Scope

- To examine the relationship between dietary patterns, foods, and nutrients, and preventable diet-related diseases, obesity, and mortality
  - Primary focus is to consider foods and nutrients in the context of dietary patterns
  - Will consider targeted questions on specific foods or nutrients, as needed

Key Topic Areas

- Dietary patterns and:
  - Cardiovascular disease*
  - Type 2 diabetes*
  - Body weight and obesity*
  - Cancer*
  - Neurological and psychological illnesses
  - Pregnancy outcomes
  - Bone health
- Foods and nutrients
  - Sodium*
  - Alcohol
  - Cholesterol

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.

Experts & Consultants

Invited Experts
- Robert H. Eckel, MD, University of Colorado
- Donna H. Ryan, MD, Pennington Biomedical Research Center
- Connie M. Weaver, PhD, Purdue University
- Steven Abrams, MD, Baylor College of Medicine
- Lorraine Gunzerath, PhD, MBA, NIH/National Institute on Alcohol Abuse and Alcoholism

Consultant SC Members
None
Dietary Patterns and CVD

Review of the Evidence

- NEL Dietary Patterns Systematic Review Project (available at www.NEL.gov)
- 2013 AHA/ACC Guideline on Lifestyle Management to Reduce Cardiovascular Risk (Eckel et al., 2013, Circulation and Journal of the American College of Cardiology)

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NEL Dietary Patterns Systematic Review Project

Total Included: 176

Dietary Patterns and CVD

Overarching Finding from NEL Dietary Patterns Project

- Dietary patterns associated with decreased risk of cardiovascular disease were characterized by:
  - regular consumption of fruits, vegetables, whole grains, low-fat dairy and fish
  - low in red and processed meat and sugar-sweetened foods and drinks

Dietary Patterns and CVD

Overarching Finding from NEL Dietary Patterns Project

- In most studies
  - regular consumption of nuts and legumes
  - moderate consumption of alcohol
  - were also shown to be beneficial.
- Additionally, research that included specific nutrients indicated that patterns that were
  - low in saturated fat, cholesterol, and sodium and rich in fiber and potassium
  - may be beneficial for reducing CVD risk.
Dietary Patterns and CVD
Recommendation from ACC/AHA Guidelines

- Advise adults who would benefit from LDL-C or BP lowering to consume a dietary pattern that
  - emphasizes intake of vegetables, fruits, and whole grains;
  - includes low-fat dairy products, poultry, fish, legumes, non-tropical vegetable oils and nuts; and
  - limits intake of sweets, sugar-sweetened beverages and red meats.
  - Adapt this dietary pattern to appropriate calorie requirements, personal and cultural food preferences, and nutrition therapy for other medical conditions (including diabetes mellitus).
  - Achieve this pattern by following plans such as the DASH dietary pattern, the USDA Food Pattern, or the AHA Diet.

- Strength of evidence: Strong IA

Dietary Patterns and Body Weight
Review of the Evidence

- NEL Dietary Patterns Systematic Review Project (available at www.NEL.gov)
- 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (Jensen et al., 2013, Circulation, Obesity, and Journal of the American College of Cardiology)

Dietary Patterns and Body Weight
Conclusions from NEL Systematic Review Project

- There is moderate evidence that, in adults, increased adherence to dietary patterns scoring
  - high in fruits, vegetables, whole grains, legumes, unsaturated oils, and fish;
  - low in total meat, saturated fat, cholesterol, sugar-sweetened foods and drinks and sodium; and
  - moderate in dairy products and alcohol
  is associated with more favorable outcomes related to body weight or risk of obesity, with some reports of variation based on gender, race or body weight status.

Dietary Patterns and Body Weight
Conclusions from NEL Systematic Review Project

- Limited and inconsistent evidence from epidemiological studies examining dietary patterns derived using factor or cluster analysis in adults that consumption of a dietary pattern characterized by
  - intake of vegetables, fruits, whole grains and reduced-fat dairy products
  - as opposed to red meat, processed meats, sugar-sweetened foods and drinks, and refined grains
  tends to be associated with more favorable body weight status over time.

- Insufficient evidence in studies using reduced rank regression

Dietary Patterns and Body Weight
Recommendation from AHA/ACC/TOS Guidelines

- Prescribe a diet to achieve reduced calorie intake for obese or overweight individuals who would benefit from weight loss, as part of a comprehensive lifestyle intervention. Any one of the following methods can be used to reduce food and calorie intake:
  a. Prescribe 1,200–1,500 kcal/day for women and 1,500–1,800 kcal/day for men (kcal levels are usually adjusted for the individual’s body weight);
  b. Prescribe a 500 kcal/day or 750 kcal/day energy deficit; or
  c. Prescribe one of the evidence-based diets that restricts certain food types (such as high-carbohydrate foods, low-fiber foods or high-fat foods) in order to create an energy deficit by reduced food intake.

- Strength of evidence: A (Strong)
Dietary Patterns and Body Weight
Recommendation from AHA/ACC/TOS Guidelines

- Prescribe a calorie restricted diet, for obese and overweight individuals who would benefit from weight loss,
  - based on the patient’s preferences and health status and
  - preferably refer to a nutrition professional for counseling.
- A variety of dietary approaches can produce weight loss in overweight and obese adults.

Dietary Patterns and Type 2 Diabetes
Review of the Evidence

- NEL Dietary Patterns Systematic Review Project (available at www.NEL.gov)
- The bodies of evidence examining the relationship between dietary patterns and risk of type 2 diabetes were limited or insufficient.

Dietary Patterns and CVD, BW, & T2D
Next Steps

- Conduct searches to identify systematic reviews/meta-analyses published since the searches were completed for the existing reviews
- Continue review of the evidence

Dietary Patterns and CVD, BW, & T2D

- What is the relationship between dietary patterns and risk of
  a) cardiovascular disease
  b) measures of body weight
  c) type 2 diabetes?

Discussion

SC 2: Dietary Patterns, Foods and Nutrients, and Health Outcomes

Dietary Patterns and Cancer

What is the relationship between dietary patterns and risk of cancer?

Approach for answering question:
NEL Systematic Review

Presenter from SC#2
Steven Clinton, The Ohio State University

Dietary Patterns and Cancer

Approach
- “Cancer” represents over 100 histopathologic types, most with multiple genetic/biologic subtypes that will exhibit unique etiologic risk factors.
- Strategy: Emphasize the 4 cancers that account for over 50% of all cancer in Americans.
- Strategy: Focus initially upon “dietary patterns” with support from expert reviews and emerging data on individual components.

American Cancer Society: Facts and Figures
### Analytical Framework: Dietary Patterns and Cancer

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

#### Analytical Questions
- What is the relationship between dietary patterns and risk of breast cancer?
- What is the relationship between dietary patterns and risk of prostate cancer?
- What is the relationship between dietary patterns and risk of lung cancer?

#### Systematic Literature Search Results

**Dietary Patterns and Cancer**

**Dietary Patterns and Prostate Cancer**

**Dietary Patterns and Lung Cancer**

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**Dietary Patterns and Cancer Literature Search: Inclusion/Exclusion Criteria**

**Date Range:**
- Published between January 2000 and January 2014 (in English in a peer-reviewed journal)

**Study Design:**
- Randomized or non-randomized controlled trial, prospective cohort study, or a nested case-control study

**Study Subjects:**
- Children, adolescents, and adults aged 2 years+
- From countries with high or very high human development (per the 2012 Human Development Index)
- Healthy or at elevated chronic disease risk (studies with subjects who were diagnosed with disease were excluded)

**Outcome:**
- Incidence of colorectal, breast, prostate, or lung cancer

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**Dietary Patterns and Prostate Cancer Description of the Evidence**

Seven studies were included in this review:

- **Study Design:** 7 prospective cohort studies (from 6 cohorts)
- **Location:** US, Australia, Sweden, UK
- **Risk of Bias:** Relatively low, 2/24 - 9/24
- **Subjects:** Generally healthy adult men (~40-60 y) without a previous diagnosis of prostate cancer
- **Sample Size:** 1,044 to 293,464 subjects
- **Prostate Cancer Cases:** 133 to 23,453 cases
- **Follow-up:** 7.6y to 23.2y

**Dietary patterns examined:**
- 3 studies used indices/scores
- 3 studies used factor analysis
- 1 study derived patterns based on animal product consumption

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**Dietary Patterns and Lung Cancer Description of the Evidence**

Four studies were included in this systematic review:

- **Study Design:** 3 prospective cohorts, 1 nested case-cohort
- **Location:** US, UK, Italy, the Netherlands
- **Risk of Bias:** Relatively low, 4/24 - 9/24
- **Subjects:** Generally healthy adults without a previous diagnosis of prostate cancer
- **Sample Size:** 3,918 to 52,706 subjects
- **Lung Cancer Cases:** 117 to 1,425 cases
- **Follow-up:** 5.7y to 9.5y

**Dietary patterns examined:**
- 2 studies used indices/scores
- 1 study used factor analysis
- 1 study derived patterns based on animal product consumption

---

**Draft Conclusion Statement**

Limited evidence exist from a small number of studies with a wide variation in methodology.

**Grade:** TBD
### Dietary Patterns and Lung Cancer

**Draft Conclusion Statement**

- Limited evidence exists from a small number of studies with a wide variation in methodology.

Grade: TBD

### Dietary Patterns and Breast Cancer

**Description of the Evidence**

25 studies were included in this review:

- **Study Design:** 1 RCT, 24 prospective cohort studies (from 15 cohorts)
- **Location:** Australia, France, Germany, Greece, Italy, Norway, the Netherlands, Singapore, Sweden, UK, US Europe (multi-center)
- **Risk of Bias:** Relatively low, 0/24 - 9/24
- **Subjects:** Generally healthy adult women (<30-62 y) without a previous diagnosis of breast cancer
- **Sample Size:** 1,598 to 335,062 subjects
- **Breast Cancer Cases:** 137 to 10,225 cases
- **Follow-up:** 6y to 26y

**Dietary patterns examined:**
- 8 studies used indices/scores
- 13 studies used factor/cluster analysis
- 2 studies used reduced rank regression
- 2 studies derived patterns based on animal product consumption
- 1 study tested a low-fat dietary pattern

### Dietary Patterns and Colorectal Cancer

**Description of the Evidence**

22 studies were included in this review:

- **Study Design:** 1 RCT, 21 prospective cohort studies (from 11 cohorts)
- **Location:** US, Denmark, Italy, Finland, France, Germany, Greece, Japan, Netherlands, Norway, Singapore, Spain, Sweden, and UK
- **Risk of Bias:** Relatively low, 0/24 - 9/24
- **Subjects:** Generally healthy adult men and women without a previous cancer diagnosis
- **Sample Size:** 4,295 to 506,488 subjects
- **Colon Cancer Cases:** 133 to 7,676 cases
- **Follow-up:** 4.5y to 26y

**Dietary patterns examined:**
- 9 studies used indices/scores
- 10 studies used factor/cluster analysis
- 1 study used reduced rank regression
- 1 study derived patterns based on animal product consumption
- 1 study tested a low-fat dietary pattern

### Dietary Patterns and Cancer

**What is the relationship between dietary patterns and risk of cancer (colorectal, breast, prostate, and lung)?**

**Discussion**

### Sodium

**Questions:**

1. What is the relationship between dietary sodium intake and blood pressure?

2. What is the relationship between dietary sodium intake and cardiovascular disease outcomes?

**Approach for answering questions:**

- **Existing reports**

  **Presenter from SC#2**
  Cheryl Anderson, University of California, San Diego
Sodium: Existing Reports

- 2013 AHA/ACC Guideline on Lifestyle Management to Reduce Cardiovascular Risk (Eckel et al., 2013, Circulation and Journal of the American College of Cardiology)
- IOM Report on Sodium Intake in Populations: Assessment of Evidence (available at www.iom.edu)
- IOM Report on Population Strategies to Reduce Sodium Intake (available at www.iom.edu)
- Dietary reference intakes for water, potassium, sodium, chloride, and sulfate (available at www.iom.edu)
- Scanned literature from Jan 2013 to present

Sodium: Guidelines from AHA/ACC Report

Advise adults who would benefit from blood pressure lowering to:
- Lower sodium intake

*NHLBI Grade: A (strong); ACC/AHA COR: I, LOE: A*

Sodium Working Group: Considerations

- Use of recommendations from existing reports
- Healthy dietary pattern
- Identify achievable, affordable, practical strategies consistent with an ecological model
2015 DGAC: MEETING 3

Sodium

1. What is the relationship between dietary sodium intake and blood pressure?

2. What is the relationship between dietary sodium intake and cardiovascular disease outcomes?

Discussion

Next Steps: Topics to Address

- Dietary patterns and other cancer outcomes
- Dietary patterns and neurological and psychological illnesses
- Dietary patterns during preconception and birth defects
- Dietary patterns and bone health
- Cholesterol
- Alcohol

SC 2: Dietary Patterns, Foods and Nutrients, and Health Outcomes

Subcommittee 2:
Dietary Patterns, Foods and Nutrients, and Health Outcomes

Anna Maria Siega-Riz
Cheryl Anderson
Tom Brenna
Steven Clinton
Frank Hu
Marian Neuhouser
Rafael Pérez Escamilla
Alice H. Lichtenstein