Part A. Executive Summary

The 2015 Dietary Guidelines Advisory Committee (DGAC) was established jointly by the Secretaries of the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA). The Committee was charged with examining the Dietary Guidelines for Americans, 2010 to determine topics for which new scientific evidence was likely to be available with the potential to inform the next edition of the Guidelines and to place its primary emphasis on the development of food-based recommendations that are of public health importance for Americans ages 2 years and older published since the last DGAC deliberations.

The 2015 DGAC’s work was guided by two fundamental realities. First, about half of all American adults—117 million individuals—have one or more preventable, chronic diseases, and about two-third of U.S. adults—nearly 155 million individuals—are overweight or obese. These conditions have been highly prevalent for more than two decades. Poor dietary patterns, overconsumption of calories, and physical inactivity directly contribute to these disorders. Second, individual nutrition and physical activity behaviors and other health-related lifestyle behaviors are strongly influenced by personal, social, organizational, and environmental contexts and systems. Positive changes in individual diet and physical activity behaviors, and in the environmental contexts and systems that affect them, could substantially improve health outcomes.

Recognizing these realities, the Committee developed a conceptual model based on socio-ecological frameworks to guide its work (see Part B. Chapter 1: Introduction) and organized its evidence review to examine current status and trends in food and nutrient intakes, dietary patterns and health outcomes, individual lifestyle behavior change, food and physical activity environments and settings, and food sustainability and safety.

The remainder of this Executive Summary provides brief synopses of the DGAC’s topic-specific evidence review chapters. Each of these chapters ends with a list of research recommendations (see Appendix E-1: Needs for Future Research for a compilation of these recommendations). The Committee integrated its findings and conclusions into several key themes and articulated specific recommendations for how the report’s findings can be put into action at the individual, community, and population levels. The Executive Summary ends with a brief summary of this chapter.
TOPIC-SPECIFIC FINDINGS AND CONCLUSIONS

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

The DGAC conducted data analyses to address a series of questions related to the current status and trends in the Nation’s dietary intake. The questions focused on: intake of specific nutrients and food groups; food categories (i.e., foods as consumed) that contribute to intake; eating behaviors; and the composition of various dietary patterns shown to have health benefits. These topics were addressed using data from the What We Eat in America dietary survey, which is the dietary intake component of the ongoing National Health and Nutrition Examination Survey. Food pattern modeling using the USDA Food Pattern food groups also was used to address some questions. In addition, the DGAC examined the prevalence and trends of health conditions that may have a nutritional origin, or where the course of disease may be influenced by diet.

The DGAC found that several nutrients are underconsumed relative to the Estimated Average Requirement or Adequate Intake levels set by the Institute of Medicine (IOM) and the Committee characterized these as shortfall nutrients: vitamin A, vitamin D, vitamin E, vitamin C, folate, calcium, magnesium, fiber, and potassium. For adolescent and premenopausal females, iron also is a shortfall nutrient. Of the shortfall nutrients, calcium, vitamin D, fiber, and potassium also are classified as nutrients of public health concern because their underconsumption has been linked in the scientific literature to adverse health outcomes. Iron is included as a shortfall nutrient of public health concern for adolescent females and adult females who are premenopausal due to the increased risk of iron-deficiency in these groups. The DGAC also found that two nutrients—sodium and saturated fat—are overconsumed by the U.S. population relative to the Tolerable Upper Intake Level set by the IOM or other maximal standard and that the overconsumption poses health risks.

In comparison to recommended amounts in the USDA Food Patterns, the majority of the U.S. population has low intakes of key food groups that are important sources of the shortfall nutrients, including vegetables, fruits, whole grains, and dairy. Furthermore, population intake is too high for refined grains and added sugars. The data suggest cautious optimism about dietary intake of the youngest members of the U.S. population because many young children ages 2 to 5 years consume recommended amounts of fruit and dairy. However, a better understanding is needed on how to maintain and encourage good habits that are started early in life. Analysis of data on food categories, such as burgers, sandwiches, mixed dishes, desserts, and beverages, shows that the composition of many of these items could be improved so as to increase population intake of vegetables, whole grains, and other underconsumed food groups and to lower population intake of the nutrients sodium and saturated fat, and the food component refined grains. Improved beverage selections that limit or remove sugar-sweetened beverages and place limits on sweets and desserts would help lower intakes of the food component, added sugars.
The U.S. population purchases its food in a variety of locations, including supermarkets, convenience stores, schools, and the workplace. The DGAC found that although diet quality varies somewhat by the setting where food is obtained, overall, no matter where the food is obtained, the diet quality of the U.S. population does not meet recommendations for vegetables, fruit, dairy, or whole grains, and exceeds recommendations, leading to overconsumption, for the nutrients sodium and saturated fat and the food components refined grains, solid fats, and added sugars.

Obesity and many other health conditions with a nutritional origin are highly prevalent. The Nation must accelerate progress toward reducing the incidence and prevalence of overweight and obesity and chronic disease risk across the U.S. population throughout the lifespan and reduce the disparities in obesity and chronic disease rates that exist in the United States for certain ethnic and racial groups and for those with lower incomes.

The DGAC had enough descriptive information from existing research and data to model three dietary patterns and to examine their nutritional adequacy. These patterns are the Healthy U.S.-style Pattern, the Healthy Mediterranean-style Pattern, and the Healthy Vegetarian Pattern. These patterns include the components of a dietary pattern associated with health benefits.

Dietary Patterns, Foods and Nutrients, and Health Outcomes

A major goal of the DGAC was to describe the common characteristics of healthy diets, and the Committee focused on research examining dietary patterns because the totality of diet—the combinations and quantities in which foods and nutrients are consumed—may have synergistic and cumulative effects on health and disease. The Committee focused on providing a qualitative description of healthy dietary patterns based on scientific evidence for several health outcomes.

The DGAC found remarkable consistency in the findings and implications across its conclusion statements for the questions examining dietary patterns and various health outcomes. When reviewing the evidence, the Committee attempted to adhere to the language used by the study authors in describing food groupings. There was variability across the food groupings, and this was particularly apparent in the meat group. For example, “total meat” may have been defined as “meat, sausage, fish, and eggs,” “red meat, processed meat, and poultry,” or various other combinations of meat. Similarly, “vegetables” seemed to most often exclude potatoes, but some studies included potatoes, yet those that mentioned potatoes rarely provided information on how the potatoes were consumed (e.g., fried versus baked). When reported in the studies, the Committee considered these definitions in their review. However, the Committee provided a general label for the food groupings in its conclusion statements.
The overall body of evidence examined by the 2015 DGAC identifies that a healthy dietary pattern is higher in vegetables, fruits, whole grains, low- or non-fat dairy, seafood, legumes, and nuts; moderate in alcohol (among adults); lower in red and processed meat; and low in sugar-sweetened foods and drinks and refined grains. Vegetables and fruit are the only characteristics of the diet that were consistently identified in every conclusion statement across the health outcomes. Whole grains were identified slightly less consistently compared to vegetables and fruits, but were identified in every conclusion with moderate to strong evidence. For studies with limited evidence, grains were not as consistently defined and/or they were not identified as a key characteristic. Low- or non-fat dairy, seafood, legumes, nuts, and alcohol were identified as beneficial characteristics of the diet for some, but not all, outcomes. For conclusions with moderate to strong evidence, higher intake of red and processed meats was identified as detrimental compared to lower intake. Higher consumption of sugar-sweetened foods and beverages as well as refined grains was identified as detrimental in almost all conclusion statements with moderate to strong evidence.

Regarding alcohol, the Committee confirmed several conclusions of the 2010 DGAC, including that moderate alcohol intake can be a component of a healthy dietary pattern, and that if alcohol is consumed, it should be consumed in moderation and only by adults. However, it is not recommended that anyone begin drinking or drink more frequently on the basis of potential health benefits, because moderate alcohol intake also is associated with increased risk of violence, drowning, and injuries from falls and motor vehicle crashes. Women should be aware of a moderately increased risk of breast cancer even with moderate alcohol intake. In addition, there are many circumstances in which people should not drink alcohol, including during pregnancy. 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.

Following a dietary pattern associated with reduced risk of CVD, overweight, and obesity also will have positive health benefits beyond these categories of health outcomes. Thus, the U.S. population should be encouraged and guided to consume dietary patterns that are rich in vegetables, fruit, whole grains, seafood, legumes, and nuts; moderate in low- and non-fat dairy products and alcohol (among adults); lower in red and processed meat; and low in sugar-sweetened foods and beverages and refined grains. These dietary patterns can be achieved in many ways and should be tailored to the individual’s biological and medical needs as well as socio-cultural preferences.

As lean meats were not consistently defined or handled similarly between studies, they were not identified as a common characteristic across the reviews. However, as demonstrated in the food pattern modeling of the Healthy U.S.-style and Healthy Mediterranean-style patterns, lean meats can be a part of a healthy dietary pattern.
The dietary pattern characteristics being recommended by the 2015 DGAC reaffirm the dietary pattern characteristics recommended by the 2010 DGAC. Additionally, these characteristics align with recommendations from other groups, including the American Institute for Cancer Research (AICR) and the American Heart Association (AHA). The majority of evidence considered by the Committee focused on dietary patterns consumed in adulthood. Very little evidence examined dietary patterns during childhood. However, the healthy dietary pattern components described above also apply to children and are reaffirmed with the USDA Food Patterns, which are designed to meet nutrient needs across the lifespan.

### Individual Diet and Physical Activity Behavior Change

The individual is at the innermost core of the social-ecological model. In order for policy recommendations such as the Dietary Guidelines for Americans to be fully implemented, motivating and facilitating behavioral change at the individual level is required. This chapter suggests a number of promising behavior change strategies that 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, and self-monitoring of diet and body weight as well as effective food labeling to target healthy food choices. These strategies complement comprehensive lifestyle interventions and nutrition counseling by qualified nutrition professionals.

For this approach to work, it will be essential that the food environments in communities available to the U.S. population, particularly to low-income individuals, facilitate access to healthy and affordable food choices that respect their cultural preferences. Similarly, food and calorie label education should be designed to be understood by audiences with low health literacy, some of which may have additional English language fluency limitations. Although viable approaches are available now, additional research is necessary to improve the scientific foundation for more effective guidelines on individual-level behavior change for all individuals living in the United States, taking into account the social, economic, and cultural environments in which they live.

The evidence reviewed in this chapter also indicates that the social, economic, and cultural context in which individuals live may facilitate or hinder their ability to choose and consume dietary patterns that are consistent with the Dietary Guidelines. Specifically, household food insecurity hinders the access to healthy diets for millions of Americans. In addition, immigrants are at high risk of losing the healthier dietary patterns characteristic of their cultural background as they acculturate into mainstream America. Furthermore, preventive nutrition services that take into account the social determinants of health are largely unavailable in the U.S. health system to systematically address nutrition-related health problems, including overweight and obesity, cardiovascular disease, type 2 diabetes, and other health outcomes.
This chapter calls for: a) stronger Federal policies to help prevent household food insecurity and to help families to cope with food insecurity if it develops, b) food and nutrition assistance programs to take into account the risk that immigrants have of giving up their healthier dietary habits soon after arriving in the United States, and c) efforts to provide all individuals living in the United States with the environments, knowledge, and tools needed to implement effective individual- or family-level behavioral change strategies to improve the quality of their diets and reduce sedentary behaviors. These goals will require changes at all levels of the social-ecological model through coordinated efforts among health care and social and food systems from the national to the local level.

Food Environment and Settings

Environmental and policy approaches are needed to complement individual-based efforts to improve diet and reduce obesity and other diet-related chronic diseases. These approaches have the potential for broad and sustained impact at the population level because they can become incorporated into organizational structures and systems and lead to alterations in sociocultural and societal norms. Both policy and environmental changes also can help reduce disparities by improving access to and availability of healthy food in underserved neighborhoods and communities. Federal nutrition assistance programs, in particular, play a vital role in achieving this objective through access to affordable foods that help millions of Americans meet Dietary Guidelines recommendations.

The DGAC focused on physical environments (settings) in which food is available. Its aim was to better understand the impact of the food environment to promote or hinder healthy eating in these settings and to identify the most effective evidence-based diet-related approaches and policies to improve diet and weight status. The DGAC focused on four settings—community food access, child care, schools and worksites—and their relationships to dietary intake and quality and weight status.

The DGAC found moderate and promising evidence that multi-component obesity prevention approaches implemented in child care settings, schools, and worksites improve weight-related outcomes; strong to moderate evidence that school and worksite policies are associated with improved dietary intake; and moderate evidence that multi-component school-based and worksite approaches increase vegetable and fruit consumption. For the questions on community food access addressing the relationship between food retail settings and dietary intake and quality and weight status, the evidence was too limited or insufficient to assign grades. To reduce the disparity gaps that currently exist in low resource and underserved communities, more solution-oriented strategies need to be implemented and evaluated on ways to increase access to and procurement of healthy affordable foods and beverages, and also to reduce access to energy-
dense, nutrient-poor foods and beverages. Although several innovative approaches are taking place now throughout the country, they generally lack adequate evaluation efforts.

The Committee’s findings revealed the power of multi-component approaches over single component interventions. For obesity prevention, effective multi-component interventions incorporated both nutrition and physical activity using a variety of strategies, such as environmental policies to improve the availability and provision of healthy foods and beverages; increasing opportunities for physical activity; increased parent engagement (in child care and school settings); and educational approaches, such as a school nutrition curriculum. For multi-component dietary interventions (e.g., to increase consumption of vegetables and fruit) the most effective strategies included nutrition education, parent engagement (in school and child care settings) and environmental modifications (e.g., policies for nutrition standards, food service changes, point of purchase information).

Collaborative partnerships and strategic efforts are needed to translate this evidence into action. Further work on restructuring the environment to facilitate healthy eating and physical activity, especially in high risk populations, is needed to advance evidence-based solutions that can be scaled up.

**Food Sustainability and Safety**

Access to sufficient, nutritious, and safe food is an essential element of food security for the U.S. population. A sustainable diet ensures this access for both the current population and future generations.

The major findings regarding sustainable diets were that a diet higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in calories and animal-based foods is more health promoting and is associated with less environmental impact than is the current U.S. diet. This pattern of eating can be achieved through a variety of dietary patterns, including the Healthy U.S.-style Pattern, the Healthy Mediterranean-style Pattern, and the Healthy Vegetarian Pattern. All of these dietary patterns are aligned with lower environmental impacts and provide options that can be adopted by the U.S. population. Current evidence shows that the average U.S. diet has a larger environmental impact in terms of increased greenhouse gas emissions, land use, water use, and energy use, compared to the above dietary patterns. This is because the current U.S. population intake of animal-based foods is higher and plant-based foods are lower, than proposed in these three dietary patterns. Of note is that no food groups need to be eliminated completely to improve sustainability outcomes over the current status.

A moderate amount of seafood is an important component of two of three of these dietary patterns, and has demonstrated health benefits. The seafood industry is in the midst of rapid
expansion to meet worldwide demand. The collapse of some fisheries due to overfishing in the past decades has raised concern about the ability to produce a safe and affordable supply. In addition, concern has been raised about the safety and nutrient content of farm-raised versus wild-caught seafood. To supply enough seafood to support meeting dietary recommendations, both farm-raised and wild caught seafood will be needed. The review of the evidence demonstrated, in the species evaluated, that farm-raised seafood has as much or more EPA and DHA per serving as wild caught. It should be noted that low-trophic seafood, such as catfish and crawfish, regardless of whether wild caught or farm-raised seafood, have less EPA and DHA per serving than high-trophic seafood, such as salmon and trout.

Regarding contaminants, for the majority of wild caught and farmed species, neither the risks of mercury nor organic pollutants outweigh the health benefits of seafood consumption. Consistent evidence demonstrated that wild caught fisheries that have been managed sustainably have remained stable over the past several decades; however, wild caught fisheries are fully exploited and their continuing productivity will require careful management nationally and internationally to avoid long-term collapse. Expanded supply of seafood nationally and internationally will depend upon the increase of farm-raised seafood worldwide.

The impact of food production, processing, and consumption on environmental sustainability is an area of research that is rapidly evolving. As further research is conducted and best practices are evaluated, additional evidence will inform both supply-side participants and consumers on how best to shift behaviors locally, nationally, and globally to support sustainable diets. Linking health, dietary guidance, and the environment will promote human health and the sustainability of natural resources and ensure current and long-term food security.

In regard to food safety, updated and previously unexamined areas of food safety were studied. Currently, strong evidence shows that consumption of coffee within the moderate range (3 to 5 cups per day or up to 400 mg/d caffeine) is not associated with increased long-term health risks among healthy individuals. In fact, consistent evidence indicates that coffee consumption is associated with reduced risk of type 2 diabetes and cardiovascular disease in adults. Moreover, moderate evidence shows a protective association between caffeine intake and risk of Parkinson’s disease. Therefore, moderate coffee consumption can be incorporated into a healthy dietary pattern, along with other healthful behaviors. However, it should be noted that coffee as it is normally consumed can contain added calories from cream, milk, and added sugars. Care should be taken to minimize the amount of calories from added sugars and high-fat dairy or dairy substitutes added to coffee.

The marketing and availability of high-caffeine beverages and products is on the rise. Unfortunately, only limited evidence is currently available to ascertain the safety of high caffeine intake (greater than 400 mg/day for adults and undetermined for children and adolescents) that
may occur with rapid consumption of large-sized energy drinks. Limited data suggest adverse health outcomes, such as caffeine toxicity and cardiovascular events. Concern is heightened when caffeine is combined with alcoholic beverages. Limited or no consumption of high caffeine drinks, or other products with high amounts of caffeine, is advised for children and adolescents. Energy drinks with high levels of caffeine and alcoholic beverages should not be consumed together, either mixed together or consumed at the same sitting.

The DGAC also examined the food additive aspartame. At the level that the U.S. population consumes aspartame, it appears to be safe. However, some uncertainty continues about increased risk of hematopoietic cancer in men, indicating a need for more research.

Individual behaviors along with sound government policies and responsible private sector practices are all needed to reduce foodborne illnesses. To that end, the DGAC updated the established recommendations for handling foods at home.

Cross-cutting Topics of Public Health Importance

The 2010 Dietary Guidelines included guidance on sodium, saturated fat, and added sugars, and the 2015 DGAC determined that a reexamination of the evidence on these topics was necessary to determine 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 overconsumed. 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.

The DGAC encourages the consumption of healthy dietary patterns that are low in saturated fat, added sugars, and sodium. 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 of total calories from saturated fat per day, and a maximum of 10 percent of total calories from added sugars per day.

Sodium, saturated fat, and added sugars are not intended to be reduced in isolation, but as a part of a healthy dietary pattern that is balanced, as appropriate, in calories. Rather than focusing purely on reduction, emphasis should also be placed on replacement and shifts in food intake and eating patterns. Sources of saturated fat should be replaced with unsaturated fat, particularly polyunsaturated fatty acids. Similarly, added sugars should be reduced in the diet and not replaced with low-calorie sweeteners, but rather with healthy options, such as water in place of sugar-sweetened beverages. For sodium, emphasis should be placed on expanding industry
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Reducing sodium, saturated fat, and added sugars can be accomplished and is more attainable by eating a healthy dietary pattern. For all three of these components of the diet, policies and programs at local, state, and national levels in both the private and public sector are necessary to support reduction efforts. Similarly, 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. The Committee encourages the food industry to continue reformulating and making changes to certain foods to improve their nutrition profile. Examples of such actions include lowering sodium and added sugars content, achieving better saturated fat to polyunsaturated fat ratio, and reducing portion sizes in retail settings (restaurants, food outlets, and public venues, such as professional sports stadiums and arenas). The Committee also encourages the food industry to market these improved products to consumers.

Physical Activity

This chapter provides strong evidence supporting the importance of regular physical activity for health promotion and disease prevention in the U.S. population. Physical activity is important for all people—children, adolescents, adults, older adults, women during pregnancy and the postpartum period, and individuals with disabilities. The findings further provide guidance on the dose of physical activity needed across the lifecycle to realize these significant health benefits.

Future Physical Activity Guidelines Advisory Committees will be asked to carefully review the most recent evidence so that the Federal government can fully update the 2008 Physical Activity Guidelines for Americans. Given the exceedingly low physical activity participation rates in this country, it will be critically important for the next Committee to identify proven strategies and approaches to increase population-level physical activity across the lifespan.

INTEGRATING THE EVIDENCE

The research base reviewed by the 2015 DGAC provides clear evidence that persistent, prevalent, preventable health problems, notably overweight and obesity, cardiovascular disease, type 2 diabetes and certain cancers, have adversely affected the health of the U.S. public for decades and raise the urgency for immediate attention and bold action. Evidence points to specific areas of current food and nutrient concerns and it pinpoints the characteristics of healthy dietary and physical activity patterns that can reduce chronic disease risk, promote healthy weight status, and foster good health across the lifespan. In addition, research evidence is converging to show that healthy dietary patterns also are more sustainable and associated with more favorable health as well as environmental outcomes.
Effective models of “what works” to promote lifestyle behavior change exist. While they can be improved, especially in terms of our capacity for scaling-up in community and health care settings, the evidence to date can be used to guide programs and services for individuals and families. They also can be used to assist the public and private sectors and communities in facilitating innovative environmental change to promote the population’s health.

It will take concerted, bold actions on the part of individuals, families, communities, industry, and government to achieve and maintain the healthy diet patterns and the levels of physical activity needed to promote the health of the U.S. population. These actions will require a paradigm shift to an environment in which population health is a national priority and where individuals and organizations, private business, and communities work together to achieve a population-wide “culture of health” in which healthy lifestyle choices are easy, accessible, affordable and normative—both at home and away from home. In such a culture, health care and public health professionals also would embrace a new leadership role in prevention, convey the importance of lifestyle behavior change to their patients/clients, set standards for prevention in their own facilities, and help patients/clients in accessing evidence-based and effective nutrition and comprehensive lifestyle services and programs.