and older age.

**2010 Key Recommendations**

**FOODS AND FOOD COMPONENTS TO REDUCE**

- Reduce sodium intake to 2,300 mg/d or better, 1,500 mg/d
- <10% cal from sat fat
- <300 mg/d cholesterol
- Trans fatty acids
- “solid fats and added sugars” (SoFAs)
- Alcohol: 2 drink/d for men, 1 drinks/d for women
2010 Key Recommendations

FOODS AND NUTRIENTS TO INCREASE

- Vegetables & fruits
- Whole grains
- Fat-free or low-fat dairy and/or fortified soy beverages
- Choose a variety of protein foods including seafood, lean meat and poultry, eggs, beans & peas, soy, unsalted nuts and seeds
- Increase seafood in place of some meat and poultry
- Use oils to replace solid fats
- Increase foods with more
  - Potassium, fiber, calcium, vitamin D. E.g. vegetables, fruits, whole grains, dairy, seafood/fish

2010 Key Recommendations

Recommendations for specific population groups

Women capable of becoming pregnant?

- Increase foods with heme iron and enhancers of iron absorption such as vitamin C-rich foods
- 400 micrograms/d folate

Women who are pregnant or breastfeeding?

- 8-12 oz/week seafood. Limit albacore tuna to 6 oz/week
- Pregnant – take an iron supplement

Individuals ages 50 years and older

- Consume foods with Vitamin B12, cereals or supplements
Some Specifics

U.S. Law
From the House Appropriations Committee (largely intact in CRomnibus)

The Committee is concerned that the advisory committee for the 2015 Dietary Guidelines for Americans is considering issues outside of the nutritional focus of the panel. Specifically, the advisory committee is showing an interest in incorporating sustainability, climate change, production practices into their criteria for establishing the next dietary recommendations, which is clearly outside of the scope of the panel. The Committee directs the Secretary to ensure that the advisory committee focuses only on nutrient and dietary recommendations based upon sound nutrition science and not pursue an environmental agenda. Should environmental or production factors be included in the panel’s recommendations to USDA and the Department of Health and Human Services, the Committee expects the Secretary to reject their inclusion in the final 2015 Dietary Guidelines for Americans.
Seafood Sustainability

Seafood Sustainability Questions

1. What is the relationship between current farm-raised versus wild caught seafood and respective nutrient profiles?

(2. What is the relationship between current farm-raised versus wild caught seafood and contaminants?)

3. What is the worldwide capacity to produce farm-raised versus wild-caught seafood that is nutritious and safe for Americans?
Farm vs. Wild Seafood: Nutrient Profile

What is the relationship between current farm-raised versus wild caught seafood and respective nutrient profiles?

Nutrient Database

Farm vs. Wild Seafood: Nutrient Profile
Description of the Evidence


- Fatty Acid Profiles of Commercially Available Finfish Fillets in the United States. (Cladis et al, 2014)
Farm vs. Wild Seafood: Nutrient Profile
Description of the Evidence

Figure 1. Comparison of EPA and DHA in Seafood from USDA-ARS National Nutrient Database, Release 26 (*) and from updated 2014 survey (Cladis et al., 2014)

Farm vs. Wild Salmon: Nutrient Profile
Description of the Evidence

- Salmon obtained in UK markets shows EPA+DHA significantly greater in farmed than wild, consistent with USDA data

Henriques et al, 2014
Farm vs. Wild Seafood: Nutrient Profile

Key findings

- Farm-raised fish are comparable to wild-caught fish in EPA and DHA profiles, with the exception of low trophic level species
  - Wild species EPA and DHA per 100 g raw serving ranges are 64-511 mg and 156-610 mg, respectively
  - Farmed species EPA and DHA ranges are 14-737 mg and 23-796 mg, respectively
- Farm-raised fish contain more total fat than wild-caught fish
- Recommended amounts of EPA and DHA can be obtained by consuming farm-raised fish, as EPA and DHA levels are as high or higher compared to wild-caught fish of the same species

Net Effects on IQ

Should albacore tuna be singled out as being limited to 6 oz per week when the recommendation is for 12 oz per week of a variety of fish?

- Assumes consumption of all one fish (no variety)
- Fig D-4, Salmon (mean and 95% CI)
  - Max benefit of about +3.3 IQ points
- Fig D-6, Albacore Tuna
  - Max benefit of about +3 IQ points
- Fig D-7, Shark
  - Max benefit of about +2 IQ points
- Mean increase in 6-9 year old child IQ points from maternal intake during pregnancy.
- Dotted vertical lines
  - 12 oz per week = 2x 6 oz cans; ~50 g/d (48.6 g/d)
  - 24 oz per week = 4x 6 oz cans; ~100 g/d
Farm vs. Wild Seafood: Contaminants Research Recommendations

- Research should be undertaken to maintain contaminant levels in farmed species at levels similar to or lower than at present.
- Monitoring of contaminant levels should be maintained for the capture fisheries to insure that levels caused by pollution do not rise appreciably.

Capacity to Produce Nutritious and Safe Seafood

What is the worldwide capacity to produce farm-raised versus wild-caught seafood that is nutritious and safe for Americans?

Expert Report
Capacity to Produce Seafood
Description of the Evidence

The State of World Fisheries and Aquaculture. FAO Fisheries and Aquaculture Department Food and Agriculture Organization of the United Nations. 2012

Capacity to Produce Seafood
Description of the Evidence

- The most recent United National (UN) Food and Agriculture Organization (FAO) report on The State of World Fisheries and Agriculture was issued in 2012 and formed the basis of the DGAC’s opinions on this topic.
- The FAO report addressed a wide variety of issues impacting capture fisheries and aquaculture, including the economics, infrastructure, labor and government policies.
- The DGAC focused on matters that directly address the world production as it impacts the supply of seafood for Americans, as a first attempt by a DGAC to consider the implications of dietary guidelines for production of a related group of foods.
Seafood production is expanding worldwide at a rate that can continue to support American’s needs, which are now met primarily by importation.
Capacity to Produce Seafood

Conclusions

The DGAC concurs with the FAO that capture fisheries increasingly managed in a sustainable way are an important and stable source of important nutrients. On average capture fisheries are fully exploited and their continuing productivity relies on careful management to avoid over exploitation and long term collapse. Expanded seafood production relies on continuation of the rapid increase in aquaculture output worldwide, projected at 33% increase by 2021 and adding 15% to the total supply of seafood. Distributed evenly to the world’s population, this capacity could in principle meet DGA recommendations for at least 8 oz seafood per week. There are concerns that the expanded capacity may not be for fish species with the most desirable nutrient profile. Under the current production, Americans rely on significant amounts of imported seafood to meet DGA recommendations.

Grade Strong

Capacity to Produce Seafood

Implications

• Both wild and farmed seafood are major food sources available to support DGAC recommendations to regularly consume a variety of seafood
• Responsible stewardship over environmental impact is needed as farmed seafood production expands
• Availability of these important foods is critical for future generations of Americans to meet their needs for a healthy diet
• Strong policy, research, and stewardship support is needed to increasingly improve the environmental sustainability of farmed seafood systems
• From the standpoint of the dietary guidelines this expanded production needs to be largely in n-3 fatty acid-rich species
Capacity to Produce Seafood
Research Recommendations

- Production methods and food systems should be developed to insure the delivery farm-raised seafood with nutrient profiles similar to those of wild caught.
- Efforts to maintain contaminant levels below levels that mitigate the healthfulness of seafood should be maintained and enhanced.
- The healthfulness of seafood in dietary patterns should be established throughout the life cycle, especially in children and adolescents.

Dietary Patterns and Neurological-Psychological Illness

What is the relationship between dietary patterns and depression?

What is the relationship between dietary patterns and age-related cognitive impairment, dementia, and Alzheimer’s disease?

NEL Systematic Review

Tom Brenna
### U.S. Scope of Depression

- In any 2-week period, 8% of Americans 12 years of age and older experienced depression
  - **21.3 million Americans**, were depressed according to NHANES screening 2007-2010
- Approximately 80% of persons with depression reported some level of functional impairment because of their depression, and 27% reported serious difficulties in work and home life.

### Challenge & Cost of Age-related Cognitive Impairment/AD/Dementia

- Total Alzheimer's disease is projected to triple by 2050, considering an aging population and current rates.
- Alzheimer's Association estimates 2012 cost of care for AD and dementia at $216 billion.
Role of Omega-3 Fatty Acids in the Treatment of Depressive Disorders: A Comprehensive Meta-Analysis of Randomized Clinical Trials

Omega-3 works Depression & EPA

- Studies using EPA and DHA treatment for depression
  - MDD: Studies on diagnosed Major Depressive Disorder
    - Depression assessed by psychiatric health care provider
  - Non-MDD: Depression assessed by questionnaire
  - Both MDD and non-MDD responds to EPA-dominant intake.

Reflection of predominant LA in industrialized country diets?

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Analytical Framework: Dietary Patterns and Neurological-Psychological Illness

**Target Population**
Children and adults (2y+), healthy and at risk for chronic disease

(Literature will be examined by age group, sex, race/ethnicity, and geographic location as appropriate. Age/lifestage groups of interest include children, adolescents, adults, including pregnant, lactating, and peri/postmenopausal women, and older adults)

**Intervention/Exposure**
Adherence to a dietary pattern (e.g., a priori patterns (indices/scores), data driven patterns (factor or cluster analysis), reduced rank regression, or patterns derived from other methods (DASH, vegetarian))

Comparator
Different levels of adherence to a dietary pattern; Adherence to a different dietary pattern

**Endpoint Health Outcomes**
- Depression
- Dementia/cognitive decline/Alzheimer’s Disease

**Key Definitions**
- Dietary patterns: The quantities, proportions, variety, or combination of different foods, drinks, and nutrients (when available) in diets, and the frequency with which they are habitually consumed.

**Potential Confounders**
- Total energy intake
- BMI
- Age
- Race/ethnicity
- Sex
- SES
- Smoking
- Alcohol intake
- Physical activity
- Family history

Systematic Review Questions:
- What is the relationship between dietary patterns and risk of depression?
- What is the relationship between dietary patterns and risk of dementia/cognitive decline/Alzheimer’s disease?
Dietary Patterns and Depression
Description of the Evidence

- Includes 19 articles (17 prospective cohort studies, and 2 analyzed data from RCTs)
  - 2 analyzed data from RCTs that tested/described dietary patterns, 6 used indices/scores, 10 used data-driven methods, 1 used reduced rank regression

- Despite methodological and outcome heterogeneity in this body of evidence, some protective dietary patterns emerged:
  - Patterns emphasizing seafood, vegetables, fruits, and nuts, were generally associated with reduced risk
  - Patterns emphasizing red and processed meats and refined sugar were generally associated with increased risk

Dietary Patterns and Depression
Conclusion Statement

Limited evidence suggests that dietary patterns emphasizing seafood, vegetables, fruits, nuts, and legumes are associated with lower risk of depression in men and non-perinatal women. However, the body of evidence is primarily composed of observational studies and employs a range of methodology in study design, definition, and measurement of dietary patterns and ascertainment of depression/depressive symptoms, and the possibility of reverse causality cannot be ruled out. Studies on dietary patterns in other populations, such as post-partum women, children and adolescents, as well as those in various ethnic and cultural subgroups, is too limited to draw conclusions.

DGAC Grade: Adults – Limited, Post-partum women, children and adolescents – Grade not assignable
Dietary Patterns and Cognitive Impairment, Dementia, Alzheimer’s
Description of the Evidence

- Includes 30 articles (28 prospective cohort studies, and 2 analyzed data from RCTs)
  - 2 analyzed data from RCTs that tested/described dietary patterns, 23 used indices/scores, 3 used data-driven methods, 3 used reduced rank regression
- Most (18 of 28) articles found an association between dietary patterns and age-related cognitive impairment, dementia, and/or Alzheimer’s disease, and some commonalities emerged:
  - Patterns higher in fruits, vegetables, nuts, legumes, and seafood were generally associated with reduced risk
  - Patterns higher in red and/or processed meats were generally associated with greater risk
  - Relatively few studies reported on refined sugar and added salt, and patterns including these nutrients tended to report greater risk

Dietary Patterns and Cognitive Impairment, Dementia, Alzheimer’s
Conclusion Statement

- Limited evidence suggests that a dietary pattern containing an array of fruits, vegetables, nuts, legumes and seafood consumed during adulthood is associated with lower risk of age-related cognitive impairment, dementia, and/or Alzheimer’s disease. Although the number of studies available on dietary patterns and neurodegenerative disease risk is expanding, this body of evidence, which is made up of high quality observational studies, is modest and employs a wide range of methodology in study design, definition and measurement ascertainment of cognitive outcomes, dietary pattern assessment, and the possibility of reverse causality cannot be ruled out.

DGAC Grade: Limited
Genetically enhanced soy oil

- High in oleic acid (75%)
- <3% linolenic acid (for improved flavor and stability)
- 20% less saturated fat than regular soybean oil
- No trans fat
- Heat stability for frying and longer fry life
- Provides flexibility in food preparation and mixing with other oils
- Suitable for both extreme high and low temperature
- Volume expected to increase from 300 million lbs in 2014 to 750 million lbs in 2015 and 9 billion lbs by 2023

Modified from J Ruff slide

JTB Conclusions

- Dietary patterns richer vegetables, fruits, seafood are associated with lower chronic disease incidence
  - neurocog risk, consistent with results for EPA, at the level of limited evidence.
- There is hope of sufficient fish to go around. More coming from fish farming.
- (Replacement of sat fat with unsaturated fat reduces CVD but not when replaced with refined carbs.)
- The process is transparent and objective
- Public commentary period ended recently, so there are many opinions on all sides.