

2015 Dietary Guidelines Advisory Committee Meeting 5

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September 16-17, 2014

Day 1 Meeting Summary

Tuesday, September 16, 2014

(10:30 a.m.)

Participants

Dietary Guidelines Advisory Committee (DGAC): Dr. Barbara Millen (Chair), Dr. Alice H. Lichtenstein (Vice-Chair), Dr. Steven Abrams, Dr. Lucile Adams-Campbell, Dr. Cheryl Anderson, Dr. J. Thomas Brenna, Dr. Wayne Campbell, Dr. Steven Clinton, Dr. Frank Hu, Dr. Miriam Nelson, Dr. Marian Neuhouser, Dr. Rafael Pérez-Escamilla, Dr. Anna Maria Siega-Riz, Dr. Mary Story

Co-Executive Secretaries: Dr. Richard Olson, Ms. Colette Rihane, Dr. Kellie O. Casavale, Dr. Shanthi Bowman

Others: Mr. Kevin Concannon, Dr. Don Wright, Ms. Angela Tagtow, Ms. Jackie Haven

Opening Remarks

Dr. Richard Olson, Designated Federal Officer, Division of Prevention Science, Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services, called the fifth meeting of the 2015 Dietary Guidelines Advisory Committee (DGAC) to order at 10:30 am. Dr. Olson welcomed the meeting participants and opened the meeting, noting that over 800 individuals were registered to view the webcast live. All 14 members of the Committee were present. Dr. Olson noted that brief biographies for the Committee members were available at www.DietaryGuidelines.gov. He introduced the Federal staff at the table (listed above under participants) and noted there were additional Federal staff present in the periphery of the room. He reviewed the agenda of the subcommittee reports that will be discussed the next two days. Subcommittees would report on their work since the last public meeting (July 17-18, 2014). He noted that in this public meeting, the Committee would begin their discussions of the scientific evidence and the first draft conclusions would be presented for Committee discussion.

Dr. Olson added that the Committee plans to meet again to discuss the final recommendations for the report and that date is posted on www.DietaryGuidelines.gov.

Dr. Olson noted that it is expected that the Committee will complete its report by the end of calendar year 2014. The Departments will post the report for public comment, hold a public comment meeting on the report, and then develop the policy document, the *Dietary Guidelines for Americans, 2015*. The policy document is expected to be published by the end of calendar year 2015. He then turned the floor over to Dr. Barbara Millen to introduce the subcommittee reports.

Introduction to Subcommittee Reports

Dr. Barbara Millen, Chair of the DGAC, began by welcoming Federal staff, support staff, and the webcast public viewers to the DGAC meeting 5. She provided background information common to the process used for each subcommittee as well as reiterated the purpose and the charge of the Committee.

Dr. Millen reviewed the themes of the Committee which included: 1) Focus on dietary patterns; 2) “What Works” to meet recommendation; and 3) “Systems” approach to consider the factors of health influence. She then reviewed the scope of each of the five subcommittees, noting that the presentations to follow will describe the work of each subcommittee as well as work on several topics that cross two or more subcommittees such as sodium, eating out and the food environment, evidence for “what works” to achieve positive outcomes, and physical activity. She described the approach being used to address the cross-cutting topic of physical activity, which will use existing reports to develop key findings and conclusions to a number of questions for Subcommittees 1 through 4.

Dr. Millen described two types of expertise that may be sought by the Committee: invited experts and consultant subcommittee members. Invited experts are individuals invited by a subcommittee, usually on a one-time basis, to provide their expertise to inform the subcommittee’s work; they do not participate in decisions at the subcommittee level. Consultant subcommittee members are individuals sought to participate in subcommittee discussions and decisions on an ongoing basis but are not members of the full Committee. Like Committee members, consultants complete training and have been reviewed and cleared through a formal process within the Federal government.

To set the stage for the subcommittee reports, Dr. Millen reviewed the approaches for examining the evidence that are common to all the subcommittees. This includes use of Nutrition Evidence Library (NEL) systematic reviews, existing high-quality reports, original data analyses, and food pattern modeling analyses, as well as consideration of public comments. She then reviewed the six steps of the NEL process managed by USDA; these steps were presented in detail at the inaugural meeting of the Committee in June 2013. She noted that the NEL process is elaborate, objective, and systematic. She introduced the types of materials the subcommittees might use in presenting the review of the evidence for the full Committee’s consideration. Dr. Millen

reviewed the basis for the conclusion statements and implication statements of the Committee. The report will be used by HHS and USDA to develop the *Dietary Guidelines for Americans, 2015* policy. She then turned the floor over to the Subcommittee 1 Chair, Dr. Marian Neuhouser.

***Subcommittee 1 (SC 1): Food and Nutrient Intakes,
and Health: Current Status and Trends***

Dr. Marian Neuhouser, SC 1 Chair, identified the members of SC 1, who are Dr. Steven Abrams, Dr. Cheryl Anderson, Dr. Mary Story, and Dr. Alice H. Lichtenstein. She also acknowledged Dr. Barbara Millen as an active member working with SC 1 as well. She described the scope of the SC 1 work as identifying the current status and trends in 1) food group, food, and nutrient intake; 2) eating behaviors; 3) diet-related chronic diseases, weight, and physical activity; and 4) dietary patterns. She explained that this work is a necessary foundation for the overall Committee report to understand where the population is and to formulate appropriate recommendations. She noted that SC 1 had no invited experts or consultants since the July meeting.

Dr. Neuhouser noted that the SC would address the current status of their work on six topics today: Nutrients of Public Health Concern, Food Group Intakes, Food Category Intakes, Eating Behaviors—Status and Trends, Health Conditions—Prevalence and Trends, and Dietary Patterns.

Nutrients of Public Health Concern

Dr. Neuhouser then identified the five specific questions she would address for the topic “Nutrients of Public Health Concern,” which are: 1) What are current consumption patterns of nutrients from foods and beverages in the U.S. population? 2) Of the nutrients that are over- or under-consumed, which present a substantial public health concern? 3) Is there evidence of overconsumption of any micronutrients from consumption of fortified foods and supplements? 4) What is the level of caffeine intake derived from foods and beverages by age/sex categories in the U.S. population? 5) How well do updated USDA Food Patterns meet Institute of Medicine (IOM) Dietary Reference Intakes and 2010 *Dietary Guidelines* recommendations? How do the recommended amounts of food groups compare to current distributions of usual intakes for the U.S. population?

Dr. Neuhouser began with the first question on current consumption patterns of nutrients from foods and beverages in the U.S. population. She noted that most of the data to answer this question were presented in previous meetings but showed information for additional population groups: pregnant women, racial/ethnic groups, and income groups. She reviewed the draft conclusion statements presented in July that 1) Vitamin A, vitamin D, vitamin E, folate, vitamin C, calcium, and magnesium are under-consumed relative to the Estimated Average Requirement

(EAR), and iron is under-consumed by adolescent and premenopausal females; 2) Potassium and fiber are under-consumed relative to the Adequate Intake (AI); and 3) Sodium and saturated fat are over-consumed relative to the Tolerable Upper Intake Level (UL) or other maximum standard. She then presented the implications from these conclusions that the U.S. population should decrease consumption of foods high in sodium and saturated fat; increase consumption of foods rich in vitamins A, D, E, C, folate, calcium, magnesium, potassium, and fiber; and consume a variety of nutrient-dense foods to meet recommended intake levels of these shortfall and over-consumed nutrients. In addition, adolescent and premenopausal females should increase consumption of foods rich in iron. The USDA Food Patterns provide guidance for consumption of a nutrient-dense, energy-balanced diet.

Dr. Neuhouser next discussed the second question: Of the nutrients that are over- or under-consumed, which present a substantial public health concern? For this question, the draft conclusion statement presented in July is that 1) Nutrient intake data, together with nutritional biomarker and health outcome data, indicate that vitamin D, calcium, potassium, and fiber are under-consumed and may pose a public health concern; and 2) Nutrient intake data, together with nutritional biomarker and health outcome data, indicate that sodium and saturated fat are over-consumed and may pose a public health concern. The implications from this conclusion are: the U.S. population should adopt the behaviors outlined in the implications for nutrients of concern question 1, and to help the population adopt these behaviors, strategies should be developed and implemented at both individual and population levels.

Dr. Neuhouser then presented an additional question that the SC had posed: What would be the effect on food choices and overall nutrient adequacy of limiting saturated fatty acids to 6 percent of total calories, replaced with sources of mono- and poly-unsaturated fatty acids? This question was answered using Food Pattern Modeling. She summarized the process and showed that with substitution of oils for the entire solid fat allowance, a level of approximately 6 percent of calories from saturated fats could be achieved, but noted that this would be less than the fifth percentile of current intake levels. She identified some of the food choices that would need to be modified to meet this level, and suggested that small changes toward this goal will help shift the overall population mean intake of saturated fat downwards.

Dr. Abrams discussed the third question: Is there evidence of overconsumption of any micronutrients from consumption of fortified foods and supplements? He presented data showing the percent of supplement users with intakes over the UL for folate, calcium, iron, and vitamin D, and the draft conclusion statement that 1) Dietary patterns in the U.S. population, including typical use of fortified foods, rarely lead to over-consumption of folate, calcium, iron, and vitamin D; and 2) However, each of these, as well as other nutrients, may be over-consumed in some supplement users, especially those taking high-dose supplements. Based on these conclusions, he noted the implications that the public may safely use dietary supplements containing the Recommended Dietary Allowance (RDA) level of nutrients, so long as total intake from diet plus supplements does not exceed the UL, and that caution should be used when

considering use of high-dose dietary supplements. Use of high-dose products such that total intake exceeds the UL should be discussed with an individual's health care provider.

Dr. Abrams then presented the fourth question: What is the level of caffeine intake derived from foods and beverages on the basis of age and gender groups in the U.S. population? The SC had previously presented data for this question and the draft conclusion statement that 1) In general, intakes of caffeine do not exceed what are likely safe levels in any age group. Some young adults may have moderately high intakes; and 2) There is less certainty about the safe level of intake in children and adolescents. However, routine consumption patterns do not suggest that excessive intakes are common in these groups. Implications are that the public may safely consume caffeine-containing beverages, such as coffee and tea. However, children, adolescents, and pregnant women should be cautious about consuming high levels of caffeine from supplements such as energy shots.

Dr. Abrams presented the fifth question: How well do updated USDA Food Patterns meet IOM Dietary Reference Intakes and 2010 *Dietary Guidelines* recommendations? How do the recommended amounts of food groups compare to current distributions of usual intakes for the U.S. population? This question was also addressed previously, with the draft conclusion statement that 1) USDA Food Patterns across a broad range of ages and energy intakes meet most goals for nutrient adequacy. Specific nutrients of public health concern for which the patterns do not meet recommendations are potassium and vitamin D; and 2) Recommended amounts for food groups and their components fall within the broad range of food group intake distributions for the U.S. population. The implications are that the USDA Food Patterns provide guidance for consumption of a nutrient-dense, energy balanced diet. To achieve nutrient adequacy, the U.S. population should be advised to consume dietary patterns consistent with the USDA Food Patterns. In some situations, specific food choices or dietary supplements may be used to increase nutrient intakes not met through the USDA Food Patterns.

Finally, Dr. Abrams presented an additional Food Pattern Modeling question that the SC had posed: Can vitamin D EARs and/or RDAs be met with careful food choices following recommended amounts from each food group in the USDA Food Patterns? How restricted would food choices be, and how much of the vitamin D would need to come from fortified dairy and other food products? He reviewed the process used, which included adding additional fortified foods and seafood with relatively high vitamin D level to the Patterns, and the findings. The conclusions of this analysis were that through the use of a diet rich in seafood and fortified foods, EAR, but not RDA, levels of vitamin D can be achieved. Additional fortification or supplementation strategies would be needed to reach RDA levels of intake consistently, especially in individuals with low intakes of fish or fortified dairy foods and beverages. The implications are that diet is an important aspect of achieving vitamin D intake targets. Americans should be encouraged to choose foods and beverages with vitamin D, and when needed, supplementation can be considered to achieve RDA intakes.

Discussion

Dr. Nelson asked about the rationale for modeling food patterns with 6 percent of calories from saturated fat. Dr. Neuhouser noted that the 6 percent level was in the American Heart Association/American College of Cardiology (AHA/ACC) Report. The Subcommittee wanted to see if this could be achieved and what food choices in the patterns would be needed to achieve this level. Dr. Nelson noted that the analysis showed changes within food categories, but there could also be shifts made in the overall pattern. Dr. Neuhouser agreed that the modeling was based on the current patterns. Dr. Lichtenstein stated that the modeling was from a narrow perspective, and also that the diet does not have to be decreased in total fat. Dr. Nelson suggested that the modeling could be done in a different way, and there might be other ways to achieve a lower saturated fat value. Dr. Lichtenstein noted that changing the Patterns would also change other nutrients, which they did not want to do.

Dr. Siega-Riz asked about vitamin D being a nutrient of concern, noting that there are other ways to increase our vitamin D levels than to increase dietary intake of fortified foods. Dr. Neuhouser explained the 3-pronged approach used to identify Vitamin D as a nutrient of concern. Dr. Abrams added that sunshine is a source, but many do not have exposure in the winter months. The RDA is based on this, and given the RDA, how is this level reached? Many major groups support the RDA as a minimum intake level. Dr. Siega-Riz responded that Americans are not getting physical activity, and this can be done outdoors, and that this modeling does not present the total picture for vitamin D. Dr. Clinton added that while 90 percent or so are not meeting the RDA, the population at risk may be 10 percent based on blood levels, and higher in African Americans; so while he agrees that it is a nutrient of concern, it is not a panic. Individuals who may be at risk due to lack of exposure to sunlight need to be aware of ways to correct this, and there is a blood test to ascertain vitamin D levels. Dr. Abrams added that to optimize bone health, exercise has to be included, and for Vitamin D, sunscreen use in children and cancer risk needs to be considered; one has to understand the balance. Dr. Nelson asked if there is a way in the implications statement to encourage children to play outside. Dr. Siega-Riz stated that not everybody needs supplementation, but the implications statement as written seems to say that. Dr. Neuhouser explained that this is why the totality of the evidence is used, and with vitamin D it is challenging to look at all the evidence and decide the appropriate recommendation. Dr. Lichtenstein added that it should also be acknowledged that there is some controversy about the appropriate serum level.

Dr. Campbell asked for clarity on the conclusion statements for vitamin D, calcium, and iron. Are they nutrients of concern on both spectrums of intake? Dr. Abrams explained that there is concern about over- and under-consumption for some nutrients, like calcium. Dr. Campbell asked, from a public health perspective, is there a clear message about diet versus supplementation? Why not use fortified dairy products? Is there a potential problem with over-supplementation? Dr. Abrams and Dr. Neuhouser noted that they would look at this and make sure the messaging is clear. Dr. Clinton added that in one slide it was suggested for those taking

a supplement to consult a “health care provider,” but most physicians do not know what the UL is. There is a need for registered dietitians for this purpose as part of the health care team.

Food Group Intakes

Dr. Neuhouser then addressed three questions on the topic “Food Group Intakes”: 1) What is the current consumption of USDA Food Pattern food groups by the U.S. population? 2) What are the trends in USDA Food Pattern food group consumption by the U.S. population? and 3) What would be the impact on the adequacy of the patterns if a) no dairy foods were consumed, b) if calcium was obtained from nondairy sources (including fortified foods), and c) if the proportions of milk and yogurt to cheese were modified?

Dr. Neuhouser began with the first question: What is current consumption of USDA Food Pattern food groups by the U.S. population? The evidence for this was presented previously, so she proceeded with the conclusion statement for this question that: 1) Across all age and gender groups, the vast majority of the U.S. population does not meet recommended intakes for fruit, vegetables, whole grains, and dairy food groups; and 2) Across all age and gender groups, the vast majority of the U.S. population exceeds recommended intakes for refined grains, solid fats, and added sugars. For this question, the implication statement is that to realize the numerous health benefits from a diet high in fruit, vegetables, whole grains, lean protein, and non-fat and low-fat dairy, the U.S. population should increase intake of under-consumed food groups and nutrient-dense foods, while maintaining energy balance; decrease consumption of refined grains (as a proportion of total grains), saturated fat, and added sugars; and increase low-fat/fat-free fluid milk and yogurt and decrease cheese to increase intakes of magnesium, potassium, vitamin A, vitamin D, and choline while decreasing the intake of sodium and saturated fat.

Dr. Neuhouser then identified several subquestions from Committee members that have been incorporated into this question, which are: 1a) What is the contribution of whole grain foods, fruits, and vegetables to total fiber and total nutrient intake in the USDA Food Patterns? 1b) What is the contribution of fruits and vegetables to current nutrient intake? 1c) What is the effect on nutrient intakes of decreasing refined/enriched grain intake, or reducing total grain intake? and 1d) What is the effect of a substitution of seafood for terrestrial animal foods on diet quality?

Dr. Neuhouser presented the evidence from a Food Pattern Modeling analysis for questions 1a and 1b, providing the percents of nutrients of concern contributed by fruits, vegetables, and whole grains. She then presented the conclusions being brought forward from the 2005 and 2010 Food Pattern Modeling reports for question 1c, which was that if all grains (6 oz eq per day) are consumed as whole grains (including fortified whole grain cereals substituted for refined grain cereals) then nutrient adequacy in the Patterns is achieved. If only whole grains (at 3 oz eq per day) are consumed without replacement or substitution of refined grains, then nutrient adequacy in the Patterns is not achieved, and it would result in nutrient shortfalls. For question 1d), Dr. Neuhouser presented the conclusions being brought forward from the 2010 Seafood Food Pattern

Modeling report, which was that: Increasing seafood intake to 8 ounces/week (for adults) would have no negative impact on nutrient adequacy and offers many benefits; 8 ounces/week increases EPA and DHA substantially from 177 milligrams to 259 milligrams in the 2000 calorie Pattern; and 8 ounces/week increases vitamin D, vitamin B-12 and selenium by more than 10 percent across the USDA Food Patterns at various calorie levels.

Dr. Neuhouser then proceeded with the second Food Group Intake question: What are the trends in USDA Food Pattern food group consumption by the U.S. population? The evidence for this was presented previously, so she proceeded with the conclusion statement for this question, which is that the U.S. population has made few dietary changes over time (2001-04 to 2007-10). Fruit intake has remained low but stable; vegetable intake has declined, particularly among children of all ages, adolescents, and young adult males; whole grain intake has slightly increased between 2001-04 and 2007-10, particularly among middle aged and older adults; and dairy intake has been relatively constant over time, but has decreased for girls 4 to 8 years and young adult males, and has increased for adults 51 to 70 years. The implications from this conclusion are that the U.S. population needs to build on the small improvements in dietary intake with regard to increase of whole grains and decrease of added sugars; poor nutritional intake is linked to numerous diet-related chronic diseases, and in the U.S. the prevalence of these conditions is far too high; and the health of the nation hinges in part on improving dietary intake.

Dr. Neuhouser then presented the third Food Group Intake question: What would be the impact on the adequacy of the patterns if: 1) no dairy foods (including milk, yogurt, cheese, and soymilk) were consumed; 2) calcium was obtained from nondairy sources (including fortified foods); and 3) the proportions of milk and yogurt to cheese were modified? The question was answered using a Food Pattern Modeling analysis. She presented the results of the analysis and then the summary statement that: 1) If no dairy products (including soymilk) are consumed, calcium, magnesium, phosphorus, vitamin A, vitamin D, potassium, and choline are negatively affected; 2) None of the calcium alternatives provide a similar enough nutrient profile in terms of these affected nutrients to be considered for inclusion in the dairy group; 3) Increasing the proportion of milk and yogurt versus cheese consumed would increase levels of magnesium, potassium, vitamin A, vitamin D, and choline in the USDA Food Patterns, and decrease amounts of sodium, cholesterol, and saturated fat.

Discussion

Dr. Hu noted that the modeling compared three versus no servings of dairy. Could a middle amount be done, with some soymilk and/or tofu added, because the sodium and saturated fat in dairy is high? Dr. Neuhouser responded that soymilk is actually part of the dairy group. There was not a modeling exercise substituting other alternate plant-milks, such as almond or rice milk, and these could be examined. Dr. Lichtenstein reminded that the bioavailability of the alternate calcium sources vary and needs to be kept in mind.

Dr. Campbell asked how the three dairy servings per day in the recommended patterns compare with current intake. Dr. Neuhouser noted that those data were presented in July and dairy is under-consumed. Dr. Campbell followed up by asking about the take-home message. Should more be consumed to meet the need? Dr. Neuhouser noted that this modeling was done, in part, based on public comments asking that alternate sources be considered; the alternates do not provide equivalent nutrients. The USDA Food Patterns are a good guide for consumption of these foods.

Dr. Nelson asked if SC 1 is coordinating with SC 2 on this, demonstrating the need for dairy for overall health. Dr. Neuhouser responded that they are coordinating with SC 2, and Dr. Anderson will be showing the work that is currently ongoing to identify amounts of foods in the dietary patterns found to be healthful. Dr. Hu noted that SC 2 is looking at dietary patterns that include low-fat dairy, but is not specifically addressing whether 3 servings of dairy is associated with risk. He noted that dairy is an important source of beneficial nutrients but is also high in sodium and saturated fat.

Dr. Nelson said that she is concerned about saying just to increase whole grains. The U.S. eats so many grains now, and there is a need to mention to not increase all grains. Dr. Neuhouser replied that this is important and SC 1 will make a note to include that.

Dr. Pérez-Escamilla mentioned that what he especially liked about the modeling was that it shows not all dairy is created equal, and that some dairy products can be increased but not others, like cheese. Dr. Neuhouser agreed and noted that this addresses Dr. Hu's concern. If there is less cheese and more skim milk consumed, there would be less sodium and less saturated fat being consumed. Dr. Hu reiterated that high amounts of sodium and saturated fat come from dairy and is not sure where so much sodium comes from.

Dr. Millen noted that the modeling exercises have shown the feasibility, what works in terms of nutrients of concern. You point out with the saturated fat, that one possible target level really falls below the 5th percentile level of usual intake in the population. You presented information on the other nutrients and food groups suggesting that some target levels may overlap the population distribution. Can you elaborate on feasibility? Dr. Abrams noted that focusing on feasibility without bioavailability shows there is a narrow focus on intake. Especially with children, for calcium, iron, and zinc, there is an issue, and the Committee needs to look at the big picture and not individual nutrient contributions. Dr. Siega-Riz noted that the previous slides show the U.S. population is nowhere near consuming what they should. How can the Committee get the U.S. population to meet halfway? Perhaps in line with Dr. Hu's comment, could modeling 3 versus 1.5 dairy servings in the consumption patterns be done?

Dr. Lichtenstein noted that the saturated fat recommendation of 6 percent is for hypercholesterolemic individuals. The Committee needs to think in terms of foods and food patterns. There is a huge range of dietary patterns that could be appropriate.

Dr. Millen noted one encouraging thing; when the distribution of intake of the population overlapping with the recommended levels of intake is examined, at least some people are beginning to approach appropriate levels of intake. There are many patterns that can be used and modified to meet recommendations. It will be a challenge for some particular nutrients, but SC 3 and SC 4 will be presenting what might be considered in terms of environmental strategies and food supply strategies. Dr. Neuhausner agreed and said that totality of what the Committee is doing shows this.

Dr. Hu mentioned that there is some concern that the RDA for calcium is too high when compared to other countries, and there is some emerging data that calcium supplementation is associated with increased risk of cardiovascular disease (CVD). Also, some recent studies show calcium levels in blood are associated with type 2 diabetes. Important elements might be missed if only one of many nutrients is focused on. Dr. Neuhausner agreed that it is complicated, and that ultimately the Committee recommendations are food-based.

Food Category Intakes

Dr. Anderson then addressed five questions on the food categories topic: 1) What are current consumption patterns by food categories (foods as consumed) in the U.S. population? 2) What are the top foods contributing to energy intake in the U.S. population? 3) What are the top foods contributing to sodium, saturated fat, and added sugars intake in the U.S. population? 4) What is the contribution of beverage types to energy intake by the U.S. population? and 5) What are the sources of caffeine from foods and beverages on the basis of Dietary Reference Intake (DRI) age and sex categories in the U.S. population? She noted that the data for these questions has been presented previously and today she would focus on conclusions and implications.

Dr. Anderson began with the first question: What are current consumption patterns by food categories (foods as consumed) in the U.S. population? The draft conclusion statements for this question are that the mixed dishes food category is the major contributor to some USDA Food Pattern food groups—grains, vegetables, and protein foods; fruit and fluid milk intake are seldom part of mixed dishes; and mixed dishes contribute substantially to intakes of energy, saturated fat, and sodium, but also make important contributions to intake of vegetables, fiber, grains, and dairy. Therefore, the implications are that an important strategy for meeting optimal intake levels of calories, saturated fat, and sodium may be to change the composition of some mixed dishes.

Dr. Anderson next addressed the second question: What are the top foods contributing to energy intake in the U.S. population? The conclusion is that ninety percent of total energy intake in the U.S. population comes from 16 of the 32 food sub-categories, with mixed dishes, snacks and sweets, and beverages together contributing more than half (56%) of energy intake in the U.S. population. The implications of this conclusion are: the foods with the highest contribution to energy intake are burgers and sandwiches, desserts and sweet snacks, and sugar-sweetened

beverages; given the link to energy intake, reducing consumption of these foods may lead to weight reduction; and public health strategies (e.g., programs, regulations, and policies) are needed to help individuals achieve recommendations.

Dr. Anderson then addressed the third question: What are the top foods contributing to sodium, saturated fat, and added sugars intake in the U.S. population? While addressing this, the Subcommittee reviewed evidence for 3 sub-questions that had been posed by Committee members: 3a) What is the current contribution of fruit products with added sugars on intake of added sugars; 3b) What is the current contribution of vegetable products with added sodium on intake of sodium; and 3c) What is the current contribution of refined grains to intake of added sugars, saturated fat, some forms of polyunsaturated fat, and sodium in the U.S. population?

Dr. Anderson presented the key findings for each subquestion. These included that less than 1 percent of total added sugars come from fruits and 100 percent fruit juice foods; that about 11 percent of total sodium comes from all vegetables (7% from all except starchy and 4% from starchy vegetables); and that the foods making up about 90 percent of all refined grains intake account for about half of sodium and saturated fat, and about a quarter of added sugars intake.

Dr. Anderson then presented the conclusion statements for question 3: Mixed dishes are the largest contributor to intake of the two nutrients of concern for over-consumption—sodium (44%) and saturated fat (38%), and that the sub-category of burgers and sandwiches is the largest contributor within mixed dishes for both nutrients; snacks and sweets also are a major contributor to saturated fat intake (18% of intake); and sodium is ubiquitous in the food supply as many food categories contribute to intake. The implications from these conclusions are: the foods with the highest contribution to saturated fat and/or added sugars intake are burgers and sandwiches, desserts and sweet snacks, and sugar-sweetened beverages; the U.S. population can use a variety of strategies to reduce consumption of these components, including smaller portion sizes, reduced frequency of consumption, and recipe modification; and given the ubiquity of sodium in the food supply, concerted efforts to reduce sodium in commercially prepared and processed foods are needed to achieve optimal intake.

Then, Dr. Anderson addressed the fourth question: What is the contribution of beverage types to energy intake by the U.S. population? The conclusion statements are: 19 percent of total energy comes from beverages, including milk and 100 percent fruit juice, and of this 19 percent of energy, major sources are sugar-sweetened beverages (35%), milk and milk drinks (26%), and 100 percent fruit juices (10%); and overall, beverages supply 47 percent of added sugars intake. The implications are: to decrease dietary intake from added sugars, the U.S. population should reduce consumption of sugar-sweetened beverages; and this is especially important for individuals who need to reduce their energy intake.

Dr. Abrams then presented the fifth food categories question: What are the sources of caffeine from foods and beverages on the basis of DRI age and sex categories in the U.S. population? He presented data that showed how the sources change in different age groups. He summarized that

among children and adolescents, sugar-sweetened and diet beverages, and coffee and tea contribute equally to overall caffeine intake, while among adults, the primary source of caffeine is coffee and tea.

Discussion

Dr. Nelson noted that burgers and sandwiches were singled out as a major source of calories, and recalled that in 2010, one major source of calories was pizza. Has this changed? Dr. Anderson replied that it had not changed and can add pizza. She noted that burgers and sandwiches provide 14 percent of calories, while pizza provides four percent. Dr. Nelson also noted that beverages are a big contributor to added sugars, and the implications say to reduce beverages but not baked goods. Why do added sugars only show up in the beverages? Dr. Anderson replied that SC 1 can look at added sugars and include this. Dr. Siega-Riz noted that 28 percent added sugars are from refined grains. Dr. Nelson encouraged the committee to think about refined grains that are coupled with added sugars, in terms of reducing added sugars.

Dr. Lichtenstein mentioned that SC 1 could talk about salt and saturated fat in the same sentence but should remember the strategies for modifying the intake of salt and saturated fat are very different. For fat, it is to suggest substitutions, and for salt, reductions. Dr. Anderson agreed. Dr. Lichtenstein also asked about which types of polyunsaturated fats were being referred to in the slide for question 3c. **Dr. Trish Britten** explained that this was a question posed by a Committee member, but SC 1 did not have the data to address that aspect of the question.

Dr. Campbell mentioned the use of ‘ubiquitous’ when talking about sodium and asked if there is a breadth of sources of added sugars to use this term with added sugars? Dr. Anderson replied that when looking at added sugars sources, the pie chart shows fewer major sources than for sodium. She acknowledged that the measurements may not be good enough to pick up everything in the food supply. Dr. Campbell noted that it is important to describe the nutrients of over-consumption from hidden sources. Dr. Anderson suggested that the term “currently unmeasurable sources” could be used, noting that currently the tools or the databases to identify these sources are not available. Dr. Lichtenstein asked for clarification on the term hidden sugar. Dr. Campbell explained that he was referring to terms on labels meant to hide sugar such as ‘evaporated cane juice’ and noted that it is hard to see if a product has added sugars. Dr. Lichtenstein reminded that the Food and Drug Administration (FDA) is looking at this. Dr. Nelson suggested that the Committee support efforts to identify added sugars.

Eating Behaviors

Dr. Story presented two questions on the Eating Behaviors topic that were presented before as four questions and that have been consolidated into two questions here: 1) What are the current status and trends in the number of daily eating occasions and frequency of meal skipping, and

how do diet quality and energy content vary based on eating occasion? and 2) What are the current status and trends in the location of meal and snack consumption and sources of food and beverages consumed at home and away from home and what is the diet quality and energy content based on the food and beverage source? She noted that eating behaviors are important for understanding food and nutrient intake and also for designing and implementing strategies to reduce obesity and other health conditions, and to improve overall health.

Dr. Story began with the first question: What are the current status and trends in the number of daily eating occasions and frequency of meal skipping, and how do diet quality and energy content vary based on eating occasion?

The data and the conclusion statements for these questions were presented previously. The conclusions are: the majority of the U.S. population consumes three meals a day plus at least one snack; among all age groups, children 2 to 5 years are most likely to consume all three meals; and adolescent girls, young adult males, non-Hispanic Blacks, Hispanics, and individuals with lower incomes are least likely to consume three meals a day. Trend data from 2005-06 to 2009-10 show little change in meal and snack patterns; breakfast tends to have a higher overall dietary quality because of its higher nutrient density compared to other meals and snacks; snacks contribute about one-fourth of daily energy intake and are lower in key nutrients relative to energy intake; and for young children ages 2 to 5, 29 percent of daily calories come from snacks.

The implications from these conclusions are: adolescents and young adults are the least likely to eat breakfast, so targeted promotion efforts are needed; the school breakfast program is an important venue for promoting breakfast consumption among adolescents; snack foods/beverages are widely available in multiple settings; population-level environmental and individual behavioral efforts are needed to improve snack choices; individuals with lower incomes are less likely to eat three meals a day and more likely to be food insecure; and Federal nutrition programs play a key role in reducing food insecurity and improving nutritional health.

Dr. Story then continued with the second question: What are the current status and trends in the location of meal and snack consumption and sources of food and beverages consumed at home and away from home, and what is the diet quality and energy content based on the food and beverage source?

Data for the overall population were presented previously. The data for these questions are presented as densities of the food group per 1000 calories from each food source, in comparison to the Healthy Eating Index (HEI) standard for that food group. Additional results that were not presented previously showing differences by age group include the following: In the fruit group the fruit density for young children from stores and schools, and for adults ages 71 and older from stores, reaches the HEI standard. For all other age groups and from all other sources, the fruit group density was below the HEI standard. In the dairy group, the dairy density from schools for children ages 2 to 19 was above the HEI standard. In the refined grains group, the density of refined grains is highest from quick-serve restaurants for all adult age groups.

Dr. Story then presented the conclusion statements for these questions: most of the calories consumed by the U.S. population are purchased at a store (69%) and consumed in the home; the percent of calories eaten away from home (34%) has remained about the same since 2003-04; food group and nutrient quality as measured by the HEI vary by where food is obtained; and overall, no matter where the food is obtained, diet quality of the U.S. population does not meet recommendations for fruit, vegetables, dairy, whole grains, and exceeds recommendations for sodium, saturated fats, refined grains, solid fats, and added sugars.

The implications from these conclusions are that bold action is needed at population and individual levels to pursue intervention and communications strategies; make healthy options the default choice in restaurants; reformulate foods by food manufacturers and in restaurants to lower over-consumed nutrients and calories; implement behavioral strategies in schools, worksites, health care and other community settings; and support Federal regulations for food labeling to provide consumers with information to make healthy food decisions and to incentivize food manufacturers to reformulate products.

Discussion

Dr. Pérez-Escamilla noted that he finds it sobering that the poor dietary quality of Americans begins early in life. Given what is known about early life, the Committee needs to focus on nutritious diets in young children. Dr. Story agreed.

Dr. Siega-Riz noted that the population most likely to skip meals, adolescents and Hispanics, can become pregnant. Was this explored? Dr. Story replied that the Subcommittee did not look at pregnant women; the sample size is small. Dr. Britten noted that it would be difficult to do this analysis for pregnant women. Dr. Shanthy Bowman agreed that the pregnant women sample size is small, but that ARS can explore doing an analysis.

Health Conditions

Dr. Anderson identified the questions on Health Conditions that will be presented: 1) What is the current prevalence of overweight/obesity and distribution of body weight, body mass index (BMI), and waist circumference in the U.S. population and age, sex, racial/ethnic, and income groups and what are the trends in prevalence? 2) What are the current rates of nutrition-related health outcomes (i.e., prevalence of CVD, high blood pressure, and type 2 diabetes, and incidence of and mortality from cancer [breast, lung, colorectal, prostate], congenital abnormalities, neurological and psychological illness [depression, Alzheimer's], and bone health [osteoporosis, low bone mass]) in the overall U.S. population? and 3) What is the relative prevalence of metabolic and cardiovascular risk factors by body weight/waist category in the U.S. population and subgroups? She noted that the focus is on health conditions being examined

by SC 2. The data for some conditions was presented previously, and the data for conditions shown in bold will be presented today.

Dr. Anderson began with the first question: What is the current prevalence of overweight/obesity and distribution of body weight, BMI, and waist circumference in the U.S. population and age, sex, racial/ethnic, and income groups, and what are the trends in prevalence? The conclusion statements for this question are: among children, adolescents, and adults, rates of overweight and obesity are extremely high and these high rates have persisted for more than 25 years; 65 percent of adult females and 70 percent of adult males are overweight or obese and rates are highest in middle-aged and older adults; rates of overweight and obesity in adults vary by age and ethnicity and overweight is most prevalent in those 40+ years of age and in Hispanic American adults; obesity is most prevalent in African American adults and obesity is least prevalent in all adults with highest incomes (400+% of the poverty threshold). Related to children and adolescents, nearly one in three youth 2 to 19 years is now overweight or obese and rates vary by age and ethnicity; and obesity increases with age and is most prevalent in African Americans and Hispanics 2 - 19 years of age. The implications from these conclusions are that the long-standing high levels of overweight and obesity require urgent population- and individual-level strategies that will work in multiple settings, including clinical, public health, and community; and comprehensive lifestyle interventions should be developed and implemented by trained interventionists and professional nutrition service providers.

Dr. Anderson then proceeded with the second question: What are the current rates of nutrition-related health outcomes (i.e., prevalence of CVD, high blood pressure, and type 2 diabetes, and incidence of and mortality from cancer [breast, lung, colorectal, prostate], congenital abnormalities, neurological and psychological illness [depression, Alzheimer's], and bone health [osteoporosis, low bone mass]) in the overall U.S. population? For congenital abnormalities, neurological and psychological illness, and bone health, which have not been presented previously, she identified the data sources used and the results in terms of rates and prevalence.

Dr. Anderson then presented the draft conclusion statements for all of the chronic diseases included in question two: adults have high rates of nutrition-related chronic diseases, including high blood pressure, CVD, type 2 diabetes, and various forms of cancer; children and adolescents have nutrition-related chronic diseases including elevated blood pressure and type 2 diabetes; at all ages, rates of chronic disease risk are linked to overweight and obesity; these chronic diseases disproportionately affect various racial and ethnic groups; prevalence of osteoporosis is 15 percent and of low bone mass is about 50 percent of women ages 50 and older; this increases with age and is more prevalent in women; congenital abnormalities are a relatively rare pregnancy outcome; and neurological and psychological conditions are a growing concern.

Dr. Anderson continued with the implications from these conclusions: prevention policies that address nutrition-related chronic diseases need to be developed; these policies should target all age groups and address nutrition and lifestyle issues; qualified professionals should deliver multidisciplinary interventions that are effective in reducing nutrition-related chronic diseases;

and more data are needed to understand the complex etiology of congenital abnormalities and neurological and psychological conditions, so as to inform potential dietary choices by the U.S. population.

Dr. Anderson then presented the final health conditions question: What is the relative prevalence of metabolic and cardiovascular risk factors by body weight/waist category in the U.S. population? She identified the data sources used and the results, showing the number of cardio-metabolic risk factors by BMI category. She presented the conclusion statement for this question: about half of normal weight individuals have at least one cardio-metabolic risk factor; 70 or more percent of overweight or obese individuals have one or more cardio-metabolic risk factors; and the percent with two or more risk factors increases with BMI. The implications from this conclusion are that because nearly three-fourths of the overweight or obese population also has at least one cardio-metabolic risk factor, they qualify for preventive lifestyle interventions by trained professionals, as recommended by AHA/ACC.

Dietary Patterns Composition

Dr. Anderson noted that in the interest of time, she would move on to the last topic before taking questions. The last topic to be covered was Dietary Patterns Composition. This topic was intended to inform the discussion in SC 2 on dietary patterns and health outcomes. The two questions on this topic addressed today were: 1) What is the composition of dietary patterns with evidence of positive health outcomes (e.g., Mediterranean, Dietary Approaches to Stop Hypertension (DASH), HEI, vegetarian), and of patterns commonly consumed in the U.S.? and 2) What are the similarities (and differences) within and amongst the dietary patterns with evidence of positive health outcomes and the commonly consumed dietary patterns?

Dr. Anderson explained that to answer these questions, SC 1 reviewed articles from SC 2 evidence reviews to identify prospective cohort studies and interventions with dietary patterns associated with positive health outcomes. From these articles, the Subcommittee identified those with quantitative food group composition data; converted available quantitative food group data to standard amounts in grams per 1000 calories; and compared the food group composition of these patterns to each other, to the USDA Food Pattern recommendations, and to commonly consumed dietary patterns in the U.S.

Dr. Anderson presented preliminary data for vegetables, fruit, dairy, and meat and poultry showing the amounts in grams per 1000 calories for dietary patterns determined by 1) an *a priori* index or dietary trial; and 2) factor or cluster analysis. She noted that these data showed the range and variability across the studies.

Dr. Neuhaus then briefly outlined the next steps for SC 1's work, which are to complete analysis on dietary patterns composition; review and revise conclusion and implication

statements as needed; and continue to draft sections for the Committee report, for review by the full Committee.

Discussion

Dr. Campbell asked for clarification on the comparison group for studies included in the slides showing food group amounts per 1000 calories, and if it is common for the comparison group to consume an inadequate amount. Dr. Anderson noted that these are typically the fifth quintile or a similar subgroup within the study. Dr. Neuhouser added that it was a relative comparison and it differs across all the cohorts. Sometimes the heterogeneity was large and sometimes it was narrower. Dr. Campbell asked if his interpretation of translating the per 1000 calorie to daily intake was accurate, and Dr. Anderson agreed that it was.

Dr. Hu asked why red meat and poultry were together, and noted that many index studies separate them. Dr. Anderson said they would look at this to see if separating was feasible. Dr. Hu asked about translating the amounts in the dairy group into servings per day. Dr. Anderson replied that the SC will look at this and come up with values. She noted that it is the overall pattern that is of interest, and so in some studies a lower level of intake from one food group may be associated with positive health outcomes.

Dr. Nelson asked about the latest trend data showing obesity rates for young children going down. Dr. Anderson noted that this was presented at an earlier meeting and is not being considered a trend because there are only two data points. Dr. Nelson suggested that a positive statement be made since it is the first time an inflection has been seen.

Dr. Siega-Riz noted that it is hard to interpret the graphs for dietary pattern composition, to associate the data points with a study such as a Mediterranean diet score or an HEI score. Dr. Anderson asked if they should be stratified by additional characteristics. Dr. Siega-Riz suggested a table be used to compare across studies and to see other food groups together with this data. Dr. Millen suggested that it will be informative to pull together a table that shows the totality of the dietary patterns so SC 1 can compare and contrast the components of the patterns.

Dr. Siega-Riz also noted that while the conclusion statement for health conditions question two shows congenital anomalies are a rare pregnancy outcome, the Committee cannot minimize the impact of congenital anomalies. Dr. Anderson agreed that this is important and that SC does not mean to minimize this.

Subcommittee 5 (SC 5): Food Sustainability and Safety

Dr. Miriam Nelson, SC 5 Chair, began by acknowledging the subcommittee members: Dr. Steven Abrams, Dr. Thomas Brenna, and Dr. Frank Hu; consultants: Dr. Timothy Griffin and Dr. Michael Hamm. She also acknowledged Dr. Barbara Millen, Dr. Alice H. Lichtenstein and staff

for working with SC 5. Dr. Nelson reported that SC 5 had not used any invited experts since the last meeting.

Consultant SC 5 Members

Dr. Michael Hamm, C.S. Mott Professor of Sustainable Agriculture, Departments of Community Sustainability and Food Science and Human Nutrition, College of Agriculture and Natural Resources, Michigan State University

Dr. Timothy Griffin, Director of the Agriculture, Food and Environment Program and Associate Professor at the Friedman School of Nutrition Science and Policy at Tufts University

Dr. Nelson reviewed the scope for SC 5 which is to address food and nutrition issues that will inform public health action and policies to promote the health of the population through food safety and long-term food security. She stated the key topics that would be presented today are: 1) Normal caffeine consumption and pregnancy outcomes; 2) an update of the 2010 Committee's recommendations on food safety and individual behavior; 3) an update to dietary patterns and sustainability; and 4) new work on a fish family of questions.

Dr. Nelson showed a SC 5 visual framework demonstrating that food sustainability, food security, and food patterns and intake all come together to support health now and in the future.

Dr. Nelson shared the list of SC 5 questions that would be presented:

1. What is the relationship between normal caffeine consumption and pregnancy outcomes?
2. What is the relationship between population-level dietary patterns and long-term sustainability and related food security? (Update)
3. What is the relationship between current farm- raised versus wild-caught seafood and respective nutrient profiles? What is the relationship between current farm-raised versus wild-caught seafood and contaminants?
4. What is the worldwide capacity to produce farm-raised versus wild-caught seafood that is nutritious and safe for Americans?
5. An update on the topic from the 2010 *Dietary Guidelines*: Food safety and individual behavior.

Normal Caffeine and Pregnancy Outcomes

Dr. Frank Hu presented on the topic of normal caffeine/coffee consumption and pregnancy outcomes. The conclusions and implication were presented on caffeine/coffee consumption on several outcomes at the July Dietary Guidelines Advisory Committee meeting. Two recent systematic reviews and meta-analyses formed the evidence for pregnancy outcomes. The

publication, Greenwood et al., was published recently and had been very useful to the Subcommittee. The pregnancy outcomes included miscarriage, preterm birth, stillbirth, small for gestational age (SGA), and low birth-weight. The primary studies were conducted in North America, South America, and Europe. The caffeine intake from dietary sources, primarily from beverages, ranged from non-consumers to those consuming more than 1,000 milligrams/day. Typical caffeine consumption in the studies was about 200- 300 milligrams per day.

The Greenwood et al., 2014 meta-analysis included 60 publications from 53 separate cohorts and case-control studies on miscarriage, preterm birth, stillbirth, SGA, and low birth-weight. The Maslova meta-analysis was published in 2010 and included 22 studies on preterm birth. Dr. Hu reported key findings from the evidence review on caffeine and pregnancy outcomes. No association between caffeine intake during pregnancy and risk of preterm birth was observed in either cohort or case-control studies. Consumption of caffeine from various sources was associated with a small increased risk of miscarriage, stillbirth, low birth weight, and small for gestational age births within the typical range of consumption (up to 300 milligrams per day), but there was inadequate control for confounders such as maternal age, smoking, and alcohol in some primary studies.

Dr. Hu presented draft conclusion statements on normal caffeine and pregnancy outcomes. Moderate evidence from observational studies indicates that caffeine intake is not associated with risk of preterm delivery. Higher caffeine intake is associated with a small increased risk of miscarriage, stillbirth, low birth weight, and small for gestational age births. Finally, these data should be interpreted cautiously due to potential recall bias in case-control studies and confounding by smoking and pregnancy signal symptoms.

Dr. Hu reported draft implications for normal caffeine and pregnancy outcomes. Overall, the evidence provides support for current recommendations to limit caffeine intake during pregnancy as a precaution. Based on existing evidence, pregnant women, or women planning to become pregnant, should be cautious and adhere to current recommendations of the American Congress of Obstetricians and Gynecologists regarding caffeine consumption, and consume no more than 200 milligrams of caffeine per day.

Dr. Hu reviewed a draft research recommendation. Given the evidence of the effects of caffeine consumption on adverse pregnancy outcomes, future studies need to establish safe levels of caffeine/coffee consumption during pregnancy.

Discussion

Dr. Siega-Riz thanked the committee for going back into the literature on this topic and stated that the summary clearly shows where the evidence is currently. The summary is well done.

Dietary Patterns and Sustainability

Dr. Nelson presented an update on dietary patterns and sustainability. She stated that sustainable diets are patterns of eating that promote health and well-being, and provide food security for current and future populations while sustaining human and natural resources. She reported updated draft conclusion statements. Consistent evidence indicates that, in general, a dietary pattern that is higher in plant-based foods and lower in animal-based foods is more health promoting and is associated with lesser environmental impact (Greenhouse Gas (GHG) emissions, energy, land, and water use) than the current average American diet. The evidence consists primarily of life cycle assessment modeling studies or land-use studies from the U.S. and other highly developed countries. The models predict that following diets similar to those suggested in the *Dietary Guidelines for Americans* and respective guidelines of other countries is more environmentally sustainable than the average American diet or the average diet from other developed countries. In addition, a more environmentally sustainable diet can be achieved without excluding any food groups.

Dr. Nelson reviewed draft implications for dietary patterns and sustainability. Evidence supports that a more environmentally sustainable dietary pattern promotes better health. The evidence supports the U.S. population moving towards the *Dietary Guidelines for Americans*, which can be achieved by a variety of dietary patterns that generally increase consumption of vegetables, fruits, whole grains, nuts and seeds, while decreasing some animal-based foods. Sustainability considerations provide an additional rationale for following U.S. dietary guidelines. Using sustainability messaging in communication strategies should be encouraged. The application of environmental and sustainability factors to dietary guidelines can be accomplished because of the compatibility and degree of overlap between favorable health and environmental outcomes. It is also clear that, within individual food categories or types, much has been done by the private and public sectors to improve environmental practices around production, processing, and distribution. It will be important that both a greater shift towards healthful dietary patterns and improving the environmental profile within the needed food categories are achieved to maximize our environmental sustainability now and to ensure greater progress in that direction over time. Promoting healthier diets that are also more environmentally sustainable will conserve resources for present and future generations, assuring that the U.S. population has access to a diet that is healthy as well as sustainable and secure, now and in the future. Careful consideration will need to be made to ensure that sustainable diets are affordable for all Americans.

Discussion

Dr. Story asked for clarification on the statement “decreasing some animal-based foods.” Dr. Nelson clarified that it is the red meat and dairy categories that are shown in the evidence, but it is more important to shift to more of a plant-based dietary pattern and a decrease in some animal based foods. There is evidence that a decrease in calories helps reduce the carbon footprint. This will be added to the conclusions.

Dr. Pérez-Escamilla suggested that instead of sustainable diets that the committee may be referring to a sustainable food supply. Dr. Nelson responded that the committee would work on the definition. There is a Food and Agriculture Organization of the United Nations (FAO) definition but it is more focused on agricultural policy. For the Committee, it is important to make it germane to dietary patterns.

Dr. Lichtenstein requested more specific information for health outcomes. Dr. Nelson responded that these data were presented at the July Committee meeting. The modelling used established dietary patterns such as Mediterranean-style that had positive health outcomes and dietary guidelines from various countries.

Dr. Campbell asked about the scope of sustainability. He queried if the target was within the continental U.S., or if the scope is going beyond the United States. Dr. Nelson stated that it is related to the whole food system. It is the first time this Committee has examined this topic. The foods system in terms of sustainability is a worldwide issue, and seafood is one example since most of the U.S. seafood comes from other countries. The Committee will not propose all of the solutions. Dr. Campbell asked if there is anything that can be said about local sustainability. Dr. Nelson said that is too premature at this time. The questions were much broader at the outset of this Committee, and that cannot be addressed right now. An enormous number of public comments in the realm of sustainability have been received, showing what is being done in terms of sustainable practices both here and abroad.

Seafood Sustainability

Dr. Thomas Brenna presented the evidence review results on the three seafood sustainability questions. He first stated that the terms seafood and fish will be used interchangeably in the discussion. He presented the first question: What is the relationship between current farm-raised versus wild-caught seafood and respective nutrient profiles? The evidence was based on the USDA National Nutrient Database for Standard Reference from 2014 and an updated analysis from Cladis et al. He described the evidence for farm versus wild seafood nutrient profiles. The key findings are that farm-raised fish are comparable to wild-caught fish in eicosapentaenoic acid (EPA) and docosahexaenoic (DHA) profiles, with the exception of low trophic level species. Overall, farm-raised fish contain more total fat than wild-caught fish. Recommended amounts of seafood that provide EPA and DHA can be obtained by consuming farm-raised seafood, as EPA and DHA levels are as high or higher compared to wild-caught of the same species.

Dr. Brenna reported draft conclusions for the topic of nutrient profiles of farm versus wild seafood. The Committee concurs with the recent survey of commonly consumed fish species in the U.S., such as bass, cod, salmon and trout, that farmed fish supplies, on average, as much EPA and DHA as similar species captured from the wild. Recommended amounts of seafood that

provide EPA and DHA can be obtained by consuming farm-raised fish, especially salmon and trout. Farmed low trophic species catfish and crawfish have less than half the EPA and DHA per serving than wild. Farmed-raised fish also contain more total fat than wild-caught fish.

Dr. Brenna shared the draft implications for seafood nutrient profiles. The U.S. population should be encouraged to eat a variety of seafood that can be wild-caught or farmed, as they are nutrient dense foods that are uniquely rich sources of healthy fats. It should be noted that low trophic farm-raised fish such as catfish and crayfish have lower EPA and DHA levels than wild-caught. Nutrient profiles in popular low trophic level farmed species should be improved through feeding and processing systems that produce and preserve nutrients similar to those delivered by wild capture in the same species. Overall, farm-raised fish have higher total fat levels than wild-caught fish. A recommendation from the Committee suggested that research should be undertaken to maintain nutrient profiles of high trophic level farmed seafood and improve nutrient profiles of low trophic farmed seafood concurrently with research to improve production efficacy.

Dr. Brenna next presented evidence on the second fish question: What is the relationship between current fishery practices (farm-raised versus wild-caught seafood) and contaminants in seafood? The evidence was based on a 2011 *Expert Report of the Joint FAO/World Health Organization (WHO) Expert Consultation on the Risks and Benefits of Fish Consumption*. Key findings include that levels of mercury and dioxins are in the same range for farmed and wild fish. At the same level of mercury content (lowest and 2nd lowest levels), farmed fish have the same or higher levels of EPA and DHA as wild-caught. At the same level of dioxin content (2nd lowest level) farmed fish have the same or higher levels of EPA and DHA as wild-caught. There are coronary heart disease (CHD) mortality benefits from eating fish and CHD risks from not eating fish, except for fish in the highest dioxin and lowest EPA and DHA categories.

Dr. Brenna presented draft conclusions on the topic of contaminants in farm-raised and wild-caught seafood. The Committee concurs with the FAO/WHO Expert Consultancy that neither mercury nor organic pollutants obviate the benefits of seafood consumption for reduction of chronic disease risk, specifically cardiovascular disease, considered by the Consultancy, for the vast majority of commercial wild and farmed species. Composition can vary widely based on production practices for farmed seafood. Any assessment considers evidence within a specific time frame.

Dr. Brenna reported draft implications. Based on health outcomes, either farmed or wild-caught seafood are appropriate choices. Pregnant and breastfeeding women should not eat certain types of fish: tilefish, shark, swordfish, and king mackerel because of their high methyl mercury contents. He shared that the Committee suggests that research should be undertaken to ensure contaminant levels in all seafood remain at levels similar to or lower than those at present. In addition, monitoring of contaminant levels should be maintained for the capture fisheries to ensure that levels caused by pollution do not rise appreciably.

Dr. Brenna presented the evidence review results for the final fish question: What is the worldwide capacity to produce farm-raised versus wild-caught seafood that is nutritious and safe for Americans? Dr. Brenna described the evidence and the capacity to produce seafood. The most recent FAO report on *The State of World Fisheries and Aquaculture* was issued in 2012 and formed the basis of the Committee'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 Committee focused on matters that directly address the world production as it impacts the supply of seafood for Americans as a first attempt by a Dietary Guidelines Advisory Committee to consider the implications of dietary guidelines for production of a related group of foods. The key finding is that seafood production is expanding worldwide at a rate that can continue to support Americans' needs, which are now met primarily by importation.

Dr. Brenna reported the draft conclusion statements on the capacity to produce seafood. The Committee 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 percent increase by 2021 and adding 15 percent to the total supply of seafood. Distributed evenly to the world's population, this capacity could, in principle, meet *Dietary Guidelines for Americans* recommendations for at least 8 ounces of 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 *Dietary Guidelines for Americans* recommendations.

Dr. Brenna reported draft implications for the topic of the capacity to produce seafood. Both wild and farmed seafood are major food sources available to support Committee 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 are 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 omega-3-rich species.

Discussion

Dr. Neuhaus congratulated the Committee on the excellent report. She stated that she was surprised to see the EPA and DHA values. Salmon in the cold water have a higher EPA and DHA content. She asked if the nutrient profile is driven by what is being fed to farmed fish that causes the higher values. One might infer the farmed are healthier than the wild. Dr. Brenna responded that the composition of most animals, and salmon is not an exception, depend of what

they eat. Salmon do not produce EPA and DHA, so one must feed those oils to farmed salmon as they do not thrive without it.

Dr. Neuhouser shared that it appears that one species of the wild was sampled. There are a multiple number of species; it might be worth mentioning that across the species there is a lot of variability. Dr. Brenna agreed and stated that the USDA data were used for comparisons. Dr. Nelson added that it was difficult for SC 5 to answer this question, because SC 5 had limited data for one species. It is a narrow species base. Dr. Brenna recognized the variability. He stated that, if you take all three questions together, it is good to see that farmed fish being produced will provide what is wanted.

Dr. Story asked if there a recommendation for how much seafood Americans should eat each week. Dr. Brenna responded that in the WHO Report, modeling went up to seven servings per week, and that the risk/benefit looked the same as two servings per week. He shared that there is a draft report from FDA on the net effects which deals with the question of whether there is an upper limit to seafood consumption. It is beneficial to eat up to 12 ounces per week for a lot of species.

Dr. Campbell queried about the distribution of the omega-3 fatty acids and the toxins. He asked if the data are based on consumption of the whole fish or as eaten. Dr. Brenna responded that the data are based on “as eaten.” Dr. Campbell asked if it is surprising that mercury and dioxin levels would be the same in the farmed and wild. Dr. Brenna shared that sources of mercury may be from natural sources such as from volcanoes and from burning of fossil fuels. Not many years ago, but not part of this evaluation, all the feeds are now being processed with activated charcoal to remove organic chemicals. Dr. Campbell asked if the fish flesh is being enhanced with fatty acids; is there an issue with increasing contaminants. Dr. Brenna shares that concern.

Dr. Lichtenstein shared that what is fed to the fish affect the EPA and DHA. The smaller fish are less likely to have the contaminants. The water is the same for the wild and farmed, so the contaminants would be the same. Dr. Campbell asked if there is a way to find out an association between the fatty acids and the contaminants. Dr. Brenna responded that the FAO report was supposed to consider this issue.

Dr. Pérez-Escamilla shared that from the food safety point of view, he did not see a recommendation for being aware of local fish advisories. There are some serious contaminant issues in some locales. Dr. Nelson stated that the Committee can add a note to pay attention to local fish advisories.

Dr. Anderson stated that the focus is heavily on EPA and DHA. She asked what other healthy fish components are there. Dr. Brenna responded that most people look to fish for EPA and DHA. In addition, they are a great source of protein. The Committee is interested in all the nutrients, but there has not been a discussion about the other nutrients.

Dr. Lichtenstein shared that people should consume a variety of fish. Dr. Brenna responded that the Committee has been using ‘variety’ in the statements.

Dr. Pérez-Escamilla stated that this Committee is reaching similar conclusions as the 2010 Committee. He suggested that the Committee should decide if they want to bring forward those recommendations. Dr. Nelson responded that the Committee will wait for the SC 2 report and coordinate with them. Dr. Brenna responded that the Committee is determining whether to support the 2010 recommendation. Dr. Lichtenstein suggested that recommendation cannot just keep being brought forward. Dr. Nelson stated that hopefully this topic will come up with SC 2, and SC 5 can coordinate with them.

Consumer Behavior and Food Safety Update

Dr. Nelson presented on the topic of consumer behavior and food safety, which is an update from the 2010 Dietary Guidelines Advisory Committee Report. She stated that food safety and prevention of foodborne illness is an important public health issue. The 2010 Committee conducted a NEL review on consumer behavior and prevention of food safety problems. The 2015 Committee reviewed the 2010 report and updated the content with Federal sources. The update included resources from Centers for Disease Control and Prevention, Food and Drug Administration, and the USDA/Food Safety and Inspection Service. Dr. Nelson reported that the core food safety principles were emphasized, including: Clean and Separate (techniques for hand sanitation, washing fresh produce, and preventing cross-contamination) and Cook and Chill (temperature control during food preparation and storage. The food safety recommendation tables that were updated include: 1) Procedures for hand sanitation; 2) Techniques for washing produce; 3) Techniques for preventing cross-contamination; 4) Safe minimum internal temperatures; and 5) Recommended techniques for food thermometers.

Discussion

Dr. Neuhouser stated that most of the Committee charge was related to consumer behavior. In the past few years there have been food safety issues in the field and in food processing facilities. She asked if this should be a concern for the Committee. Dr. Nelson responded that early on, the Subcommittee felt confident that other Federal agencies were covering this issue, and it would be duplicative to do the same. The Subcommittee discussed this with staff from the Food and Drug Administration.

In conclusion, **Dr. Nelson** shared the next steps for Subcommittee 5 which include 1) completing chapter background and conceptual model; 2) identifying research gaps; and 3) finalizing the writing of the chapter.

Subcommittee 2 (SC 2): Dietary Patterns, Foods and Nutrients,

and Health Outcomes

Dr. Anna Maria Siega-Riz, SC 2 Chair, began the presentation by thanking Federal staff for their support and acknowledging the hard work of the other SC 2 members, Dr. Cheryl Anderson, Dr. Tom Brenna, Dr. Steven Clinton, Dr. Frank Hu, Dr. Marian Neuhouser, Dr. Rafael Pérez-Escamilla, and Dr. Alice H. Lichtenstein, Committee Vice Chair, as well as Dr. Barbara Millen, Committee Chair. Dr. Siega-Riz reiterated the scope of SC 2, which is to examine the relationship between dietary patterns, foods, and nutrients, and preventable diet-related diseases, obesity, and mortality. When the body of evidence is not strong or moderate for the relationship between dietary patterns and health outcomes, the Subcommittee will consider evidence for specific foods and nutrients. Dr. Siega-Riz noted that SC 2 did not receive input from consultants between July and September 2014, but SC 2 did invite experts (listed below) to present on the topic of the microbiome (*Examining Probiotic Functional Food Benefits in the Context of the Human Microbiome*), which is an emerging field. The 2015 Committee hopes to lay the foundation for the 2020 Dietary Guidelines Advisory Committee.

Invited Experts

Dr. Linda Duffy, Program Director, NIH National Center for Complementary and Integrative Health

Dr. Van Hubbard, Director, NIH Division of Nutrition Research Coordination in the National Institute of Diabetes and Digestive and Kidney Diseases

Dr. Pamela Starke-Reed, Deputy Administrator, USDA Agricultural Research Service

Dr. Siega-Riz outlined the topics that would be covered during the presentation: dietary patterns and neurological-psychological illnesses, congenital anomalies, and bone health; saturated fat and cardiovascular disease; and alcohol. She then turned the presentation over to SC 2 member, Dr. Brenna.

Dietary Patterns and Depression, Cognitive Impairment, Dementia and Alzheimer's Disease

Dr. Brenna identified the first series of questions to be addressed by SC 2: 1) What is the relationship between dietary patterns and depression? and 2) What is the relationship between dietary patterns and age-related cognitive impairment, dementia, and Alzheimer's disease? This is the first time neurological-psychological illnesses have been addressed by the Dietary Guidelines Advisory Committee. As was mentioned in the SC 1 presentation, the estimated prevalence of depression is eight percent of Americans 12 years of age and older. For dementia/Alzheimer's disease, the estimated prevalence is five million Americans 65 years and older. Total Alzheimer's disease is projected to triple by 2050.

These questions were answered using a NEL systematic review. Dr. Brenna reviewed the analytical framework, search strategy, inclusion/exclusion criteria for the reviews, and the

description of the evidence. The body of evidence included 19 articles for dietary patterns and depression and 30 articles for dietary patterns and cognitive decline/Alzheimer's disease/dementia.

Dr. Brenna presented the Subcommittee's draft conclusion statement for dietary patterns and depression. 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.

Dr. Brenna also presented the Subcommittee's draft conclusion statement for dietary patterns and cognitive decline/Alzheimer's disease/dementia. 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, and dietary pattern assessment, so the possibility of reverse causality cannot be ruled out.

Discussion

Dr. Campbell asked if the studies included individuals with previously diagnosed depression. Dr. Brenna confirmed this was not the case and that all studies measured depression incidence.

Dr. Story asked if any of the articles discussed weight status specifically as a potential confounder. Dr. Brenna and Dr. Lichtenstein did not recall any articles that called attention to weight status, though authors may have corrected for body mass index. Dr. Hu noted that in other studies, body weight and depression have been found to have a reciprocal relationship. In terms of dementia/Alzheimer's disease, he noted that both obesity and type 2 diabetes appear to increase risk.

Dietary Patterns and Congenital Anomalies

Dr. Siega-Riz presented next on the topic of dietary patterns and congenital anomalies. The Subcommittee focused on the four leading congenital anomalies. The specific questions are as follows: What is the relationship between dietary patterns and risk of 1) neural tube defects, 2) congenital heart defects, and 3) cleft lip/palate?

These questions were answered using a NEL systematic review. Dr. Siega-Riz reviewed the analytical framework, search strategy, inclusion/exclusion criteria for the reviews, and the description of the evidence. The body of evidence included five case-control studies. Dr. Siega-Riz presented the Subcommittee's draft conclusion statement. Limited evidence suggests that maternal dietary patterns high in fruits, vegetables and grains and low in red and processed meats, and sweets were associated with lower risk of developing of neural tube defects, particularly among women who do not take folic acid supplements. Whereas some dietary patterns were associated with lower risk of developing anencephaly, others were associated with lower risk of developing spina bifida. There is insufficient evidence to determine an association between maternal dietary patterns and congenital heart defects or cleft lip/palate. All studies were consistent in demonstrating that folic acid supplementation periconceptionally was associated with a decreased risk of having a child with neural tube defects, congenital heart defects, and cleft lip/palate.

Dr. Siega-Riz also presented the Subcommittee's draft implication statement for dietary patterns and congenital anomalies: Women of reproductive age should continue to take a folic acid-containing supplement in addition to consuming a diet rich in fruits, vegetables and grains and low in red and processed meats and sweets.

Discussion

Dr. Campbell noted that the draft conclusion statement includes specific dietary components, yet in the description of the evidence, it was stated that the variability of dietary patterns methodology used and composition of dietary patterns identified makes it difficult to draw conclusions. He asked for clarification.

Dr. Siega-Riz indicated that the food components/ drivers listed in the conclusion statement were consistent across all of the studies that were positively associated with a lower risk for neural tube defects, regardless of the methodology used.

Dr. Campbell then raised a question about the implication statement and why it applied to congenital anomalies as a whole, not just to neural tube defects.

Dr. Siega-Riz said that the Subcommittee was comfortable broadening the implication statement and said that one of the things that will come out SC 2's work is the identification of themes across all of the topic areas and elements of dietary patterns that are consistently associated with reduced risk for a variety of health outcomes.

Dr. Millen also followed up on this discussion and stated the staff have systematically gone through each of the papers and have mapped the specific components associated with each dietary pattern in order to identify common elements. She also acknowledged the concern regarding the limited body of evidence and the specific implications. The Subcommittee will revisit this topic.

Dr. Pérez-Escamilla inquired about the countries that were included in the studies and if they were conducted before or after folic acid fortification policy was enacted.

Dr. Siega-Riz indicated that the National Birth Defects Prevention Study, which is the largest case-control study in the U.S. on the causes of birth defects, was conducted after fortification was implemented. As a result, the conclusion statement takes into account both supplementation and fortification of foods. If a woman is taking a folic acid supplement periconceptionally, folic acid from the diet has less of an impact because she is getting sufficient folic acid from her supplement, whereas diet plays a much more critical role when a woman is not taking a supplement.

Dr. Nelson suggested emphasizing that the conclusion statement is not based on a comparison of pre-and post-fortification data. She did not want the strength of the data regarding the importance of fortification to appear limited. These data are in fact strong.

Dietary Patterns and Bone Health

Dr. Millen presented on the topic of dietary patterns and bone health. The specific question is: What is the relationship between dietary patterns and bone health? As was mentioned in the SC 1 presentation, this is an important topic due to the fact that the prevalence of osteoporosis is 15 percent and the prevalence of low bone mass is about 50 percent among women over 50 years of age. Both conditions increase with age and are more prevalent in women.

This question was answered using a NEL systematic review. Dr. Millen reviewed the analytical framework, search strategy, inclusion/exclusion criteria for the review, and the description of the evidence. The body of evidence included thirteen studies.

Dr. Millen presented the Subcommittee's draft conclusion statement. In adults, limited evidence suggests that a dietary pattern higher in vegetables, fruits, grains, nuts, and dairy products, and lower in meats and saturated fats, is associated with more favorable bone health outcomes (decreased risk of fracture and osteoporosis, and improved bone mineral density) in adults. Although there are a growing number of available studies examining the relationship between dietary patterns and bone health in adults, the number of high quality studies is modest and those available employ a wide range of methodologies in study design, dietary assessment techniques, and varying bone health outcomes. Definitive conclusions regarding the relationship between dietary patterns and bone health outcomes (bone mineral density and bone mineral content) in children and adolescents cannot be drawn due to the limited evidence from a small number of studies with wide variation in study design, dietary assessment methodology, and bone health outcomes. Dr. Millen also presented the draft implication statement and noted that although there is strong evidence on the roles of vitamin D and calcium in bone health across the age spectrum, further research is needed on dietary patterns that are most beneficial.

Discussion

Dr. Campbell asked if any of the research examined osteopenia as an outcome rather than osteoporosis. On a quantitative basis, more women experience fractures while they are osteopenic rather than when they are osteoporotic. Dr. Nelson noted that there is not a diagnosis for osteopenia and that it is not a good indication of who will eventually become osteoporotic. She recommended not including it as an intermediate marker.

Saturated Fat and Cardiovascular Disease

Dr. Frank Hu presented next on saturated fat and cardiovascular disease (CVD). The specific question of interest was: What is the relationship between saturated fat and risk of cardiovascular disease? Dr. Hu noted that this has been an area of intense scientific interest and media attention. Several recent controversies and media reports have called into question the *Dietary Guidelines for Americans* recommendation to replace saturated fat with healthier fats. SC 2 formed a Working Group to review and synthesize the current evidence. In addition to Dr. Hu, the Working Group consists of the Committee Chair, Dr. Barbara Millen, the Committee Vice-Chair, Dr. Alice H. Lichtenstein, and Dr. Tom Brenna.

Dr. Hu reviewed the analytical framework, inclusion/exclusion criteria for the review, and the description of the evidence. Due to the vast amount of literature on this topic, the Working Group focused on systematic review and meta-analyses published in the past five years. The evidence considered consisted of two systematic reviews and six meta-analyses. The Working Group placed greater emphasis on reviews that examined the macronutrient replacement for saturated fat because alterations in saturated fat intake result in changes to other dietary components, such as carbohydrates. Dr. Hu noted that one cannot talk about saturated fats in isolation.

Dr. Hu reviewed the draft conclusion statements for saturated fat and cardiovascular disease. The first conclusion stated that there is strong and consistent evidence from randomized control trials (RCTs) that replacing saturated fat with polyunsaturated (PUFA) or monounsaturated (MUFA) fatty acids significantly reduces total and low-density lipoprotein cholesterol. Replacing saturated fat with carbohydrates also reduces total and low-density lipoprotein cholesterol, but significantly increases triglycerides and reduces high-density lipoprotein cholesterol.

The second draft conclusion is that there is strong and consistent evidence from RCTs and statistical modeling used in prospective cohort studies that the replacement of saturated fat with PUFA reduces the risk of CVD events and coronary mortality. Overall, summary estimates from meta-analyses of RCTs and observational studies have shown that for every one percent of energy intake from saturated fat that is replaced with PUFA, the incidence of coronary heart disease is reduced by two to three percent.

Third, strong and consistent evidence from RCTs of low-fat trials and meta-analyses of prospective cohort studies has shown that reducing total fat intake (replacing total fat with carbohydrates) does not lower CVD risk.

Fourth, strong evidence from prospective cohort studies has shown that higher saturated fat intake as compared to carbohydrates (replacement of saturated fat with carbohydrates) is not associated with CVD risk. In some studies, the comparison or replacement nutrient was not specified but was largely carbohydrates (sources not defined); in these studies, this replacement was not associated with a difference in risk of CVD.

The last conclusion statement is that there is limited evidence regarding whether replacing saturated fat with MUFA confers CVD benefits. One reason is that the main sources of MUFA in a Western diet pattern are animal fats. However, evidence from RCTs and prospective studies has demonstrated the benefits of plant sources of MUFA such as olive oil and nuts on CVD risk.

Dr. Hu reviewed three draft implications for saturated fat and cardiovascular: 1) The recommendations on saturated fat intake should specify replacement macronutrients and should be based on food and overall dietary patterns; 2) A reduction in saturated fat intake to 10 percent of energy would require a shift in dietary patterns toward those with strong evidence for cardiovascular benefits such as the USDA pattern, the Mediterranean-style pattern, the DASH-style pattern, and other dietary patterns that are rich in fiber, potassium, and unsaturated fats (see Dietary Pattern section); and 3) The type of fat should be emphasized. Nonhydrogenated vegetable oils that are high in unsaturated fats and relatively low in saturated fat instead of animal fats or tropical oils rich in saturated fat should be recommended as the primary source of culinary fat. Additionally, although a healthy dietary pattern is relatively low in saturated fat, healthy dietary patterns can include lean meats and non- and low-fat dairy products in small to moderate amounts. Simply replacing saturated or total fat in the diet by replacing it with any type of carbohydrates is not effective in reducing risk of CVD. Thus, dietary advice should move away from the conventional low-fat message. The types of carbohydrates that are used to replace saturated fat should be primarily fiber-rich whole grains and should minimize the consumption of refined grains and added sugars. The consumption of “low-fat” or “non-fat” products with high amounts of refined grains and added sugars should be discouraged.

Discussion

Dr. Nelson asked Dr. Hu why legumes and fruits and vegetables were not listed in addition to fiber-rich whole grains in the last implication statement, citing their healthy carbohydrate content and the fact that the U.S. population currently has low intakes of fruits, vegetables and legumes. Dr. Hu responded that the current statement reflects research with isocaloric replacement of dietary components. He agreed that broadening the statement to include other healthy dietary carbohydrate food sources should be given consideration.

Dr. Nelson commented that the Committee’s charge includes making recommendations to inform Federal dietary guidance policy. Dr. Nelson asked Dr. Hu if there is a reason to retain the upper limit of 35 percent of calories from total fat in Federal dietary guidance policy. Dr. Hu noted that the Working Group focused on saturated fat intake rather than total fat. Dr. Hu stated that two relevant and important messages have emerged from the recent evidence review. The first point is that the type of fat consumed matters—more so than the total amount of fat. The second key message is that reducing total fat per se or replacing total fat with any type of

carbohydrate does not reduce CVD risk, implying that total fat restriction may not be evidence-based. Dr. Nelson asked if an implication about total fat is also needed, given current policy.

Dr. Lichtenstein commented on a different aspect of total fat having to do with what is termed “the conventional message about recommending low-fat diets” in the draft implications. She pointed out that in 2000, the *Dietary Guidelines for Americans* switched from recommending low-fat diets to moderate-fat diets. Dr. Lichtenstein added that in 2000, the American Heart Association (AHA) and the National Institutes of Health, National Heart, Lung, and Blood Institute (NHLBI) also changed their recommendations. Thus, there is no conventional message to recommend low-fat diets, and the consensus is that this is not a good idea and may induce dyslipidemia. She agreed it is important to stop perpetuating the low-fat diet message. Dr. Hu agreed the low-fat diet message has been perpetuated and has also been disseminated by the media, often by incorrectly stating that the USDA and AHA recommend low-fat diets. The record needs to be set straight.

Dr. Nelson encouraged the group to consider mentioning in the implications that the need for an absolute total fat requirement is not necessary; rather, the quality of the fat needs to be considered. Dr. Lichtenstein added that modeling should also be completed to identify the impact of “lifting” the total fat content of the diet to ensure there are sufficient calories remaining for other foods such as fruits and vegetables, legumes and so forth.

Dr. Neuhaus asked if the implications should mention that the implications support or are consistent with the messages disseminated by the AHA and other organization as a means of conveying the totality of the evidence and expert review. Dr. Hu agreed that it is important to convey public health messages that reflect the evidence, citing the perpetuation of low-fat diet messages.

Dr. Pérez-Escamilla commented on the context of the total diet as Dr. Hu mentioned in his presentation. Dr. Pérez-Escamilla asked Dr. Hu if specific recommendations can be made about the amounts of animal protein, saturated fat and so forth to consume. Healthy dietary patterns often provide a range of percent of calories as has been done in the past for total fat. Dr. Pérez-Escamilla asked if a single number for percent of calories from saturated fat is being moved away from. Dr. Hu acknowledged the complexity of this issue, adding that it is important to balance two issues. The first is that a high amount of saturated fat in the diet is not desirable for cardiovascular outcomes. None of the healthy dietary patterns are characterized by very high amounts of saturated fat intake. Secondly, for saturated fat, it is important to not be overly restrictive. The modeling analyses presented by SC 1 earlier in the day showed that it is unrealistic to reduce the percent of calories from saturated fat to six or seven percent. In balancing the reality and the evidence, 10 percent of calories from saturated fat still seems to be reasonable because it affords flexibility to follow a variety of healthy dietary patterns. One must consider saturated fat intakes in the context of other dietary components.

Dr. Lichtenstein agreed and felt this underscores the importance of food-based guidelines as opposed to nutrient-based guidelines. Certain foods in the food supply contribute to saturated fat such as full-fat dairy products and meats, particularly processed meats. There are alternatives

that have healthier fat content such as low-fat dairy and lean meats. If lean cuts of meat, fish, and poultry, legumes, and low- and non-fat dairy are consumed, a number may be less important.

Dr. Millen commented that the Committee's discussion is a good example of why it will be important to dovetail with the SC 2 review of dietary patterns and CVD outcomes evidence review in which a food-based approach was used. The main drivers of a healthy dietary pattern were identified and the conclusion statement indicates that a variety of dietary patterns can be followed to achieve health benefits, thus tailoring to the needs of the individual. The two parts will provide a balanced message.

Dr. Neuhouser stated the current median percent of calories from saturated fat is approximately 10 to 12 percent across all sex-age groups. She felt this is somewhat encouraging in terms of feasibility of reducing the population intake of saturated fats to 10 percent. Nevertheless, much work remains because many Americans consume higher levels of saturated fat and the prevalence of obesity and overweight is high. Dr. Lichtenstein added that in addition to commenting on the appropriate amount of saturated fat to consume or the amounts of foods that contribute to saturated fat intake, it would be good to mention enjoyment of food too. A variety of healthy dietary patterns can be used to accommodate food preferences and cultural traditions.

Alcohol

Dr. Siega-Riz described the approach for examining the evidence related to alcohol. The 2015 Committee report will include a "risk/benefit" discussion of alcohol consumption. She mentioned that some of the dietary patterns that were described during the July Committee meeting included alcohol. Dr. Siega-Riz stated that relevant evidence related to the positive and negative aspects of alcohol and health based on the dietary patterns evidence review will be included. SC 2 will carry forward some of the conclusions related to alcohol and health from the 2010 Committee report. SC 2 will add a discussion section on alcohol and cancer using recent existing reports. Dr. Siega-Riz added that SC 5 is reviewing evidence on the health effects of energy drinks that are mixed with alcohol. A presentation on the alcohol topic review is planned for the next Committee meeting.

Discussion

Dr. Adams-Campbell commented on the "French Paradox" related to wine consumption in France. Some recent reports suggest that Americans may be consuming more alcohol than the French. Dr. Siega-Riz asked if SC 1 described overall alcohol patterns as part of an earlier presentation. Dr. Neuhouser responded that they did not present on alcohol intakes. Dr. Siega-Riz noted that SC 2 will have to follow up on this topic, and she thanked Dr. Adams-Campbell for bringing this to the Committee's attention.

Subcommittee 2 Next Steps

Dr. Siega-Riz summarized next steps for SC 2. They will be looking across the dietary patterns evidence to capture consistent themes and to describe common elements of the dietary patterns that confer multiple health benefits. In addition, where the evidence between dietary patterns and risk of a health outcome is limited, the Subcommittee will examine evidence related to foods and nutrients and health, as needed. Where the evidence is described as strong, the subcommittee will bring forward effect size estimates from the RCTs evaluating dietary patterns and health outcomes to help quantify “what works.”

Discussion

Dr. Nelson commented that the SC 2 discussion about dietary patterns lower in animal-based foods parallels previous discussions in SC 5. She suggested that due to the significant overlap, the two Subcommittees could work together to provide clarity about what it means to describe a pattern as “lower in animal-based foods.” Dr. Siega-Riz noted that the work in SC 1 is also relevant since SC 1 is attempting to quantify the composition of the patterns examined by SC 2. This effort will help to shed light on the macronutrient composition of the patterns and help to provide details about the specific grams consumed as well as ranges of the various food components.

Dr. Nelson raised a question about the current recommendation in the *Dietary Guidelines for Americans* to consume three servings of dairy per day. She wondered if there was enough evidence to support this recommendation and if there would be any utility in evaluating recent systematic reviews on the relationship between dairy consumption and health outcomes. Dr. Siega-Riz reiterated the importance of looking at dietary patterns overall. She noted that when a food or dietary component is eliminated from the diet, it is substituted with something else, and the impact of this substitution has to be considered. She suggested that it may be possible to use food pattern modeling to evaluate substitutes of low-fat and non-fat dairy in conjunction with the nutrient profile that needs to be met in order to identify non-dairy alternatives. Dr. Lichtenstein noted that this is the same issue that comes up with meat and the potential impact of removing it from a dietary pattern altogether.

Dr. Pérez-Escamilla noted that since dairy is a diverse food group, it would be helpful if the types of dairy products (i.e., cheese, milk, and yogurt) could be parsed out during the review of dietary pattern evidence in order to provide clearer recommendations. During his experience on the 2010 Dietary Guidelines Advisory Committee, the studies did not provide this level of detail. Dr. Campbell raised concern over singling out one food category when there are other sources of saturated fat that are grouped together (e.g., red and processed meat). He would prefer the Committee not be overly selective in their approach. Dr. Lichtenstein noted, as other Committee members have also pointed out, the effect of dietary substitutions has to be considered. With dairy, there are both full-fat and non-fat options and with meat there is a range in the fat content by type/cut of meat. If calories are decreased by choosing the leaner options, what else is added that may increase calories?

Dr. Hu had two comments related to the discussion of dairy. He noted that dairy recommendations are unique due to the fact that there is a specific daily target. The *Dietary*

Guidelines for Americans do not specify a specific quantity for red meat consumption. Dr. Hu felt that such a strong recommendation should be supported by health outcome data. He noted that food pattern modeling can help support the amount of dairy that is needed to meet calcium recommendations, but perhaps more flexibility could be offered by providing ranges that would fit into a variety of dietary patterns. Dr. Hu also noted that non-fat and low-fat dairy products are often high in added sugars and that a small container of yogurt can contain as many as 6 teaspoons. A qualifier could be added when recommending non-fat or low-fat products. Dr. Neuhausser also noted that some of the non-dairy products, such as plant-based milks, also have added sugars. She was not sure why there is a strong call to question the intake of dairy and noted that dairy provides several nutrients; thus, the Committee should consider the totality of evidence.

Dr. Millen encouraged the Committee not to let targeted questions drive specific recommendations for food groups but rather to focus on global dietary patterns. As evidence pertaining to a number of health outcomes comes together, the Committee can identify where data are strongest. As an example, Dr. Millen noted that there has not been a consistent definition for whole grains or consistent utilization of that group in the dietary patterns literature, so it poses a dilemma. However, the evidence for fruits, vegetables and low-fat dairy is much more consistent. Dr. Millen suggested that food pattern modeling can assist the Committee in trying to optimize dietary patterns across nutrients that have been identified as a public health concern.

Dr. Lichtenstein stated that there are multiple approaches to deal with the foods that have been raised as a concern, such as non-fat and low-fat yogurt high in added sugars. As was seen with trans-fat, perhaps the FDA's proposed rule to label added sugars may reduce the amount of added sugars through reformulation. She also noted that in other countries yogurt is often not as sweet. Dr. Nelson agreed with Dr. Millen's comments regarding food pattern modeling, especially if the modeling identifies evidence-based ranges for dairy intake. She expressed concern about always carrying the same recommendation forward as a result of dogma.

Dr. Pérez-Escamilla brought up a new topic and commented on the label "mixed dishes" used by SC 1. He noted the large heterogeneity of this food category and therefore the utility of the term. He also commented on the label "sandwiches" and noted it too is heterogeneous. Dr. Anderson stated that SC 1 has attempted to improve granularity around both groups and will continue to make concerted efforts to talk about the categories in specific terms. When writing its chapter, SC 1 will not focus on the elimination of categories but rather on modifications that can be made to improve diet quality. Dr. Millen concurred that these categories are not targeted for elimination but rather for communication, and that there are many easy ways to enhance diet quality.

Meeting Recesses

Recessed (3:30... p.m.)

2015 Dietary Guidelines Advisory Committee Meeting 5

Sponsored by the
U.S. Department of Health and Human Services (HHS)
U.S. Department of Agriculture (USDA)

September 16-17, 2014

Day 2 Meeting Summary

Wednesday, September 17, 2014

(8:00 a.m.)

Participants

Dietary Guidelines Advisory Committee (DGAC): Dr. Barbara Millen (Chair), Dr. Alice H. Lichtenstein (Vice-Chair), Dr. Steven Abrams, Dr. Lucile Adams-Campbell, Dr. Cheryl Anderson, Dr. Wayne Campbell, Dr. Steven Clinton, Dr. Frank Hu, Dr. Miriam Nelson, Dr. Marian Neuhouser, Dr. Rafael Pérez-Escamilla, Dr. Anna Maria Siega-Riz, Dr. Mary Story

Co-Executive Secretaries: Dr. Richard Olson, Ms. Colette Rihane, Dr. Kellie O. Casavale, Dr. Shanthy Bowman

Others: Dr. Don Wright, Ms. Angela Tagtow, Ms. Jackie Haven

Opening Remarks

Ms. Colette Rihane, Co-Executive Secretary and Director, Office of Nutrition Guidance and Analysis, Center for Nutrition Policy and Promotion, U.S. Department of Agriculture, (USDA), called the fifth meeting of the 2015 Dietary Guidelines Advisory Committee (DGAC) to order at 8:00 a.m. Ms. Rihane welcomed the meeting participants and opened the meeting, noting that over 900 individuals were registered to view the webcast live. Dr. Tom Brenna was not present for the second day of the Committee meeting, Dr. Frank Hu joins the Committee through telephone, and Dr. Steve Abrams must leave the meeting at noon. She reviewed the agenda for the day and the Committee's charge. She noted that in this public meeting, the Committee would discuss the scientific evidence and the draft conclusion statements would be presented for the Committee discussion.

Ms. Rihane mentioned that once the Committee's role is completed, HHS and USDA will develop the *Dietary Guidelines for Americans, 2015* based on the Committee report and consideration of public and Federal agency comments.

Ms. Rihane noted a change instituted to provide information more efficiently to the public. Upon registration for the meetings, participants may select an option to receive slides via email within a week after the meeting. If not selected, once made “508 compliant,” they will be available with the webcast recordings at www.DietaryGuidelines.gov a few weeks after the meeting date.

Information and public comments can be reviewed and submitted through www.DietaryGuidelines.gov. Ms. Rihane then turned the floor over to Dr. Barbara Millen to introduce the Subcommittee reports for the day.

Subcommittee Presentations and Discussion

Subcommittee 3 (SC 3): Diet and Physical Activity Behavior Change

Dr. Rafael Pérez-Escamilla, SC 3 Chair, began by acknowledging the other members of SC 3, Dr. Lucile Adams-Campbell, Dr. Wayne Campbell, Dr. Steven Clinton, Dr. Anna Maria Siega-Riz, and Dr. Michael G. Perri, consultant, Dr. Barbara Millen, the Committee chair, as well as the SC 3 support staff including Katrina Piercy and the Nutrition Evidence Library (NEL) team.

Dr. Pérez-Escamilla discussed the scope of SC 3 which was previously shared in detail at the January, March, and July meetings. This subcommittee is focused on motivators/facilitators/barriers of dietary and physical activity behaviors and interventions to improve adherence to dietary and physical activity recommendations. Dr. Pérez-Escamilla highlighted acculturation and household food insecurity as two important contextual factors that shape the ability of Americans to achieve recommended behaviors focusing on: 1) family shared meals; 2) eating out; 3) food/menu label use; 4) sedentary behaviors; 5) self-monitoring; and 6) sleep patterns. It was noted that these behaviors and interventions are assessed with 1) diet and physical activity outcomes; 2) weight/anthropometry outcomes; and 3) chronic disease risk/biomarker outcomes.

Dr. Pérez-Escamilla highlighted household food insecurity, family shared meals, eating out, sedentary behavior including screen time, self-monitoring, and sleep patterns as the key topic areas to be discussed at the meeting. Dr. Pérez-Escamilla noted that Dr. Perri has helped SC 3 to understand the relationship between behavioral change counseling interventions in relation to weight loss and weight management. Finally, Dr. Pérez-Escamilla stated the questions to be addressed at the meeting and speakers on each.

Consultant SC 3 Member

Dr. Michael Perri, Dean, College of Public Health and Health Professions and The Robert G. Frank Endowed Professor of Clinical and Health Psychology, University of Florida.

Household Food Insecurity

Dr. Siega-Riz began with the first topic of household food insecurity. The question for this topic is: What is the relationship between household food insecurity and measures of dietary intake and body weight? For this question, the United States Department of Agriculture (USDA) definitions of food insecurity were used. The analytical framework, inclusion/exclusion criteria, description of evidence, and literature results were presented for adults and children noting that articles were only found on the relationship between household food insecurity and body weight. Literature searches identified 835 articles and nine articles were ultimately included in a systematic review.

Dr. Siega-Riz then presented draft key findings and limitations noting that heterogeneity in populations and methodology may contribute to mixed findings. The draft conclusion statement stated: Limited and inconsistent evidence conducted in adults and children suggests a positive association may exist between persistent and/or progressing household food insecurity and body weight in older adults, pregnant women, and young children. No studies reported a relationship with lower body weight. The Committee grade was limited. The draft implications statement is: Federal food assistance programs should carefully document and monitor food insecurity and nutritional risk in program participants, and Participants should receive tailored counseling to choose foods that meet the *Dietary Guidelines for Americans* and achieve or maintain a healthy body weight.

Discussion

Dr. Story asked if the Subcommittee was able to find any evidence of the importance of the Federal nutrition programs. Dr. Siega-Riz responded that there was only one study which examined that relationship with a Federal assistance program, which was in older adults. For the Women Infant and Children's (WIC) study, everyone in the study was a WIC participant and there was no comparison group.

Dr. Lichtenstein asked which food assistance program the participants were on for the study with older adults. Dr. Siega-Riz responded that she was not sure, but would double check. Dr. Lichtenstein noted there is a difference in the types of food assistance programs, so that information would be beneficial.

Dr. Pérez-Escamilla commented as a follow up to Dr. Story's question, that for this question, the focus was on prospective cohort studies, but there are data from the USDA Economic

Research Service that the Supplemental Nutrition Assistance Program (SNAP) played a tremendous role in household food insecurity during the economic crisis of 2008.

Dr. Story asked if the implications could be strengthened about the importance of SNAP and other programs. Dr. Pérez-Escamilla noted that that was not a specific question that the Subcommittee asked. That information will be in the contextual materials.

Dr. Millen noted that the Committee has asked Federal colleagues to gather information on various programs' impact and effectiveness. Those reports are not a part of systematic evidence review, but the Committee plans to use that information as a contextual piece for this chapter and others.

Family Shared Meals

Dr. Adams-Campbell presented on the family shared meals topic area and addressed the questions: 1) What is the relationship between frequency/regularity of family meals and measures of dietary intake in U.S. population groups? and 2) What is the relationship between frequency/regularity of family meals and measures of body weight and obesity in U.S. population groups? Dr. Adams-Campbell discussed the description of the evidence for both questions in addition to the analytical framework and inclusion/exclusion criteria. The literature search identified 2,382 articles. Two articles were included on the dietary intake question systematic review and six articles were included on the body weight question systematic review.

For the first question on measures of dietary intake, the draft key findings statement is that increased consumption of family meals was associated with improved dietary intake, specifically an increase in fruits and/or vegetables, and calcium-rich or milk-based foods. The draft conclusion statement is: Insufficient evidence is available examining the association between frequency of family meals and measures of dietary intake to draw a conclusion. The Committee grade was not assignable.

Draft key findings and limitations were presented for the second question on body weight and obesity noting that studies did not have a standard definition for family meals and that no study assessed the quality or source of meals consumed. The draft conclusion statement was: Limited evidence from prospective studies shows inconsistent relationships between the number of family/shared meals and body weight of children. The Committee grade was limited.

Discussion

Dr. Nelson noted she was surprised to see that the grade was not assignable for the first question. Dr. Siega-Riz noted that there was only one cohort study, so there was not enough evidence.

Eating Out

Dr. Campbell presented next on the topic of eating out, noting that this is an update to a NEL systematic review completed for the 2010 Committee. The question for this topic is: What is the relationship between eating out and/or take away meals and body weight in children and adults?

Dr. Campbell provided background between the 2010 and 2015 Committee questions and presented the analytical framework and inclusion/exclusion criteria, noting that there were disparities in defining eating out/take away venues. Literature searches identified 835 articles and were narrowed to seven new articles in addition to nine articles taken from the 2010 NEL systematic review for a total of 16 studies. Description of the evidence was then discussed for children and adults mentioning that one study examined the transition of children into adulthood.

Draft key findings for children showed mixed results for anthropometric outcomes. In adolescents transitioning to adulthood, one study found high baseline frequency of fast food intake was associated with increased BMI z-scores at five-year follow-up. In adults, evidence consistently demonstrated a relationship between increased frequency of fast food meal consumption and higher weight gain, BMI, and risk for obesity, although there was insufficient evidence with other types of eating venues. Draft limitations were presented stating: Data are sparse regarding meal composition, studies in young children or older adults. Hispanic/Latino and Asian populations are poorly represented in this body of literature.

Two draft conclusion statements were presented. The first draft conclusion statement was: Moderate evidence from prospective cohort studies in populations 8 to 40 years of age at baseline indicates increased frequency of fast food consumption is associated with increased weight, BMI and risk for obesity. The Committee grade was moderate. The second draft conclusion was: Insufficient evidence is available to assess the relationship between frequency of other types of restaurant and takeout meals and weight outcomes. The Committee grade was not assignable.

Finally, two draft implications were presented. One draft implication statement was: Given that one-third of calories are consumed outside of the home, Americans should limit the frequency of eating at fast food establishments. The second draft implication statement was: When eating out, Americans should choose healthier foods to avoid increases in body weight.

Discussion

Dr. Story noted she was surprised there was a moderate grade and asked whether the Subcommittee considered breaking out children from adults. Dr. Campbell responded that unlike the 2010 Committee which had separate questions, the Subcommittee combined age groups into one question; therefore the moderate grade reflected scope and focus of the questions addressed.

Dr. Story suggested that since the data were presented separately, it would make sense to have a separate conclusion statement. Dr. Campbell noted that he would take this point back for discussion with the Subcommittee. Dr. Siega-Riz noted that the Subcommittee had a discussion of grading strong or moderate and they did not feel the evidence was strong for either age group. She noted that there were not many prospective studies and no randomized studies. Dr. Story recommended the Subcommittee to discuss again and noted the importance of having consistency in judging evidence.

Dr. Neuhouser noted that some of what was presented is consistent with SC 1 with diet quality based on where food is consumed, some is not consistent. She noted that for totality of evidence, it will be important to tie messages together so that it is clear. Dr. Campbell asked Dr. Neuhouser to clarify SC 1's findings and noted that this evidence was specific to body weight, not dietary quality. Dr. Neuhouser responded the conclusion was that in all locations where people obtained food, there was poor diet quality. Dr. Campbell noted there is not enough information on non-fast food venues to link or not link that with diet quality or body weight and noted there is a need for new/better research in this area.

Dr. Anderson noted concern about that implication statement specifically highlighting fast-food restaurants. She suggested amplifying the implication statement by noting where data were not available and that this would help to tie in other parts of the report which note where people are eating makes an impact. Dr. Campbell asked about the scope of the implication statement – his understanding was that it was not a place for qualifiers. Dr. Millen noted that within the research recommendations the lack of data could be mentioned. Dr. Pérez-Escamilla noted the importance of incorporating comments from Dr. Anderson and Dr. Neuhouser within the integration chapter.

Dr. Nelson asked to clarify the number of studies included. Dr. Campbell explained there were nine studies from the 2010 question and seven studies from 2010 forward which were combined for a total of 16.

Dr. Nelson noted she was surprised the implications statement did not encourage restaurants to continue to improve their menus and noted that many are doing this. Dr. Millen responded that the lack of association or mixed results does not necessarily mean the Committee do nothing about the situation. As the Committee looks across various subcommittees, it will be looking for common themes and this will likely be one. As an aside, one interpretation of the data is that perhaps the lack of evidence of the association suggests there are poor food choices but also better food choices from a broader array of options that may be available from some food establishments. Dr. Campbell noted that they do not have the data to understand what the lack of association is due to and that the literature in 2010 was much more consistent and uniform in finding.

Dr. Nelson noted that it may be clearer if adults and children are separated out. She noted that she is doing research which shows that calorie amounts for adult and children meals at fast food

establishments are lower than those at quick-serve establishments and noted this area is complicated.

Dr. Lichtenstein noted that one-third of calories are consumed outside of the home. She inquired if the Committee can get the percentage of calories consumed from worksite, school breakfast/lunch, etc. Dr. Campbell wondered if SC 1 might have this type of data.

Dr. Lichtenstein made a general comment about needing to be specific about definitions and terminology for the terms “mixed” and “inconsistent.”

Dr. Clinton noted the challenge in this field is that fast-food is not well or uniformly defined in the literature. He felt there was a need to emphasize this in the research recommendations.

Dr. Pérez-Escamilla noted that the last question SC 3 will address is related to calorie information [Food labeling topic].

Dr. Nelson noted that the National Restaurant Association’s “Kids Live Well Standards” are very rigorous and are related to the *Dietary Guidelines* and may be something for SC 3 to consider.

Sedentary Behavior Including Screen Time

Dr. Campbell then presented on the “Sedentary Behavior Including Screen Time” topic area. He stated that one question on this topic, What is the relationship between sedentary behavior and measures of dietary intake and body weight/BMI in adults? was addressed at the March meeting along with draft conclusion statements.

Dr. Campbell then addressed a new question: How effective are behavioral interventions that focus equally on reducing recreational sedentary screen time and improving physical activity and/or diet for: 1) reducing screen time; 2) improving weight-related outcomes; 3) increasing physical activity; and 4) improving diet. The evidence for this question was provided from an existing report, “Community Preventive Services Task Force Obesity Prevention and Control: Behavioral Interventions that Aim to Reduce Recreational Sedentary Screen Time” (Community Guide or CG).

The description of the evidence, which is an update from the 2007 CG, was then provided. Intervention definitions of screen time were discussed as well as the CG review of the evidence. The CG findings state: Evidence indicates that behavioral screen time interventions are effective in reducing recreational sedentary screen time (47 study arms), improving physical activity (42 study arms), improving diet (37 study arms), and improving or maintaining weight status (38 study arms).

The CG conclusion statement was then presented: The Community Preventive Services Task Force recommends behavioral interventions to reduce recreational sedentary screen time among children aged 13 years and younger. This finding is based on strong evidence of effectiveness in reducing recreational sedentary screen time, increasing physical activity, improving diet, and improving or maintaining weight-related outcomes. Evidence includes studies of interventions that focus only on reducing recreational sedentary screen time (screen-time-only) and studies that focus on reducing recreational sedentary screen time and improving physical activity and/or diet (screen-time-plus). Limited evidence was available to assess the effectiveness of these interventions among adults.

The CG task force conclusion statement grade was strong and the 2015 Committee concurred with this finding. The draft implications statement is: There are effective interventions identified by the Community Preventive Services Task Force that should be implemented to reduce screen time and thus have beneficial effects on children's diet and weight status.

Discussion

Dr. Millen asked if Dr. Campbell could comment on less intense versus more intense interventions. Dr. Campbell responded that intensity was not necessarily related to aggressiveness of interventions; rather it referred to the number of components. For example, high intense interventions were multi-component as opposed to only looking at one component, such as screen time. Dr. Millen noted it would be helpful to clarify which settings were examined and other components, such as whether parents were involved. Dr. Pérez-Escamilla noted that his interpretation of high versus low was related to the strength of behavioral foundation of the intervention.

Dr. Story inquired whether in the implications more information could be added about effective interventions and where they should be implemented. Dr. Millen noted this was her recommendation as well.

Dr. Lichtenstein noted there may be a place in the report to focus on prevention, not necessarily looking to reduce screen time, but programs to prevent screen time from the start. Dr. Campbell shared that the CG noted that most kids are well over the American Academy of Pediatrics (AAP) screen time recommendations, and therefore the focus for this report was on treatment interventions.

Dr. Story asked if any interventions included removing TV from the bedroom; Dr. Campbell did not recall the specifics.

Dr. Nelson encouraged adding targets where appropriate. For example, it could be referenced if the Subcommittee supports American Academy of Pediatrics (AAP) screen time

recommendations of two hours. She noted she agreed with previous recommendations about adding details about specific interventions.

Dr. Anderson inquired whether school tablet time was included in the overall amount of screen time noted per day. Dr. Campbell confirmed that this included cell phone and computer screen time. Dr. Anderson asked if this would be discussed in the report. Dr. Campbell responded that he will look closer at the report and will pull out information to clarify where applicable.

Dr. Nelson noted that TV screen time is flooded with ads for unhealthy foods and in schools, screen time is not flooded with advertisements. Dr. Pérez-Escamilla noted that the CG report focused a lot on screen time plus interventions, which include interventions to increase physical activity and dietary quality. Dr. Siega-Riz noted there are pop-ups on tablets/ipads, similar to TV.

Self-monitoring

Dr. Pérez-Escamilla then presented on the self-monitoring topic area. The question for this topic is: What is the relationship between use of self-monitoring strategies and body weight outcomes in adults and youth? The analytical framework, inclusion/exclusion criteria, and description of evidence were presented. Literature searches identified 1,192 articles and 18 articles were ultimately included in a systematic review.

Dr. Pérez-Escamilla then presented draft key findings and limitations noting that study participants were predominately overweight, educated, Caucasian, females between the ages of 30 to 60 years. One draft conclusion statement included: Moderate evidence, primarily in overweight adult women living in the U.S., indicates that self-monitoring of diet, weight, or both, in the context of a behavioral weight management intervention, generally improves weight-loss outcomes. The Committee grade was moderate. A second draft conclusion statement stated: Limited but consistent evidence suggests that higher frequency or greater adherence to self-monitoring of diet, weight, or both, in the context of a behavioral weight management program, is associated with better weight-loss outcomes. The Committee grade was limited.

Dr. Pérez-Escamilla finished by presenting two draft implications. One stated: Self-monitoring with individualized feedback should be incorporated into behavioral lifestyle programs for weight management. A second draft implication stated: Self-monitoring coupled with personalized feedback can be used to enhance outcomes in weight management programs.

Discussion

Dr. Lichtenstein noted that motivation was mentioned and that many strategies can be resource-intensive. She inquired if any work was done to identify motivation to tailor intervention. Dr.

Pérez-Escamilla responded that one study in Japan tailored intervention based on motivation level and the only successful group was the one with the tailored intervention. Dr. Lichtenstein asked if there was any proactive work to address individuals currently at a healthy weight, especially those at critical life stages for increasing body weight. Dr. Pérez-Escamilla noted this will be in the research recommendations, what type and what frequency of self-monitoring work for prevention. He shared that there was only one study related to pregnant women, and the Institute of Medicine (IOM) concluded in 2009 that this was a very important area for additional work.

Dr. Neuhaus noted she was surprised to see a moderate grade, not strong, since there were four randomized controlled trials. Dr. Pérez-Escamilla noted that the frequency comes from observational studies and that these studies were not set up to test self-monitoring specifically and only used the self-monitoring arm to draw conclusions. Dr. Millen noted that initially the approach was to see if there was an independent effect of self-monitoring, but that most studies incorporated some type of intervention in addition to self-monitoring. She noted this was an important area to look at across all subcommittees' findings, especially those of SC 2. Dr. Anderson noted there should be focus to promote environments that support efforts for behavior change.

Sleep Patterns

Dr. Adams-Campbell then presented on sleep patterns, the last topic area for SC 3. Two questions were addressed: 1) What is the relationship between sleep patterns and measures of appetite and dietary intake/dietary behavior in U.S. population groups? and 2) What is the relationship between sleep patterns and body weight in U.S. population groups?

Dr. Adams-Campbell stated the exploratory search had insufficient evidence on sleep and dietary intake and a duplication assessment determined there were no high quality reviews available to replace a NEL review. SC 3 defined this as an emerging topic.

Discussion

Dr. Clinton noted there may be literature, but that the question itself would not necessarily pick it up related to energy balance, weight, and sleep apnea and noted there is a clear relationship there.

Dr. Nelson noted her surprise about not having data for the second question. Dr. Campbell responded that for this topic, without data on the first question, sleep and body weight fell outside of the scope of the Committee's charge.

Dr. Neuhouser noted her surprise there was not more information on this area and noted that she was aware of several studies on this topic in process.

Dr. Pérez-Escamilla noted everyone is in agreement that this is an important topic. He noted that similar to the microbiome, the plan is to invite an outside speaker to discuss sleep patterns with SC 3.

Dr. Millen added a clarification and noted there was an effort to systematically address questions with the exploratory searches. Since those came up empty, there was no way to further explore this topic in that way.

Dr. Nelson inquired if sleep apnea was a search term. Dr. Campbell said no and noted SC 3 was focused on sleep patterns, not on clinical outcomes.

Next Steps

Dr. Pérez-Escamilla ended the presentation by noting that food/menu label use as the last area to be addressed and worked on by SC 3. One question will be broken down into two areas concentrating on calories in menus in restaurants and other food venues as well as the use of the food label and how that relates to diet quality and body weight outcomes. Preliminary literature searches have returned a fair amount of evidence which should help to answer these questions. Dr. Pérez-Escamilla noted that the chapter writing phase will begin soon and said that the full Committee's comments and suggestion will all be taken into consideration in finalizing conclusion statements and the final write up.

Subcommittee 4 (SC 4): Food and Physical Activity Environments

Dr. Mary Story, SC 4 Chair, began the presentation by recognizing the other Subcommittee members, Dr. Lucile Adams-Campbell, Dr. Wayne Campbell, Dr. Miriam Nelson, and Dr. Barbara Millen. She stated that the focus of this presentation is to provide an overview of the work that SC 4 has conducted between the July and September DGAC meetings. Dr. Story then reviewed the scope for SC 4, which is looking at the food environment in key settings such as neighborhood and community food access, early care and education, schools, and worksites. Subcommittee 4 is also interested in understanding and assessing the role of the food environment in promoting or hindering healthy eating in key settings and identifying the most effective diet-related approaches and policies ("what works") to improve health and reduce disparities. Dr. Story stated that Subcommittee members would be discussing evidence on four topics: 1) food access, 2) early care and education (ECE), 3) schools, and 4) worksite. Dr. Story stated that no experts had been invited to present to SC 4 and that the Subcommittee does not have any consultant members. She then turned the presentation over to SC 4 member, Dr. Nelson.

Dr. Nelson discussed current work on the food access topic area and noted that the analytical framework, key findings, and conclusion statements were presented at the July meeting and that the draft conclusion statements are being presented again for contextual purposes leading into the draft implications statement, which is new information. Current questions of interest are focused on the relationship between neighborhood/community food access in food retail settings and the dietary intake, quality, and weight status of individuals. Dr. Nelson reviewed the key findings and presented the draft conclusion statements: 1) Emerging evidence suggests that the relationship between access to farmers' markets/produce stands and dietary intake and quality is favorable (Grade: insufficient evidence to grade). The body of evidence on access to other food outlets, such as supermarkets, grocery stores, and convenience stores/corner stores, and dietary intake and quality is limited and inconsistent (Grade: insufficient evidence to grade); and 2) Limited but consistent evidence suggests that the relationship between access to convenience/corner stores and weight status is unfavorable with closer proximity and greater access being associated with significantly higher BMI and/or increased odds of overweight/obesity (Grade: limited). The body of evidence on access to other food outlets, such as supermarket, grocery stores and farmers' markets/produce stands, and weight status is limited and inconsistent (Grade: insufficient evidence to grade).

Dr. Nelson stated that because the two food access questions are similar, one implications statement was developed for the topic area. The draft implications statement for food access states: For people to improve their diets and health, they need to have convenient access to nutritious, high quality, and affordable healthy foods in environments where they live, work, learn, and play. Limited access to affordable and healthy food is a challenge, particularly for families living in rural areas and low-income urban communities. Innovative approaches to bring healthy food retail into communities have proliferated, especially in underserved neighborhoods. These include creating financing programs to incentivize grocery store development; improving availability of healthy food at corner stores and bodegas, farmers' markets and mobile markets, community gardens and youth-focused gardens; creating new forms of wholesale distribution through food hubs; and improving transportation and public safety options. However, most of these approaches lack adequate evaluation. These and other promising equity-oriented efforts need to continue and be evaluated and then successfully scaled up to other communities. To ensure healthy food access to everyone in America, action is needed across all levels, Federal, state, and local, to create private-public partnerships and business models, with the highest priority on those places with highest need to ensure healthy food access for everyone in America. Although efforts are needed to increase access to healthy foods, similar efforts are needed to reduce access to and consumption of calorie-dense nutrient poor foods and sugar-sweetened beverages in community settings. These efforts need to be seamlessly integrated with Federal nutrition assistance programs such as WIC, SNAP as well as elder nutrition. Dr. Nelson turned the presentation over to Dr. Story, to continue the presentation.

Discussion

Dr. Lichtenstein asked about the relationship between body weight and access to convenient stores/corner stores and if the data were controlled for access to other options such as supermarkets that might also be open 24 hours a day. Dr. Nelson responded that the data evaluated the totality of the food environment and proximity to where individuals live, work and play.

Dr. Clinton commented that food banks are providing a lot of food to Americans who are in need and suggested including food banks within the implications statement. Dr. Clinton also asked if the research provided any insights about the quality of food provided by food banks to help this population meet the *Dietary Guidelines*. Dr. Nelson responded that food banks are making advancements in their standards to increase the healthfulness of foods that they are providing. Some examples include the use of nutrition criteria or only accepting a certain amount of unhealthy food. She agreed a statement about food banks could be included in the implications statement.

Early Childhood Education (ECE)

Dr. Story presented findings on the ECE topic area. She began by stating the question that was evaluated: What is the impact of obesity prevention approaches in ECE programs on the weight status of children two to five years of age? Dr. Story explained that the question was addressed using an existing systematic review which was updated with a NEL systematic review. Dr. Story noted that a description of the evidence for the ECE question and draft conclusion statement were previously presented. She then reviewed the draft conclusion statement: Moderate evidence indicates that multi-component obesity prevention approaches implemented in childcare settings improve adiposity-related outcomes in preschoolers. A combination of dietary and physical activity interventions is most effective for preventing or slowing excess weight gain and reducing the proportion of young children aged 2-5 years who are overweight or obese. (Grade: moderate).

Dr. Story then presented the draft implications statement for the topic, which is new. The implications statement states: Existing evidence indicates that multi-component interventions that incorporate both nutrition and physical activity are effective in reducing obesity risk in preschool children. Successful strategies include curricular enhancements of classroom education for children for both nutrition education and physical activity, outreach engagement to reach parents about making positive changes in the home, improvements in healthfulness of meals and snacks and mealtime environment, modifying food service practices, increasing physical activity play, reducing sedentary behaviors, and improving outdoor playground environments. Evidenced-based healthy eating and physical activity practices should be implemented in childcare settings with training and technical assistance for staff. Policies at the Federal, state, and local levels for nutrition and activity standards and guidelines in childcare settings need to be strengthened. It is also important that childcare facilities provide meals and snacks that are consistent with the meal patterns in the Federal Child and Adult Care Food Program (CACFP) to ensure that young children have access to healthy meals and snacks and age-appropriate portions. Drinking water also needs to be readily available and accessible to children. Government

agencies should ensure access to affordable nutritious foods through CACFP and maximize participation in the program.

Discussion

Dr. Lichtenstein stated that it is good to see the emphasis on prevention.

Dr. Abrams stated that there is often discussion about the value of preschool programs relative to their cost and asked if there is evidence respective to states that have well-developed pre-kindergarten programs and if there has been an effect on weight. Dr. Story responded that those programs have not been evaluated yet. Dr. Abrams responded that it would be good to know if these programs have nutritional benefits in addition to educational benefits.

Dr. Pérez-Escamilla asked if there are case-studies at the county or state level that have successfully implemented these recommendations. Dr. Story responded that this work is ongoing and that the Centers for Disease Control and Prevention (CDC) has some studies that they are currently funding as well as Nemours in Delaware which has an initiative looking at training staff on obesity prevention. Dr. Pérez-Escamilla responded that this might be helpful contextual information to include as a reference for the next DGAC. Dr. Story responded that New York City has evaluated their program and that this can be added.

Dr. Neuhouser noted that there is not a reference to the Head Start program and asked if this program should be included. Dr. Story stated that she would bring that recommendation back to the SC 4 for discussion.

Dr. Siega-Riz stated that this age group is so important because there is a high prevalence of overweight and yet there are tools available to minimize this effect and the implications statement nicely outlines what these tools are.

School-based Questions

Dr. Campbell started his presentation noting that the analytical framework, search strategy, inclusion and exclusion criteria, and literature search results were presented at a previous meeting and noted that today he will presented the key findings from the systematic reviews as well as the draft conclusion and implications statements. He then presented the schools questions that were reviewed related to approaches and policies within the school environment and their impact on dietary intake and quality, and weight. Dr. Campbell noted that these questions will be addressed using existing systematic reviews.

Dr. Campbell presented the first question on school-based approaches and dietary intake, and after describing the evidence and key findings, he presented the draft conclusion statement: Moderate evidence indicates that multi-component school-based approaches can increase daily fruit and vegetable consumption in children grades kindergarten through eighth. A paucity of school-based studies preclude conclusions with youth in grades 9-12. Fruit and vegetable

consumption individually, as well as in combination, can be targeted with specific school-based approaches (Grade: moderate).

Dr. Campbell then presented the second question focused on school-based policies and dietary intake. After describing the evidence and key findings, he presented the draft conclusion statement: Moderate evidence indicates that implementation of school policies for nutrition standards to change the availability, accessibility and consumption of foods and beverages sold outside the school meal programs (competitive foods and beverages) are associated with higher quality purchasing behavior and dietary intake while at school (Grade: moderate).

Dr. Campbell then presented the third question focused on school-based approaches and weight status. After describing the evidence and key findings he presented the draft conclusion statement: Moderate and generally consistent evidence indicates that multi-component school-based approaches have beneficial effects on weight status in children ages 6-12 years. Insufficient school-based studies have been conducted with adolescents (Grade: moderate). Dr. Campbell then presented the final question focused on school-based policies and weight status. After describing the evidence and key findings, Dr. Campbell presented the draft conclusion statement: Limited evidence suggests that school policies targeting nutrition, alone and in combination with physical activity, may beneficially affect weight-related outcomes (Grade: limited).

Dr. Campbell explained that the implications statement reflects all four of the school-based questions combined. The draft implications statement is: Existing evidence indicates that school-based programs designed to improve the food environment and support healthy behaviors may effectively promote improved dietary intake and weight status of school-aged children. Programs that emphasize multi-component, multidimensional approaches (including increased physical activity) are important to changing behavior and need to be reinforced within the home environment, as well as the community, including the neighborhood food retail outlets that surround schools. School policies should strive to support effective programs that increase availability, accessibility, and consumption of healthy foods and beverages, while reducing less healthy competitive foods and beverages. The combination of economic incentives along with specific policies can increase the likelihood that specific approaches will be effective. The recently updated USDA nutrition standards for school meals and snacks and beverages sold in schools will ensure that students throughout the U.S. will have healthier school meals and snack and beverage options, but schools need support and active engagement from students, parents, community members, and their districts and states to successfully implement and sustain them.

Discussion

Dr. Pérez-Escamilla asked if the literature evaluated schools that have parental involvement versus minimal parental involvement. Dr. Campbell responded that the systematic reviews included studies that evaluated parental involvement and the home environment, and noted that the studies were not all uniform or independent of other approaches or programs. The emphasis from the systematic reviews was that when including parents and home-based involvement the program was more likely to be successful.

Dr. Pérez-Escamilla asked a clarifying question about school policies and prevalence of overweight and obesity, and if this was examined in the reviews. Dr. Campbell responded that the implications statement reflects all of the studies that were evaluated in the systematic reviews, which included systematic reviews on school policies.

Dr. Siega-Riz asked if the effect size could be added into the questions related to school-based approaches and dietary intake and school-based policies and weight status. Dr. Campbell stated that if the information is available within the systematic review, he will work to include the effect size. Dr. Story noted that the information might be hard to put into a conclusion statement, but it could probably fit within the key findings.

Dr. Siega-Riz asked about school-based policies and dietary intakes, noting that based on the key findings presented by the Subcommittee the conclusion statement could be graded as strong. Dr. Campbell responded that the conclusion statement was a caution that the systematic reviews and meta-analyses overall were strong, but the authors of the systematic reviews noted that the studies within the reviews had a high risk of bias. Dr. Story stated that the Subcommittee could revisit the grade, and Dr. Nelson agreed.

Dr. Neuhouser noted that foods as a reward were evaluated within the literature and asked if teachers could be added to the list of stakeholders in the implications statement who need to support changes within the school system. Dr. Campbell added that school administrators should also be included.

Dr. Neuhouser asked if any of the studies within the systematic reviews examined other innovative school programs, such as cooking or being involved in food preparation, and if other approaches could be included in the findings. Dr. Campbell responded that those types of approaches were not mentioned within the systematic reviews. School-gardens did show an effect in increasing vegetable intake so SC 4 wanted to include this intervention in the review. Dr. Story suggested that these types of approaches could be added to the research recommendations.

Dr. Lichtenstein noted that some schools use a timer on vending machines to make sure that food and beverages can only be purchased at certain times during the day and asked if this was seen in the literature. Dr. Campbell responded that availability and accessibility of competitive foods and beverages were seen in the reviews, but it may not have been specifically related to having timers on vending machines. Dr. Neuhouser noted that many vending machine companies provide monetary incentives to schools, and this may counteract school policies. Dr. Campbell responded that those types of incentives were not addressed in the literature. Dr. Lichtenstein responded that if there are not data it could be included as a research recommendation.

Worksite Approaches

Dr. Adams-Campbell began her presentation by stating the Subcommittee is addressing questions related to worksites. She then reviewed the four questions that are being evaluated,

which include the impact of worksite-based approaches and policies on dietary intake and weight status of employees. Dr. Adams-Campbell reviewed the analytical framework, search strategy, and inclusion and exclusion criteria. Dr. Adams-Campbell then described the evidence for each of the four questions noting that the worksite questions are being answered using existing systematic reviews, which include randomized controlled studies as well as other study designs and represent a range of sample sizes of employees across the U.S. Dr. Adams-Campbell concluded her presentation by noting that conclusion and implications statements are forthcoming.

Discussion

Dr. Nelson asked what the rationale was for only going back to 2010 in the search strategy stating that worksite questions were not examined by the 2010 Dietary Guidelines Advisory Committee. She then posited that it was likely because the question is being addressed using existing systematic reviews, which would have captured studies prior to 2010. **Dr. Psota**, Nutrition Evidence Library Project Manager for SC 4, responded that it is because the question is being addressed using systematic reviews and therefore will include individual studies published before 2010.

Dr. Anderson asked a point of clarification about the various study designs within the systematic reviews, noting that the reviews include both randomized and non-randomized controlled trials. Dr. Adams-Campbell agreed.

Cross-Cutting Topics

Added Sugars

Dr. Mary Story, Added Sugars Working Group Co-Lead, began her presentation by acknowledging the efforts of the Working Group co-lead, Dr. Cheryl Anderson and members, Committee Chair, Dr. Barbara Millen, Committee Vice-Chair, Dr. Alice H. Lichtenstein, Dr. Miriam Nelson, Dr. Wayne Campbell, Dr. Frank Hu, and Dr. Marian Neuhouser. Dr. Story stated that since the Working Group was only recently formed, no findings would be reported during her presentation.

Dr. Story began her presentation by describing the scope of the Working Group's review and the process the Working Group developed to complete their work. The scope of the Working Group's effort is to inform potential recommendations for added sugars by examining the relationship between added sugars intakes and health, and evaluating the amounts of added sugars that can be consumed while still meeting nutrient needs within the U.S. Department of Agriculture (USDA) Food Patterns. The Working Group will also review the evidence on low-calorie sweeteners which have been used to replace added sugars in some foods and beverages.

Dr. Story presented mean daily added sugars intake data for males and females by age group based on National Health and Nutrition Examination Survey (NHANES) 2001-04 and 2007-10 data. NHANES mean daily intake data were also compared to the sex and age-specific added sugars allowances in the USDA Food Patterns. Dr. Story noted that mean added sugars intakes of males and females for both survey time periods peaked in the 14-18 year age group. She noted that mean intakes of added sugars in 2007-10 were lower than in 2001-04 for all sex-age groups. Nevertheless, added sugars intakes exceeded the added sugars limits in the USDA Food Patterns.

Dr. Story described the food source contributors to added sugars intakes of persons 2+ years based on dietary intake data from NHANES 2009-10. The two largest food group contributors to added sugars intake were beverages (excluding milk and 100 percent fruit juice) (47%) and snacks and sweets (31%). Sugar-sweetened beverages contributed 39 percent of total added sugars intake with soft drinks and fruit drinks contributing 25 and 11 percent respectively of the total added sugars intakes of the U.S. population.

Dr. Story stated that the proposed definition of added sugars from the March 2014 Food and Drug Administration (FDA) Proposed Rule for the revision of the Nutrition and Supplement Facts Label will be used. She noted that the definition is comprehensive and includes sugars that are added during food processing and sugars that are packaged as such. Sugars, syrups, naturally occurring sugars that are isolated from a whole food and concentrated (e.g., fruit juice concentrates), and other caloric sweeteners are included. The added sugars definition includes single ingredient foods such as individually packaged table sugar, but excludes sugar alcohols.

Invited Expert

The Working Group heard from one invited expert between July and September 2014. **Dr. Barry Popkin**, W.R. Keenan, Jr. Distinguished Professor of Nutrition, University of North Carolina School of Public Health, Chapel Hill, NC presented to the Working Group.

Dr. Story proceeded to describe the analytical framework the Working Group used to answer the question: What is the relationship between intake of added sugars and cardiovascular disease, body weight/obesity, type 2 diabetes, and dental caries? The target population for the review includes children and adults 2+ years who are healthy or at risk for chronic disease. The intervention/exposure of interest is added sugars intake and will include studies on sugar-sweetened beverages. The comparator for the review is different levels of added sugars intake.

Dr. Story reviewed the sources of evidence used for addressing the health outcomes of interest. An original Nutrition Evidence Library (NEL) systematic review spanning January 2000 to August 2014 was completed to examine the relationship between intake of added sugars and cardiovascular disease. The Working Group is reviewing 13 intervention studies and 13 prospective cohort studies. A World Health Organization (WHO) commissioned systematic review/meta-analysis will be used to examine the relationship between added sugars intake and dental caries. Added sugars intake and body weight outcomes will be reviewed using a WHO

commissioned systematic review/meta-analysis supplemented with two recent systematic reviews and meta-analyses. Finally, added sugars intake and type 2 diabetes will be reviewed using five systematic reviews and meta-analyses published between January 2010 and August 2014.

A concurrent review of the evidence on low-calorie sweeteners and health outcomes is underway. Many low-calorie sweeteners are part of the review, including acesulfame K, aspartame, saccharin, stevia, and sucralose.

Dr. Story stated the Working Group will continue to review evidence on added sugars, low-calories sweeteners, and health outcomes. The Working Group will describe the amounts of added sugars that can be consumed within the limits of the USDA Food Patterns. The Working Group plans to develop recommendations for multi-level strategies to reduce added sugars intakes and improve consumer knowledge and understanding related to the amounts of added sugars in foods and beverages.

Discussion

Dr. Anderson commented that the list of added sugars in the proposed definition of added sugars, which was taken from the FDA proposed rule, does not include evaporated cane juice. She felt that additional clarification was needed. Dr. Lichtenstein stated the Working Group will check with the FDA on this.

Dr. Nelson commented that the evidence and recommended strategies on cross-cutting topics such as sodium, added sugars, and physical activity will strengthen the Committee's report. Hearing no additional questions and comments on added sugars, Dr. Nelson proposed that the Physical Activity Writing Group follow with their presentation before the Committee adjourns for lunch.

Physical Activity Writing Group

Dr. Miriam Nelson, Physical Activity Writing Group (PAWG) Chair, began the presentation by giving a brief historical overview of the physical activity topic area within the context of the *Dietary Guidelines for Americans*. She noted that physical activity has been part of the *Dietary Guidelines for Americans* for the last 15 years due to the body of evidence on combining good nutrition and physical activity to promote optimal health, growth and development, and healthy aging. She added that the *Physical Activity Guidelines for Americans* (PAG) was first published in 2008, followed 5 years later by the *Physical Activity Guidelines for Americans Midcourse Report: Strategies to Increase Physical Activity Among Youth* (2013). She went on to note that there is likely to be a *2018 Physical Activity Guidelines for Americans*, which led the Committee to decide early on in its work to use the published *Physical Activity Guidelines* reports to address the physical activity topic. She added that bringing forward the work from the *Physical Activity Guidelines Advisory Committee Report, 2008; Physical Activity Guidelines for Americans, 2008;*

and Physical Activity Guidelines for Americans Midcourse Report: Strategies to Increase Physical Activity Among Youth (2013) provides context for the Committee's work and ensures physical activity is clearly acknowledged.

Dr. Nelson provided an overview of the Committee's approach to addressing the physical activity topic area. The Physical Activity Writing Group (PAWG) agreed to use existing systematic reviews and reports to address physical activity and identified the three Physical Activity Guidelines (PAG) reports to serve as primary sources of evidence. They then reviewed and extracted key findings and methodology considerations from each PAG report, developed questions, and identified key findings. Dr. Nelson went on to explain that the PAWG carried forward verbatim conclusion statements and evidence grades from the reports to answer the questions. As an important note, she added that the PAWG did not editorialize or revise the conclusions from the PAG reports because the Committee agrees with the findings of these reports. The PAWG then drafted conclusion statements to answer questions and as well as an overall implications statement and research recommendations.

Dr. Nelson reviewed the key topic areas of the PAWG, noting that based on the Committee's robust discussion of physical activity at its July public meeting additional conclusions were brought forward from the PAG reports, including the following: physical activity and health outcomes in people with disabilities, physical activity and health outcomes during pregnancy and the postpartum period, and the risk of adverse events. Other key topic areas (discussed at previous public meetings) include: physical activity and health outcomes in children and adults; physical activity dose in children, adults, and older adults; and physical activity interventions in children.

She then discussed current data on population physical activity levels and trends. Based on data from the 2008, 2009, and 2012 National Health Interview Survey (CDC/National Center for Health Statistics), there has been a slight increase in self-reported physical activity among all adults, with males reporting more physical activity than females. Specifically, the proportion of all adults reporting they meet the *2008 Physical Activity Guidelines* recommendations for aerobic activity (i.e., at least 150 minutes/week of moderate intensity aerobic activity, 75 minutes/week of vigorous intensity, or an equivalent combination) was 43.5 percent in 2008, 47.2 percent in 2009, and 50.0 percent in 2012. She noted that the *Physical Activity Guidelines* recommendations for adults describe levels of weekly physical activity (i.e., 150 minutes/week), whereas *Physical Activity Guidelines* recommendations for youth describe levels of daily physical activity (i.e., 60 minutes/day). Dr. Nelson added that data from the 2009 Youth Risk Behavior Surveillance System (CDC/NCHHSTP) indicate adolescents (total, males, and females) report low levels of adherence to *Physical Activity Guidelines* recommendations for aerobic physical activity: 18.4 percent, 24.8 percent, and 11.4 percent, respectively.

Dr. Nelson then described objective measurement of physical activity levels using accelerometry data rather than self-reported data, as presented by Troiano et al. (MSSE, 2008). According to this data, less than 5 percent of all females, less than 10 percent of boys, and less than 5 percent of men meet the *2008 Physical Activity Guidelines* recommendations. She went on to explain that the population has a long way to go in order to meet current *Physical Activity Guidelines* recommendations, but data suggest physical activity is trending up.

Dr. Nelson presented the question and the draft conclusion statement for physical activity and health outcomes in people with disabilities. There is one question for this subtopic area: What is the relationship between physical activity and health outcomes in people with disabilities? The primary sources of evidence used to address this question are the Physical Activity Guidelines Advisory Committee Report, 2008 and the *2008 Physical Activity Guidelines for Americans*.

Dr. Nelson went on to present the draft conclusion statement for physical activity and health outcomes in people with disabilities as follows: “The 2015 Committee concurs with findings of the Physical Activity Guidelines Advisory Committee Report, 2008, which states that for people with physical disabilities, strong evidence shows that exercise can increase cardiorespiratory, musculoskeletal and mental health outcomes (e.g., anxiety and depression). For people with cognitive disabilities, strong evidence shows that exercise can improve musculoskeletal health, select functional health, and mental health outcomes.” The Committee evidence grade for this portion of the conclusion statement is strong.

She continued the draft conclusion statement as follows: For people with physical disabilities, moderate evidence indicates that physical activity improves a variety of functional health outcomes and reduces the effects of certain types of secondary conditions (i.e., pain and fatigue associated with the primary disability). For people with cognitive disabilities, moderate evidence indicates that physical activity improves cardiorespiratory health outcomes, musculoskeletal fitness, and metabolic health, and helps maintain healthy weight. The Committee evidence grade for this portion of the conclusion statement is moderate.

Dr. Nelson continued the draft conclusion statement as follows: For people with physical disabilities, limited evidence suggests physical activity may promote a healthy weight and improve metabolic health. For people with cognitive disabilities, limited evidence suggests that physical activity may reduce secondary conditions. The Committee evidence grade for this portion of the conclusion statement is limited.

Dr. Nelson then described the 2008 *Physical Activity Guidelines* recommendations for people with disabilities which are incorporated in the draft conclusion statement but not provided a Committee grade: Adults with disabilities, who are able to, should get at least 150 minutes a week of moderate-intensity, or 75 minutes a week of vigorous-intensity aerobic activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week. Adults with disabilities, who are able to, should also do muscle-strengthening activities of moderate or high intensity that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits. When adults with disabilities are not able to meet the Guidelines, they should engage in regular physical activity according to their abilities and should avoid inactivity. Adults with disabilities should consult their health-care provider about the amounts and types of physical activity that are appropriate for their abilities. Dr. Nelson added that people with disabilities have the lowest participation rates in physical activity compared to all other populations groups.

Next, Dr. Nelson presented the question and the draft conclusion statement for physical activity and health outcomes during pregnancy and the postpartum period. There is one question for this subtopic area: Does being physically active during pregnancy and the postpartum period provide health benefits? The primary sources of evidence used to address this question are the *Physical Activity Guidelines Advisory Committee Report, 2008* and the *2008 Physical Activity Guidelines for Americans*.

Dr. Nelson presented the draft conclusion statement for physical activity and health outcomes during the pregnancy and postpartum period as follows: The 2015 Committee concurs with findings of the *Physical Activity Guidelines Advisory Committee Report, 2008*, which states that while the benefits of maternal physical activity have clearly been demonstrated, there is a lack of prospective, randomized intervention studies in diverse populations. Based on current evidence, unless there are medical reasons to the contrary, a pregnant woman can begin or continue a regular physical activity program throughout gestation, adjusting the frequency, intensity, and time as her condition warrants. Little evidence exists for the dose of activity that confers the greatest health benefits to women during pregnancy and the postpartum period. In the absence of data, it is reasonable for women during pregnancy and the postpartum period to follow the moderate-intensity physical activity recommendations set for adults unless specific medical concerns warrant a reduction in activity. The Committee evidence grade for this conclusion statement is *limited*.

Dr. Nelson then described the 2008 *Physical Activity Guidelines* recommendations for women who are pregnant or in the postpartum period, which are incorporated in the draft conclusion statement but not provided a Committee grade: Healthy women who are not already highly active or doing vigorous-intensity activity should get at least 150 minutes of moderate-intensity aerobic activity a week during pregnancy and the postpartum period. Preferably, this activity should be spread throughout the week. Pregnant women who habitually engage in vigorous-intensity aerobic activity or who are highly active can continue physical activity during pregnancy and the postpartum period, provided that they remain healthy and discuss with their health-care provider how and when activity should be adjusted over time. Dr. Nelson added that these recommendations are consistent with those of the American Congress of Obstetricians and Gynecologists.

Next, Dr. Nelson presented the question and the draft conclusion statement for physical activity and risk of adverse events. There is one question for this subtopic area: What is the relationship between the amount and type of physical activity and the risk of adverse events? The primary sources of evidence used to address this question are the *Physical Activity Guidelines Advisory Committee Report, 2008* and the *2008 Physical Activity Guidelines for Americans*.

Dr. Nelson went on to present the draft conclusion statement for physical activity risk of adverse events as follows: The 2015 Committee concurs with findings of the *Physical Activity Guidelines Advisory Committee Report, 2008*, which states that the benefits of regular physical activity outweigh the inherent risk of adverse events. Risk of musculoskeletal injuries is lower for non-contact (e.g., walking) and limited contact (e.g., baseball) activities than for contact (e.g., basketball) and collision (e.g., football) activities. The usual dose of regular physical activity is directly related to the risk of musculoskeletal injury and inversely related to the risk of sudden

adverse cardiac events. The risk of musculoskeletal injuries and sudden cardiac adverse events is directly related to the size of the difference between the usual dose of activity and the new or momentary dose of activity. The most consistently reported risk factor for musculoskeletal injuries and sudden cardiac adverse events is inactivity and low fitness. The Committee evidence grade for this conclusion statement is strong.

Dr. Nelson then reviewed the *2008 Physical Activity Guidelines* recommendations related to physical activity and risks for adverse events, which are incorporated in the draft conclusion statement but not provided a Committee grade: The Committee concurs with the *Physical Activity Guidelines for Americans, 2008* that to do physical activity safely and to reduce risk of injuries and other adverse events, people should: Understand the risks and yet be confident that physical activity is safe for almost everyone; choose to do types of physical activity that are appropriate for their current fitness level and health goals, because some activities are safer than others; increase physical activity gradually over time whenever more activity is necessary to meet the guidelines or health goals; inactive people should “start low and go slow” by gradually increasing how often and how long activities are done; protect themselves by using appropriate gear and sports equipment, looking for safe environments, following rules and policies, and making sensible choices about when, where, and how to be active; be under the care of a health-care provider if they have chronic conditions or symptoms; and people with chronic conditions and symptoms should consult their health-care provider about the types and amounts of activity appropriate for them.

Dr. Nelson briefly described the Physical Activity Writing Group’s next steps, which include drafting a physical activity chapter for the 2015 Committee Report. She noted that the PAWG is in the final stages of drafting the content for the physical activity chapter, which will soon be sent to Drs. Lichtenstein and Millen for review.

Finally, Dr. Nelson presented the draft overall implications statement for the physical activity chapter as follows: Given the low rates at which children, adults, and older adults engage in regular physical activity, coupled with the strong evidence for health benefits from physical activity, every effort should be made to encourage and facilitate programs at multiple levels so that children, adults, and older adults can meet the *2008 Physical Activity Guidelines for Americans*. Ultimately, there is a need to develop programs, policies, and communication strategies across sectors, and improve the built environment to create a culture of health that facilitates participation in regular physical activity. Individuals, communities, schools, health care, and the private and public sector should: Ensure that all individuals, particularly those with the greatest health disparities, have access to safe, affordable, and enjoyable modes of physical activity; support policies and promote programs for children, youth, adults, and older adults that help set and re-enforce a personal value system that instills a lifetime of physical activity; enact effective policies and strengthen existing policies within schools, communities, health care settings, housing, and worksites that promote physical activity in combination with the *Dietary Guidelines for Americans*; and enact effective policies and strengthen existing policies that promote active transport (e.g., walking and bicycling) within and between communities nationwide.

Drs. Campbell and Lichtenstein did not provide additional comments following Dr. Nelson's presentation.

Discussion

Dr. Pérez-Escamilla asked what the evidence indicates about individuals who are largely sedentary due to jobs that require extended amounts of time sitting, but spend concentrated time exercising to meet *Physical Activity Guidelines* recommendations. Dr. Nelson noted that the 2008 Physical Activity Guidelines Advisory Committee did not address this question since it was the first edition of the *Physical Activity Guidelines* and the Committee's primary focus was physical activity dose. She added that there is currently a lot of work to investigate the impact of light activity, which was not addressed in the 2008 *Physical Activity Guidelines*, as well as the impact of extended periods of sedentary behavior combined with various levels of physical activity (i.e., light, moderate, and vigorous). She noted these areas have been identified as research recommendations for the draft physical activity chapter.

Dr. Neuhouser noted language in the draft conclusion statement for physical activity and risk of adverse events that recommends use of protective gear and sports equipment to reduce the risk of injury. She argued that making recommendations for specific gear may inadvertently exclude those individuals without resources to purchase gear and/or those without access to gear. She added that local organizations may be able to provide bike helmets and other protective gear for community members at low or no cost. She also noted the importance of ensuring safe places for individuals to be active through partnerships with local transportation and recreation agencies and organizations. Dr. Nelson agreed and explained that information regarding safety and the importance of focusing efforts on vulnerable populations or populations with the greatest need are currently in the draft overall implications statement for the physical activity chapter.

Dr. Millen asked if the Physical Activity Guidelines reports examine the etiology of physical inactivity or opportunities for increasing physical activity in the population, and noted that considering physical inactivity within a systems approach is important for conveying the complexity of the problem. Dr. Nelson responded that the physical activity implications statement and research recommendations emphasize the need for policies, programs, and communications strategies that help instill the value of being physically active at the individual level while also affecting systems-based changes (e.g., transportation policies) that support a value system for physical activity.

Dr. Campbell asked if the Physical Activity Guidelines reports address risks associated with overtraining and disordered eating. Dr. Nelson explained that if individuals train appropriately and are well-nourished, the risk of adverse events is low, even at high levels of activity. She added that this area is outside the scope of the Committee's physical activity topic area.

Dr. Campbell followed up by asking if the *Physical Activity Guidelines* addressed the impact of seasonal and geographical variations on the risk for adverse events. Dr. Nelson noted the *Physical Activity Guidelines* includes some guidance on hydration related to climate and the duration of physical activity, but does not discuss the issue in depth.

Sodium Working Group

Dr. Cheryl Anderson, Sodium Working Group Chair, reported on the activities of the Working Group, whose members include the Committee Vice-Chair, Dr. Alice H. Lichtenstein, Dr. Wayne Campbell, and Dr. Steven Clinton. The Working Group did not receive input from any invited experts or consultants between July and September 2014.

Dr. Anderson reviewed the scope of the Working Group activities which is to describe: 1) the relationship between sodium intake, blood pressure, and cardiovascular disease; 2) strategies individuals can use to promote recommended intake of sodium; 3) policies and environmental strategies to promote recommended intake of sodium; and 4) how sodium recommendations may be influenced by the interaction of sodium and potassium.

Dr. Anderson set the stage for her remarks by reviewing current mean daily dietary sodium intakes of the U.S. population by sex and age group based on NHANES 2007-10 data. Mean sodium intakes of children and adults exceeded the Institute of Medicine (IOM) Dietary Reference Intake (DRI) Tolerable Upper Intake Level (UL) for sodium. Additionally, the percent of children and adults with usual daily sodium intakes above the UL is high. NHANES 2009-10 data on the food group sources of sodium in the U.S. diet were shown to illustrate the fact that sodium is pervasive in the foods Americans eat.

The remainder of Dr. Anderson's presentation focused on two questions: What is the relationship between sodium intake and blood pressure in adults? and What is the relationship between sodium intake and blood pressure in children? The review of sodium and blood pressure in adults question was informed by the 2013 American Heart Association (AHA)/American College of Cardiology (ACC) Guideline on Lifestyle Management to Reduce Cardiovascular Risk and the 2005 IOM Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate.

The draft conclusion statement for sodium and blood pressure in adults states that the Committee concurs with the 2013 AHA/ACC Lifestyle report that strong evidence exists to advise adults who would benefit from blood pressure lowering to lower their sodium intake. The Committee concurs with the 2013 AHA/ACC Lifestyle report that moderate evidence exists to advise adults who would benefit from blood pressure lowering to consume no more than 2,400 milligrams (mg)/day sodium and to aim for further reduction of sodium intake to 1,500 milligrams/day for even greater reduction in blood pressure, adding that even without achieving the two aforementioned goals, reducing sodium intake by at least 1,000 milligrams/day lowers blood pressure. Dr. Anderson noted the moderate grade reflects the fact that there is less clinical trial data available. The Committee concurred with the 2013 AHA/ACC Lifestyle report that there is strong evidence to advise adults who would benefit from blood pressure lowering to combine the Dietary Approaches to Stop Hypertension (DASH) dietary pattern with lower sodium intake. Dr.

Anderson indicated that the implications statements will be written for the sodium topic after the Working Group completes its reviews.

Dr. Anderson proceeded to discuss sodium and blood pressure in children. The Working Group updated the 2010 Committee systematic review of the relationship between sodium intake and blood pressure in children from birth to age 18 years, with studies published between January 1970 and May 2009. The updated review was used to determine if changes to the 2010 Committee conclusion statement and evidence grade are warranted.

The analytical framework for determining the relationship between sodium and blood pressure in children targets children 2 to 18 years of age. The 2010 Committee review included 19 articles of which 15 were intervention studies and 4 were prospective cohort studies. The 2015 Committee updated literature search for clinical trial or prospective cohort studies published between January 2009 and June 2014 yielded two additional studies, both of which included 24-hour urinary sodium assessments. The first study, a randomized controlled trial of Portuguese children (n=128; mean age ~11 years) examined the effects of a 6-month intervention on salt intake and blood pressure. The second study, a prospective cohort study of German children (n=432; mean age ~6 years), examined the relationship between salt intake and blood pressure over 10 years of follow-up. Dr. Anderson noted the children in both studies had baseline blood pressure levels in the normal range; thus the contrast in blood pressure levels achieved in the RCT was not very wide.

Based on the review of the two new studies, the Working Group determined that no changes were warranted to the 2010 Dietary Guidelines Advisory Committee conclusion statement or grade. The data reviewed by the 2010 Committee indicated that sodium reduction modestly lowers blood pressure in infants and children. Neither of the two new studies the 2015 Committee reviewed found a relationship between dietary sodium intake and blood pressure in healthy, normotensive children.

The draft conclusion statement for sodium and blood pressure in children states that a moderate body of evidence has documented that as sodium intake decreases, so does blood pressure in children, birth to 18 years of age.

The Working Group's next steps are to: 1) continue reviewing the evidence on the relationship between sodium intake and the risk of cardiovascular disease outcomes using three existing reports and a Nutrition Evidence Library (NEL) update of literature published since January 2013; 2) highlight individual strategies to promote recommended intake of sodium, using existing reports; 3) describe policies and environmental strategies to promote recommended intake of sodium using existing reports; and 4) examine the inter-relationship of sodium and potassium based on the AHA/ACC Lifestyle report.

Discussion

Dr. Nelson commented that she is pleased with the Committee's efforts on cross-cutting topics such as sodium and added sugars, noting that the Committee will need to decide how to integrate the cross-cutting topic reviews into their final report.

Next Steps

Dr. Millen, Chair of the DGAC, thanked the Chairs of the subcommittees, lead members of the working groups, and the support staff for their work. She highlighted the systematic, objective, and thorough approach the Committee is using for its review of the scientific evidence, noting that it is an extraordinarily intricate process.

She mentioned the task of the Committee, which is to: 1) Determine how food, nutrition, and physical activity can promote the health of the U.S. population; 2) Reduce the burden of major chronic diseases and other lifestyle related problems; and 3) Address the food and health disparities in the U.S. population. Dr. Millen reviewed the scope and topics covered by each of the subcommittees for the 2015 Dietary Guidelines Advisory Committee's fifth meeting.

The subcommittees reported on their findings to date, including their views on the implications of their findings or potential dietary guidelines policy development. Dr. Millen reviewed the Dietary Guidelines Advisory Committee timeline of past and future events. The Committee's goal is to submit its report by the end of calendar year 2014. After concluding her remarks, Dr. Richard Olson adjourned the meeting.

Adjourned (11:56 a.m.)