Science Base Chapter: *Cross-Cutting Topics of Public Health Importance*

Introduction

- The *2010 Dietary Guidelines* identified sodium, saturated fat, and added sugars as nutrients of concern, and the 2015 DGAC determined that a reexamination of the evidence on these topics was necessary to evaluate whether revisions to the guidance were warranted.
- These topics were considered to be of public health importance because each has been associated with negative health outcomes when over-consumed.

Introduction

- Additionally, the Committee acknowledged that a potential unintended consequence of a recommendation on added sugars might be that consumers and manufacturers replace added sugars with low-calorie sweeteners. As a result, the Committee also examined evidence on low-calorie sweeteners to inform statements on this topic.

Introduction

- Although sodium, saturated fat, and added sugars are receiving particular focus here, it is important to consider potential changes in intake within the context of a healthy dietary pattern.
- As the Committee determined it was appropriate to address these topics across two or more Subcommittees, Working Groups were formed with representatives from the relevant Subcommittees to ensure that the topics were addressed using a cross-cutting approach.

Sodium Working Group Membership

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Introduction

- From its first edition in 1980, the *Dietary Guidelines for Americans* consistently recommended the public reduce dietary sodium intakes.
- This recommendation is based on evidence supporting a dose-dependent relationship between sodium intake and blood pressure and observational data identifying associations between sodium intake and blood pressure and cardiovascular outcomes.
- However, despite many years of accumulating evidence and public health guidelines focused on changing individual behavior to achieve a reduced sodium intake among Americans, consumption continues to far exceed recommendations.
- The DGAC has identified dietary sodium as a nutrient of public health concern because of overconsumption, with usual intakes for those ages 2 years and older at 3,463 mg/day.

Questions Addressed

- What is the relationship between sodium intake and blood pressure in adults? (Existing reports)
- What is the relationship between sodium intake and blood pressure in children? (NEL update of existing report)
- What is the relationship between sodium intake and cardiovascular disease outcomes? (NEL update of existing report)
- What effect does the interrelationship of sodium and potassium have on blood pressure and cardiovascular disease outcomes? (Existing reports)

Status Update

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

Summary of Major Conclusions

- Strong evidence: Higher sodium intake and increased blood pressure
- Moderate evidence: Higher sodium intake and increased risk of CVD
  - Inconsistent and insufficient evidence for lowering sodium intakes below 2,300 mg/day
- Insufficient evidence: Potassium and blood pressure

Major Recommendations

- Given the well-documented relationship between sodium intake and high blood pressure, sodium intake should be reduced and combined with a healthful dietary pattern.

Major Recommendations

- **The general population, ages 2 years and older,** should rely on the recommendations of the IOM Panel on Dietary Reference Intakes for Electrolytes and Water, specifically the Tolerable Upper Intake Levels (ULs) for the appropriate age group.
- **Individuals who would benefit from blood pressure lowering (i.e., those with prehypertension and hypertension),** should rely on the recommendations in the 2013 AHA/ACC Lifestyle Report. These include:
  - lowering sodium intake in general; or
  - consuming no more than 2,400 mg of sodium/day; or
  - lowering sodium intake to 1,500 mg per day for even greater reduction in blood pressure; or
  - lowering sodium intake by at least 1,000 mg per day even if the goals of 2,400 or 1,500 mg per day cannot be met.

Major Recommendations

- A primary emphasis should be placed on policies and population-based strategies for sodium reduction while at the same time paying attention to consumer education.
- Local, state, and Federal agencies should consider a comprehensive and coordinated strategy, that includes partnerships with the food industry, to reduce the sodium content of foods in the United States based on the socio-ecological model highlighted in the 2015 DGAC's conceptual model.
- These strategies should be consistent with the recommendation described in the 2010 IOM report on *Strategies to Reduce Sodium Intake in the United States*.

Saturated Fat Working Group Membership

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Introduction

- The relationship between different types of dietary fats and risk of CVD has been extensively studied in RCTs and epidemiologic studies.
- Numerous RCTs have demonstrated that saturated fat as compared to mono- (MUFA) or polyunsaturated fats (PUFA) or carbohydrates increases total and LDL cholesterol. Thus, limiting saturated fat consumption has been a longstanding dietary recommendation to reduce risk of CVD.
- Although saturated fat intake has declined in the past decades, current intake is still high at a median of 11.1 percent of daily calories.
- A central issue in the relationship between saturated fat and CVD is the specific macronutrients that are used to replace it because consuming unsaturated fats versus carbohydrates in place of saturated fat can have different effects on blood lipids and risk of CVD. Thus, the Committee's assessment of the available evidence puts greater emphasis on the replacement macronutrient for saturated fat.

Questions Addressed

- What is the relationship between intake of saturated fat and risk of cardiovascular disease? (Existing reports)

Status Update

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

Summary of Major Conclusions

- Strong evidence: Replacing saturated fat with unsaturated fats, especially PUFAs, reduces LDL-cholesterol and CVD risk
- Strong evidence: Replacing saturated fat with overall carbohydrates does not lower CVD risk
- Limited evidence: Replacing saturated fat with MUFAs

Major Recommendations

- Recommendations on saturated fat intake should specify replacement macronutrients and emphasize replacing saturated fat with unsaturated fats, especially polyunsaturated fats.
- The Committee recommends retaining the 10 percent upper limit for saturated fat intake.

Major Recommendations

- In practice, non-hydrogenated vegetable oils that are high in unsaturated fats and relatively low in SFA (e.g., soybean, corn, olive, and canola oils) instead of animal fats (e.g., butter, cream, beef tallow, and lard) or tropical oils (e.g., palm, palm kernel, and coconut oils) should be recommended as the primary source of dietary fat.
- In low-fat diets, fats are often replaced with refined carbohydrates and this is of particular concern because such diets are generally associated with dyslipidemia (hypertriglyceridemia and low HDL-C concentrations). Therefore, dietary advice should put the emphasis on optimizing types of dietary fat and not reducing total fat.

Major Recommendations

- When individuals reduce consumption of refined carbohydrates and added sugar, they should not replace them with foods high in saturated fat. Instead, refined carbohydrates and added sugar should be replaced by healthy sources of carbohydrates (e.g., whole grains, legumes, vegetables, and fruits), healthy sources of fats (e.g., non-hydrogenated vegetable oils that are high unsaturated fats, and nuts/seeds), or healthy sources of protein (e.g., nuts, legumes, lean meats, and low-fat dairy). The consumption of “low-fat” or “nonfat” products with high amounts of refined grains and added sugars should be discouraged.

Major Recommendations

- Dietary recommendations on macronutrient composition for reducing CVD risk should be dietary pattern-based emphasizing foods that characterize healthy dietary patterns.

Added Sugars Working Group Membership

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Introduction

- Added sugars are sugars that are either added during the processing of foods, or are packaged as such, and include sugars (free, mono- and disaccharides), syrups, naturally occurring sugars that are isolated from a whole food and concentrated so that sugar is the primary component (e.g., fruit juice concentrates), and other caloric sweeteners.
- The *2010 Dietary Guidelines* also included guidance stating that, for most people, no more than about 5 to 15 percent of calories from solid fats and added sugars (combined) can be reasonably accommodated in a healthy eating pattern.
- The current intake of added sugars still remains high at 268 calories or 13 percent of total calories per day among the total population, and 15 to 17 percent in children 9 and older, adolescents, and young adults.

Introduction

2015 DGAC Food Pattern Modeling: Added sugars available in the USDA Food Patterns (Healthy U.S.-Style, Healthy Mediterranean-Style, and Vegetarian Patterns) in calories, teaspoons, and percent of total calories per day*

CALORIE LEVEL	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200
	Empty calorie limits available for **added sugars** (assuming 45% empty calories from added sugars and 55% from solid fat)											
Healthy U.S.-style	68	50	50	54	77	122	126	158	171	180	212	275
Healthy Med-style	63	50	50	81	72	117	126	135	149	158	194	257
Vegetarian	77	77	81	81	81	131	131	158	158	158	185	234
Average	69	59	60	72	77	123	128	150	159	165	197	255
Average (tsp)	4.3	3.7	3.8	4.5	4.8	7.7	8.0	9.4	9.9	10.3	12.3	15.9
Healthy U.S.-style	7%	4%	4%	3%	4%	6%	6%	7%	7%	6%	7%	9%
Healthy Med-style	6%	4%	4%	5%	4%	6%	6%	6%	6%	6%	6%	8%
Vegetarian	8%	6%	6%	5%	5%	7%	6%	7%	6%	6%	6%	7%
Average	7%	5%	4%	5%	4%	6%	6%	6%	6%	6%	7%	8%

* See ***Part D. Chapter 1: Food and Nutrient Intakes, and Health: Current Status and Trends*** and Appendix E3.7 for a full discussion of the food pattern modeling.

Introduction

- Although food pattern modeling evaluates the amount of added sugars that can be consumed while meeting food group and nutrient needs, the DGAC also reviewed scientific literature examining the relationship between the intake of added sugars and health to inform recommendations.
- The Committee focused on the health outcomes most commonly researched related to added sugars, specifically, body weight and risk of type 2 diabetes, CVD, and dental caries.

Questions Addressed

- What is the relationship between the intake of added sugars and cardiovascular disease, body weight/obesity, type 2 diabetes, and dental caries?
  - NEL systematic review: CVD
  - Existing reports: BW, T2D, and dental caries
- What is the relationship between the intake of low-calorie sweeteners and body weight/obesity and type 2 diabetes?
  - Existing reports

Status Update

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

Summary of Major Conclusions

- Added sugars, especially sugar-sweetened beverages:
  - Strong evidence for an increased risk of:
    - Excess body weight and obesity
    - Type 2 diabetes
  - Moderate evidence for an increased risk of:
    - Hypertension, stroke, and CHD; higher blood pressure and serum triglycerides
    - Dental caries

Summary of Major Conclusions

- Low-calorie sweeteners:
  - Moderate evidence for replacing sugar-containing sweeteners with low-calorie sweeteners for reducing calorie intake, body weight, and adiposity in short duration studies
  - Limited and inconsistent evidence of an association between low-calorie sweeteners and long-term body weight control and risk of type 2 diabetes

Major Recommendations

- Strong evidence supports reducing added sugars intake to reduce health risks.
- **The DGAC recommends limiting added sugars to a maximum of 10 percent of total daily caloric intake**. This recommendation is supported by:
  1. The food pattern modeling analysis conducted by the 2015 DGAC and
  2. The scientific evidence review on added sugar and chronic disease risk conducted by the Committee.

Major Recommendations

- Since 39 percent of added sugars are from sugar-sweetened beverages, efforts are needed to reduce these beverages.
- The recommendation to limit added sugars, especially sugar-sweetened beverages, is consistent with recommendations from national and international organizations.

Major Recommendations

- Because the evidence for low-calorie sweeteners is insufficient (due to a paucity of data), those sweeteners should not be recommended for use as a primary replacement/substitute for added sugars in foods and beverages.

Major Recommendations

- Policies and programs at local, state, and national levels in both the private sector and public sector are necessary to support efforts to lower added sugar in foods and beverages and to limit availability of sugar sweetened beverages and snacks.
  - Water is the preferred beverage choice.
  - The Nutrition Facts Panel should include added sugars (in grams and teaspoons).
  - Consumers would benefit from a front-of-package label.

Major Recommendations

- Policies and programs, continued:
  - Economic and pricing approaches, using incentives and disincentives, should be explored.
  - Efforts to reduce added sugars in foods and sugar-sweetened beverages in school meals should continue.
  - Policies that limit exposure and marketing of foods and beverages high in added sugars to young children, youth and adolescents are needed.

Major Recommendations

- Policies and programs, continued:
  - Health promotion efforts and policies are needed to reduce sugar-sweetened beverages in post-secondary institutions and worksites.
  - Policy changes within the Supplemental Nutrition Assistance Program (SNAP) should be considered to encourage purchase of healthier options.
  - Public education campaigns are needed.

Chapter Summary

- The DGAC encourages the consumption of healthy dietary patterns that are low in saturated fat, added sugars, and sodium.
- The conclusions in this chapter complement the findings from *Chapter 1: Food and Nutrient Intakes, and Health: Current Status and Trends* and *Part D. Chapter 2: Dietary Patterns, Foods and Nutrients, and Health Outcomes.*
- The goals for the general population are: less than 2,300 mg dietary sodium per day (or age-appropriate Dietary Reference Intake amount), less than 10 percent total calories from saturated fat per day, and a maximum of 10 percent of total calories from added sugars per day.

Chapter Summary

- Rather than focusing purely on reduction, emphasis should be placed on replacement and shifts in food intake and overall dietary patterns.
- Policies and programs at local, state, and national levels in both the private and public sector are necessary to support reduction efforts.
- The Committee supports efforts in labeling and other campaigns to increase consumer awareness and understanding of sodium, saturated fats, and added sugars in foods and beverages.

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Science Base Chapter:

Cross-Cutting Topics of Public Health Importance: Sodium

Discussion