

2010 Dietary Guidelines Advisory Committee, Meeting 6

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Meeting Summary

Wednesday, May 12, 2010

(8:00 a.m.)

Participants

Dietary Guidelines Advisory Committee: Dr. Linda V. Van Horn (Chair), Dr. Naomi K. Fukagawa (Vice-Chair), Dr. Cheryl Achterberg, Dr. Lawrence J. Appel, Dr. Roger A. Clemens, Dr. Miriam E. Nelson, Dr. Sharon M. Nickols-Richardson, Dr. Thomas A. Pearson, Dr. Rafael Pérez-Escamilla, Dr. Xavier Pi-Sunyer, Dr. Eric B. Rimm, Dr. Joanne L. Slavin, Dr. Christine L. Williams

Executive Secretaries: Ms. Carole Davis, Ms. Kathryn McMurry

Others: Dr. Robert Post, Dr. Wendy Braund, Mr. Kevin Concannon, Dr. Wanda Jones

Welcome and Opening Remarks

Dr. Robert Post, Deputy Director of the Center for Nutrition Policy and Promotion (USDA), called the final meeting to order at 8:01 a.m. He thanked the Committee members and recognized staff contributions. He reviewed the Committee's charge: to inform the Secretaries of USDA and HHS of warranted changes to the *Dietary Guidelines*, based on review of scientific and medical evidence published since the last *Dietary Guidelines*, emphasizing food-based recommendations over nutrient-based recommendations. The DGAC will not translate recommendations into policy or communications documents. The Committee will submit an advisory report of technical recommendations and the recommendations' rationales to the Secretaries. Dr. Post reviewed information from the Federal Advisory Committee Act (FACA), including the requirements to publish announcements of each meeting in a *Federal Register* notice in support of open, transparent meetings. To further support transparency, members are not to hold discussions with members of the public or outside groups but are to refer them to Dietary Guidelines Management Team for information. The public was invited to provide written comments and review the archived recordings of the meetings at www.dietaryguidelines.gov. The purpose of this meeting was for final deliberations, but members should continue to comply with FACA requirements until the advisory report has been delivered to the secretaries.

Dr. Post introduced Mr. Kevin Concannon, Undersecretary for Food, Nutrition, and Consumer Services at USDA and Dr. Wanda Jones, Principal Deputy Assistant Secretary for Health at

HHS. Before they could address the Committee, the building was evacuated due to a fire emergency. The meeting resumed at 10:08 am. Because of the time delay, Undersecretary Concannon was needed for another obligation and was unable to make his remarks.

Dr. Wanda Jones, Principal Deputy Assistant Secretary for Health, Office of Public Health and Science (HHS) spoke on behalf of Dr. Howard Koh. She had been following the Committee's work, noting the 2010 process of developing evidence-based recommendations was especially robust. The higher level of scientific authority and increased access will give the *Dietary Guidelines* greater influence and value. USDA and HHS will jointly release the Committee's report so the work can be assimilated into the field. She thanked the Committee for its work.

Dr. Wendy Braund, Acting Deputy Director of the Office of Disease Prevention and Health Promotion (HHS), welcomed the members and public and conveyed Rear Admiral Penelope Slade-Sawyer's regrets that she could not attend. She expressed HHS' gratitude for the Committee's and staff's work. These *Guidelines* come at a time when they can promote health and help reduce risks of major chronic diseases associated with diet and physical activity. HHS looks forward to using the report to develop official Federal policy.

Dr. Robert Post commented on the success of using WebEx, especially regarding the transparency and access it offers. He informed the internet audience on how to get technical assistance and turned the meeting over to Dr. Van Horn.

Dr. Linda V. Van Horn (DGAC Chair), greeted the meeting attendees. She said the report to the Secretaries will be one of the strongest evidence-based reports ever written and will be paramount to the development of the *2010 Guidelines*. The Committee and staff have been working to finalize conclusion statements, supporting summaries of the evidence, and fine-tuning the draft chapters. The purpose of this sixth meeting was to present all the questions and to come to agreement on the conclusion statements. Members will ask questions, raise issues, and identify where adjustments are needed. In addition to the seven topic area Subcommittees, the Committee has a Science Review Subcommittee that provides guidance and oversight to the DGAC process, including cross-cutting issues of the evidence-based reviews. Members of different Subcommittees are working jointly to develop a Total Diet chapter and a Translational Integration chapter.

The scientific questions were answered using the Nutritional Evidence Library (NEL) systematic review process, other evidence such as the 2005 DGAC report, Institute of Medicine (IOM) and other evidence reports, and food pattern modeling. Details of the evidence review will be available to the public in the USDA Nutrition Evidence Library (NEL), ensuring that the details of the science review are well-documented, transparent, and reproducible. The Subcommittees considered nearly a thousand public comments in their deliberations. In previous meetings, the evidence behind the conclusions was graded numerically. This practice has been discontinued due to the difficulty of applying a common grading system to evidence reviews with varied methodologies. The 2010 DGAC report will instead use standardized language to describe the evidence.

The Total Diet: Combining Nutrients, Consuming Food
DGAC Chair: Linda V. Van Horn, PhD, RD

Chair Van Horn gave an overview of this chapter, which is new to the DGAC report. The chapter synthesizes the evidence on dietary components that contribute to excess energy and inadequate nutrient intakes and the foods that are needed to provide essential nutrients and other health benefits. It provides an evidence-based comparison of worldwide eating patterns and describes the USDA food patterns that demonstrate a flexible nutrient-dense total diet. The average American diet does not resemble the intakes recommended in the *Dietary Guidelines*. Americans consume too many calories and too much added sugars, solid fats, refined grains, and salt. They consume too little dietary fiber, vitamin D, calcium, potassium, unsaturated fatty acids, and other nutrients found in vegetables, fruits, whole grains, low-fat dairy products, and seafood. Overweight and obesity are highly prevalent in adults and children. The total diet described in the chapter incorporates factors associated with preventing adiposity.

The “Total Diet” is the combination of foods and beverages that provide energy and nutrients and constitute an individual’s complete dietary intake, on average, over time. The chapter blends the Committee’s recommendations into a healthy total diet which achieves the recommended nutrient intakes and meets but does not exceed energy needs. Diets high in energy, but low in nutrients can leave a person overweight, but undernourished and at risk for chronic disease. Americans are encouraged to know their energy needs and to control portion sizes. Beverages contribute heavily to overall energy intake. Americans should reduce the solid fats and added sugars (SoFAS) in their diet, since they contribute substantially to total energy, saturated fat, and cholesterol intake, and do not provide fiber and other nutrients. The DGAC focus is on reducing SoFAS intake rather than discretionary calories. Current SoFAS intakes are significantly higher than the recommended limits. The chapter recommends consumption of nutrient-dense foods, which include vegetables, fruits, high-fiber whole grains, seafood, eggs, and nuts, low-fat forms of milk and milk products, lean meats and poultry, when prepared without added SoFAS, starches or sodium. Found in a variety of forms, but ideally minimally-processed, these foods can provide the nutrients that are currently lacking. Sodium intake must be reduced, and manufacturers and restaurants industries have a critically-important role in this.

A new focus was examining whole dietary patterns and health outcomes, because this data is now available. The DGAC focused on DASH and Mediterranean-style patterns because they have considerable evidence, and also looked at Asian and plant-based diets. Application of healthful eating patterns was considered using the USDA food patterns, which include recommended amounts from the major food groups in nutrient-dense forms and allow for oils, with limits on calories from the SoFAS. They meet the nutrient needs within the energy requirements. Plant-based, lacto-ovo vegetarian, and vegan variations were developed, and USDA also modeled the impact of non-nutrient-dense choices.

Good health across the lifespan requires a total diet that is limited in total calories and portion controlled, focused on nutrient-dense foods, and very low in SoFAS. Physical activity is important for energy balance and maintaining body weight, but the primary focus should be on reducing excess calorie intake. Children and adolescents are of particular concern, since early dietary patterns set the foundation for choices and behaviors as adults. Several distinct dietary patterns are

associated with health benefits; a common feature is emphasis on plant foods. Americans have considerable flexibility in selecting a diet that meets nutrient requirements while reducing preventable diseases and controlling weight. The challenge will be to promote the population-wide adoption of healthy dietary patterns in a setting of powerful influences that promote unhealthy lifestyles.

Discussion

Dr. Appel questioned whether to explicitly include the Japanese and Okinawan diets, due to the scarcity of data. Dr. Pi-Sunyer felt that would put undue emphasis on the diets and cause confusion. Committee consensus was to remove detailed discussion of those diets from the main chapter and to include them in the appendix. Dr. Achterberg and others pointed out that there is no one “American” or “western” diet, and that most traditional diets are fairly healthy. A person can eat healthfully in a variety of ways. Dr. Clemens said while discussion of SoFAS will be important, foods are now fried in oils, so it is calories that are the issue. Members suggested modified wording related to lowering sugar-sweetened beverage intake; recommending reducing hours of screen time; clarification of the language on caloric intake and physical activity; improvements in the pie chart showing food groups that are under-consumed; and highlighting that the main issue is not sugar or other components but the calories they contain. Chair Van Horn reiterated that it is important for everyone to know how many calories they need and not exceed that quantity.

Translating and Integrating the Evidence: A Call to Action *DGAC Vice Chair: Naomi Fukagawa, MD, PhD*

Vice Chair Fukagawa said adherence to the dietary recommendations has been poor. Major findings with cross-cutting public health impact were identified in order to provide guidance on how to implement changes to ensure effective enhancement of health and well-being of the population through diet.

Member Nelson went through the four integrated points and recommendations for successful implementation over the next five years. The first was, “Reduce the incidence and prevalence of overweight and obesity in the U.S. population by reducing overall calorie intake and increasing physical activity.” To accomplish this, consumers should know their calorie needs; decrease intake of calories from SoFAS and refined grains; increase intake of a variety of vegetables, fruits, and fiber-rich whole grains; avoid sugar-sweetened beverages; consume smaller portions; choose lower-calorie options, especially when eating foods away from home; and increase overall physical activity.

The second integrated finding was to “Shift food intake patterns to a more plant-based diet that emphasizes vegetables, dried beans and peas, whole grains, nuts and seeds. Additionally, increase intake of seafood and nonfat/low-fat milk and dairy products and consume only moderate amounts of lean meats, poultry, and eggs.” This will help to meet nutrient needs, especially shortfall nutrients, while maintaining energy balance and can be attained with a wide range of food patterns.

Third was, “Reduce intake of foods containing added sugars, solid fats, refined grains, and sodium because they contribute few, if any nutrients.” These are the main over-consumed components, and they lead to excess calorie intake. To accomplish this goal, efforts must go beyond individual behavior change to employ a comprehensive approach. The food industry must act to enable Americans to achieve these goals. However, individual behavior is still important.

Fourth was to “Meet the 2008 *Physical Activity for Americans*.” To achieve this, Americans must improve physical activity participation at home, school, work, and community and reduce sedentary behaviors among children and adolescents.

The chapter suggests three major approaches to reversing the trend of childhood overweight and obesity: improve the food environment for children at home, school, and in the community; prevent obesity early, even in utero; and prevent maternal obesity before conception and during gestation. These approaches include specific actions: improve foods sold and served in schools; increase nutrition and physical education in schools; develop standard approaches to monitor, track, prevent, and treat overweight and obesity; develop standardized approaches for the healthcare profession to educate mothers about healthy weight gain during pregnancy; increase safe communities and routes to school; remove sugar-sweetened beverages and high-calorie snacks from schools; promote action around reducing screen time; and improve programming during the summer months.

There are many challenges ahead: population growth, availability of fresh water, arable land constraints, climate change, current policies, business practices, and the environments that do not promote physical activity. To accomplish the integrated points, the chapter recommends several sustainable changes: improve nutrition literacy; empower and motivate people to want to change; create financial incentives for healthy food; improve availability of fresh produce, especially in rural and urban areas; increase environmentally-sustainable production of vegetables, fruits, and whole grains; ensure household food security; expand sustainable, safe aquaculture; encourage the food industry and restaurants to offer health-promoting foods; and implement the National Physical Activity Plan.

It is one thing to issue *Dietary Guidelines* and another to implement change. Success should be measured through evidence that meaningful change has occurred when the 2015 DGAC convenes. A strategic plan must be developed and implemented that engages multiple sectors to help Americans meet the Guidelines. DGAC encourages all stakeholders to take action to make every choice available to Americans a healthy choice.

Discussion

Dr. Pérez-Escamilla suggested that maternal obesity before conception, excessive gestational weight gain, and postpartum weight retention be addressed. Dr. Pearson recommended food safety education as part of the health, nutrition, and physical education programs. Dr. Achterberg noted that some SoFAS, such as breakfast cereals, do contain important nutrients. Committee consensus was to remove the language “because they contribute few, if any, nutrients” from the third integrated finding. There was discussion of how to word the finding for clarity. For breakfast cereals, the added sugar was the main problem. While refined grains provide many nutrients, due to fortification, they are over-consumed. Several members questioned the recommendation to reduce

intake of all refined grains. Dr. Pérez-Escamilla recommended specifying the refined grains that constitute the problem, mostly snacks and desserts. Dr. Nelson agreed to rewrite the finding. Dr. Appel suggested including language from the 2005 DGAC report on the role of diet and physical activity in reducing health disparities. Dr. Clemens spoke on the top three challenges: population growth, fresh water, and land constraints and offered to work with Dr. Nelson on the agricultural challenges.

Grading of Evidence

Member Appel spoke on the use of terminology to describe the evidence. There had been discussion of using numerical grades, which was confining. The new approach was to use “strong,” “convincing,” or “persuasive,” for Grade I evidence; “fair,” “moderate,” and “inconsistent” for Grade II; and “limited” for Grade III. Below that level, evidence can be graded as “insufficient.” This allows more gradation than the numeric system.

Energy Balance & Weight Management Subcommittee *Chair: Xavier Pi-Sunyer, MD, MPH*

Xavier Pi-Sunyer, Chair of the Subcommittee, introduced the Subcommittee members and support staff and gave the floor to Dr. Nelson, who first addressed the question, “What effects do the food environment and dietary behaviors have on body weight?” Dr. Nelson noted that moderately strong evidence is available linking the food environment and dietary intake, especially less consumption of vegetables and fruits, and higher body weight. Lack of supermarkets and density of fast food restaurants and convenience stores were linked to BMI. Certain dietary behaviors have also been associated with body weight in children and adults. Strong evidence is available indicating a positive association between body weight and eating out at fast food restaurants, portion size, and screen time. Strong evidence is also available indicating that for adults who need or desire to lose weight, or who are maintaining body weight following weight loss, self-monitoring of food intake improves outcomes. Moderate evidence suggests that children who do not eat breakfast are at increased risk of overweight and obesity, but there is inconsistent evidence for adults. Limited and inconsistent evidence suggests that snacking is associated with body weight, and there is insufficient evidence to determine the relationship between frequency of eating and overweight and obesity.

Discussion

Dr. Clemens noted that culture and education need to be considered when increasing the availability of fresh fruits and vegetables to underserved communities. Dr. Pérez-Escamilla said types of fruits and vegetables, economic access, and motivation also need to be considered. Dr. Appel noted the importance of self-monitoring of dietary intake. Dr. Nelson said people should know their calorie needs, but the Committee should be aware of unintended consequences. Dr. Pi-Sunyer noted that many consumers are “unconscious eaters.” The Committee agreed that consumers should know their energy needs and calorie information should be available for consumers at point of purchase. Dr. Achterberg cautioned that overemphasis on monitoring of dietary intake could promote unhealthy eating behaviors.

Member Pérez-Escamilla continued the presentation by reviewing questions related to gestational weight gain and maternal postpartum weight change. His first overall question was, “What is the relationship between maternal weight gain during pregnancy and maternal-child health?” The Committee recommends that maternal weight gain during pregnancy should be within the IOM recommended ranges to promote maternal and child health. Regarding the relationship between breastfeeding and maternal postpartum weight change, Dr. Pérez-Escamilla reported that a moderate body of evidence indicates that breastfeeding may be associated with maternal postpartum weight loss, but the weight loss is small, transient, and depends on breastfeeding intensity and duration.

Member Williams then reviewed a series of questions examining the association between dietary intake and childhood adiposity. There is a positive association between total energy intake and energy density and adiposity in children (moderately strong). Evidence from prospective cohort studies suggest that increased intake of dietary fat is associated with greater adiposity in children (moderate), and there is a relationship between greater intake of sugar-sweetened beverages and increased adiposity in children (strong). Intake of 100% fruit juice is not associated with increased adiposity for most children (limited), but it has been prospectively associated with increased adiposity in children who are overweight or obese. Greater consumption of vegetables and fruits may protect against increased adiposity in children and adolescents (limited). Limited and inconsistent evidence exists to support a hypothesis that intake of calcium or dairy plays a role in regulating adiposity in children and adolescents. There was insufficient evidence to support the hypothesis that dietary fiber is protective against increased adiposity in children.

Discussion

Dr. Rimm questioned the conclusion statement for dietary fat and voiced concern about suggesting a low-fat diet for children and adolescents. He questioned the quality of the studies supporting the hypothesis, compared to those that did not. Dr. Williams noted that the implications state that children and adolescents should consume a diet within the IOM range, and most children are consuming too much fat. Dr. Pearson noted that, in adults, isocaloric studies did not show weight loss for a low fat diet. Chair Van Horn said it is important to reduce SoFAS intake, but the Committee is not recommending low fat diets. Dr. Nelson said several conclusion statements in the chapters will require more context. Drs. Williams and Rimm will finalize the wording for this conclusion statement.

There was also discussion on the wording of the conclusion statement for milk and milk products. Dr. Nelson questioned if the evidence was limited because there were few studies or because the evidence was inconsistent. Dr. Williams said the evidence is mixed, but there were a number of studies. Dr. Pérez-Escamilla pointed out that inconsistent results are consistent with there being no relationship. It was suggested to reword the conclusion to clarify that evidence is mixed and the preponderance of evidence does not support a relationship between increased intake of milk and milk products and reduced adiposity in children and adolescents. Dr. Slavin

noted that there may be inconsistencies between Dr. Williams' review and the conclusions reached by the Carbohydrate and Protein Subcommittee.

Member Pi-Sunyer then reviewed the relationship between macronutrient proportion and body weight in adults. When calorie intake is controlled, macronutrient proportion of the diet is not related to losing weight or avoiding weight regain. Diets with less than 45% of calories as carbohydrates or more than 35% of calories from protein are not more successful for long-term weight loss or weight maintenance, are difficult to maintain over time, and may be less safe.

Discussion

There was discussion of wordsmithing the first conclusion.

Member Pi-Sunyer next discussed the association between energy density and body weight and type 2 diabetes (T2D) among adults. Dietary patterns that are relatively low in energy density improve weight loss and weight maintenance among adults (strong), and lower energy density diets may be associated with lower risk of T2D (limited).

Member Pi-Sunyer discussed the effect of weight loss, versus weight maintenance, for older adults on selected health outcomes. Weight loss in older adults has been associated with an increased risk of mortality, but older studies did not differentiate between intentional and unintentional weight loss. Recent evidence has indicated a reduced risk of mortality with intentional weight loss. Therefore, intentional weight loss in overweight or obese older adults is recommended. Intentional weight loss in older adults has been associated with reduced development of T2D and improved cardiovascular risk factors (moderate). There were insufficient data on cancer to come to a conclusion. Weight gain produces increased risk for several health outcomes. The implications statement was that weight loss is appropriate advice for elderly overweight/obese persons. Weight gain should be avoided.

Member Nelson spoke on the relationship between physical activity, body weight, and other health outcomes. Physically active people are at reduced risk of becoming overweight or obese and physically active adults who are overweight or obese experience a variety of health benefits similar to those in people of ideal body weight. People of all body weight classifications gain health and fitness benefits by being habitually physically active. Additionally, physically active people have higher levels of health-related fitness, lower risk of developing most chronic disabling medical conditions, and lower rates of various chronic diseases. The health benefits of being habitually active apply to all people.

Discussion

When Dr. Rimm asked about the recommended exercises, Dr. Nelson referred the members to the 2008 Physical Activity Guidelines for Americans, which advocates both aerobic and strength training. Dr. Appel noted the importance of adding sources of energy for various age groups to the Report.

Nutrient Adequacy Subcommittee
Chair: Shelly Nickols-Richardson, PhD, RD

Sharon M. Nickols-Richardson, Chair of the Subcommittee, recognized the Subcommittee members and staff. Three questions the Subcommittee considered were related to over-consumed and under-consumed dietary components and nutrients. Most of the conclusions for these questions are based on dietary intake data from NHANES.

The first question was, “What nutrients and components are overconsumed by the general public?” For both children and adults, energy intake from SoFAS; sodium; percentage of total energy from saturated fats; total cholesterol (only in men and boys aged above 12); and refined grains were consumed at levels high enough to be of concern. For adults, total energy intake was also of concern. The implications were that Americans should lower energy intake from SoFAS to less than the USDA Food Patterns limits; all Americans must lower sodium intake; public health efforts are warranted to reduce intake of saturated fats; males over 12 should consume less cholesterol; and at least half of all refined grain intake should be replaced with high-fiber whole grains.

The second question was, “What food groups and selected dietary components are under-consumed by the general public?” The following are low enough to be of concern for both adults and children: vegetables, fruits, whole grains, fluid milk and milk products, and oils. There were a number of implications. Americans make food choices that do not meet the characteristics of healthy dietary plans, and nutrient shortfalls are often an indicator of low intakes of certain food groups. Therefore, efforts are warranted to promote increased intakes of vegetables, fruits, whole grains, and fat-free or low-fat fluid milk and milk products among all ages; substitution of oils for solid fats regardless of age, and increased intakes of lean, iron-rich meat, poultry, and fish by adult women and adolescent girls. Intakes of nutrient-dense foods should replace foods in the current diet that contribute to high SoFAS and refined grains intakes. Oils should be substituted for solid fats, not added to the diet. The substitutions and selection of nutrient-dense foods to replace non-nutrient-dense foods should be done in a manner such that total caloric intake falls within or below daily energy needs.

The third question was, “What nutrients are under-consumed by the general public and present a substantial public health concern?” The following nutrients are of public health concern for both adults and children: vitamin D, calcium, potassium, and dietary fiber. The implication was that efforts are warranted to promote increased intakes of foods higher in these nutrients for all Americans within flexible dietary intake patterns that balance energy intake and expenditure.

Discussion

Dr. Pearson lauded the group on its attention to other Subcommittees’ recommendations. It is important to be consistent in recommendations across chapters, and the emphasis should be on achieving a nutritionally adequate diet while avoiding overconsumption. The food pattern modeling work showed that this is possible. There was discussion on omega-3 fatty acids, which were not considered as a shortfall nutrient because there is no DRI for them.

Member Nickols-Richardson briefly addressed the questions on specific nutrient at various stages of the lifespan, noting that these have previously been presented in detail. The first question was, “What is the relationship between folate intake and health outcomes in the United States and Canada following mandatory folic acid fortification?” Evidence shows a large reduction in neural tube defects (NTDs) (strong), reduced stroke mortality (limited), and increased colorectal cancer (CRC) incidence (limited) following mandatory fortification.

The next question was, “Is iron a nutrient of special concern for women of reproductive capacity?” Substantial numbers of adolescent girls and women of reproductive capacity have laboratory evidence of iron deficiency. The implication was that efforts are warranted to increase dietary intake of heme-iron-rich foods and of enhancers of iron absorption by these special populations.

The next question was, “Are older adults consuming sufficient vitamin B12?” NHANES data shows that individuals older than 50 years consume adequate intakes of vitamin B12, including B12 found naturally in foods and crystalline B12 consumed in fortified foods. Nonetheless, a substantial proportion of individuals older than age 50 may have reduced ability to absorb naturally-occurring vitamin B12. The implications were that, although individuals older than 50 appear to be meeting their need for vitamin B12, they should be encouraged or continue to consume foods fortified with B12, such as fortified cereals or their crystalline form of B12 supplements. Practitioners should assess vitamin B12 status in those older than 65 years.

The next question was, “Can a daily multivitamin/mineral supplement prevent chronic disease?” For the general population, there is no evidence to support a recommendation for the use of multivitamin/mineral supplements in the primary prevention of chronic disease. Limited evidence suggests that supplements containing combinations of certain nutrients are beneficial in reversing chronic disease when used by special populations. However, certain nutrient supplements appear to be harmful in other subgroups. The implications were that, although intake of a variety of multivitamin/mineral supplements increases blood levels of many nutrients, long-term effects on primary prevention of several chronic diseases are poorly defined. The supplement use for obesity-specific endpoints is unexplored. Americans are encouraged to meet overall nutrient requirements through food intake patterns that include nutrient-dense forms of foods and balance energy intake with expenditure.

The last question, “What is the relationship between nutrient intake and breakfast consumption, snacking, and eating frequency?” was conducted through NEL searches. Moderate evidence supports a positive relationship between breakfast consumption and intakes of certain nutrients in children, adolescents, and adults. A limited body of evidence supports a positive relationship between snacking and increased nutrient intake in children, adolescents, adults, and older adults, and inadequate evidence is available to evaluate the relationship between eating frequency and nutrient intakes. The implications were that Americans are encouraged to eat nutrient-dense forms of foods for breakfast while staying within energy needs to facilitate achieving nutrient recommendations. Nutrient-dense forms of foods are suggested for any snacks, if energy balance permits this behavior.

Discussion

Dr. Appel suggested deleting the language on the lack of information on supplementation and obesity. Dr. Nickols-Richardson agreed. Chair Van Horn noted that it is possible to be both obese and malnourished, but those nutrient shortfalls are better addressed with an improved diet. Dr. Pi-Sunyer asked about calcium and vitamin D supplements. Calcium and vitamin D are included in the text of the chapter; their benefits for bone health have not been lost.

Vice Chair Fukagawa suggested balance in statements about saturated fat, since it is found in some foods being recommended. Dr. Achterberg asked about the effects of certain drugs on nutrient absorption. Drug-nutrient interactions were beyond the scope of the chapter, but it may be important for future committees to define who is “healthy,” as most older Americans use prescription drugs. Dr. Pérez-Escamilla asked about SoFAS intakes related to ethnicity, race, and income. The Food and Nutrition Service (FNS) did not examine differences by ethnicity or race but found no major differences by income level.

Fatty Acids & Cholesterol Subcommittee *Chair: Thomas Pearson, MD, MPH, PhD*

Thomas Pearson, Chair of the Subcommittee, acknowledged the Subcommittee members and staff. These questions and conclusions had been previously presented, so he gave a quick overview. The first question was, “What is the effect of saturated fatty acid (SFA) intake on increased risk of cardiovascular disease (CVD) or type 2 diabetes (T2D), including intermediate markers such as serum lipids and lipoprotein levels?” SFA is associated with intermediate markers and endpoint health outcomes for increased total cholesterol, LDL cholesterol, risk of cardiovascular disease (CVD), markers of insulin resistance, and risk for T2D (strong). Decreased SFA intake improves measures of both CVD and T2D risk. The implication was that a 5 percent substitution of monounsaturated fatty acids (MUFA) or polyunsaturated fatty acids (PUFA) for saturated fatty acids would have a significant public health impact. Emphasis here is on isocaloric substitution rather than added fat calories. Atherosclerosis starts in childhood and young adulthood, so the benefits of substitution would be greater than previously expected.

The next question was, “What is the effect of dietary cholesterol intake on risk of cardiovascular disease, including effects of intermediate markers such as serum lipid and lipoprotein levels and inflammation?” Moderate evidence relates dietary cholesterol intake to clinical CVD endpoints. Independent of other dietary factors, evidence suggests that consumption of one egg per day is not associated with risk of coronary heart disease (CHD) or stroke in healthy adults, but not people with T2D, although consumption of more than seven eggs per week has been associated with increased risk. Among individuals with T2D increased dietary cholesterol intake is associated with CVD risk. The implication was that consumption of cholesterol at one egg per day is not associated with increased CVD risk in healthy individuals. Eggs are a good source of high quality protein and numerous micronutrients. However, in individuals with T2D, egg consumption (at one egg/day) has negative effects on serum lipids and lipoprotein cholesterol levels and increases risk of CVD. Consumption of more than seven eggs per week is not recommended for the general public. Limiting dietary cholesterol to less than 300 mg per day in healthy individuals, with further

reductions of dietary cholesterol to less than 200 mg per day for persons with or at high risk for CVD and T2D, is recommended.

The next few questions were addressed by nutrient modeling. The first of these was, “What is the impact on food choices and overall nutrient adequacy of limiting cholesterol to < 200 milligrams per day?” This question is linked to the above recommendation. Cholesterol levels can be reduced to less than 200 milligrams in the patterns at all calorie levels by limiting eggs to less than two per week, reducing amounts of meats and poultry, and substituting oils for solid fats. These changes would cause reductions in protein, choline, vitamin A, vitamin D, EPA, and DHA, and an increase in vitamin E. Most of these nutrients including vitamin E are already consumed at below-recommended levels.

Discussion

In response to the question of whether this is a recommended change in cholesterol intake, Dr. Pearson said the current recommended intake of cholesterol is less than 300 mg per day for the general population, less than 200 for those with CVD and T2D. Members discussed eggs and egg-containing products. The amount of cholesterol in eggs is changing, and their role in cholesterol intake is decreasing. However, the literature focused on eggs, which are becoming a poor surrogate for cholesterol intake. Not consuming the yolk can decrease cholesterol intake while maintaining protein intake, but it also reduces intake of nutrients such as choline, vitamin A, and vitamin E.

Member Pearson’s next set of questions looked at other fatty acids. The first of these was, “What is the effect of dietary intake on monounsaturated fatty acids (MUFA) when substituted for SFA on increased risk for CVD and T2D, including intermediate markers such as lipid and lipoprotein levels, blood pressure, and inflammation?” As with all the modeling, the emphasis was on isocaloric substitution. MUFA is associated with improved health outcomes related to both CVD and T2D, when MUFA is a replacement for dietary SFA (strong). A 5 percent energy replacement of SFA with MUFA decreases intermediary markers and the risk for CVD and T2D in healthy adults and improves insulin responsiveness in insulin resistant and T2D subjects.

The next question was, “What is the effect of replacing a high carbohydrate diet with a high monounsaturated fat diet in persons with type 2 diabetes?” Increased MUFA intake rather than high carbohydrate intake may be beneficial for persons with T2D and results in improved biomarkers of glucose tolerance and diabetic control (moderate).

The next question was, “What is the effect of dietary intake of n-6 PUFAs on risks of cardiovascular disease and type 2 diabetes, including intermediate markers such as lipid and lipoprotein levels, blood pressure, and inflammation?” Dietary PUFAs are associated with improved health outcomes related to CVD, especially when PUFA is a replacement for SFA or *trans* fatty acids (TFA). Energy replacement of SFA with PUFA decreases total cholesterol, LDL cholesterol, and triglycerides, as well as numerous markers of inflammation. PUFA intake significantly decreases risk of CVD and decreases the risk of T2D (strong).

The next question was, “What are effects of dietary stearic acid on LDL cholesterol?” When stearic acid is substituted for SFA or TFA, plasma LDL cholesterol levels are decreased; when substituted

for carbohydrates, LDL cholesterol levels are unchanged, and when substituted for MUFAs or PUFAs, LDL cholesterol levels are increased (moderate). The impact of changes in stearic acid intake on CVD risk remains unclear.

Evidence has shown that stearic acid has a neutral effect on LDL cholesterol, and is therefore not cholesterol-raising. The next question was, “What is the impact on food choices and overall nutrient adequacy of limiting cholesterol-raising fatty acids to: (a) <7 percent of total calories; and (b) <5 percent of total calories, with CR fatty acids operationalized as total saturated fatty acids minus stearic acid?” The food patterns have 6.0 to 6.8 percent of calories from cholesterol-raising fatty acids. To further reduce levels of CR fatty acids, all solid fats were isocalorically replaced with oils, resulting in CR fatty acid levels of 5 to 5.5 percent of calories.

The next fatty acid question was, “What effect does consuming natural (ruminant) versus synthetic (industrially-hydrogenated) trans fatty acids have on LDL-, HDL-, and non-HDL cholesterol levels?” The conclusion was that limited evidence is available to support a substantial biological difference in detrimental effects of iTFA and rTFA on health when rTFA is consumed at seven to ten times the normal level of consumption.

“What is the relationship between consumption of seafood n-3 fatty acids and risk of CVD?” Consumption of two servings of seafood per week (4 oz per serving), which provides an average of 250 mg per day of long-chain n-3 fatty acids, is associated with reduced cardiac mortality from CHD or sudden death in persons with or without CVD (moderate).

Food modeling was done to address seafood intake. “What is the impact on nutrient adequacy of increasing seafood in the USDA food patterns to one of three scenarios: (a) Four ounces per week of seafood high in n-3 fatty acids (EPA and DHA); (b) 8 oz per week of seafood, including seafood both low and high in n-3 fatty acids in proportions currently consumed; and (c) 12 ounces per week of seafood low in n-3 fatty acids?” The conclusion was that the amounts of seafood in the base USDA food patterns could be increased without any negative impact on nutrient adequacy, though the scenario in item (c) fell short of the 250 mg goal.

The next question was, “What is the relationship between consumption of plant n-3 fatty acids and the risk of cardiovascular disease?” Alpha-linolenic acid (ALA) intake of 0.6 to 1.2 percent of total calories will meet the recommendations and may lower CVD risk, but new evidence is insufficient to warrant higher intake. Higher intake of n-3 from plant sources may reduce mortality among persons with existing CVD (limited).

The next question was, “What are the effects of maternal dietary intake of n-3 fatty acids from seafood on breast milk composition and on health outcomes in infants?” Increased maternal dietary intake of long-chain n-3 PUFAs, especially docosahexaenoic acid (DHA), from at least two servings of seafood per week during pregnancy and lactation is associated with increased DHA levels in breast milk and improved infant health outcomes, such as visual acuity and cognitive development (moderate).

The next two questions looked at the health effects related to nuts and chocolate. Consumption of unsalted peanuts and tree nuts, specifically walnuts, almonds, and pistachios, in the context of a

nutritionally-adequate diet and when total calorie intake is held constant, has a favorable impact on CVD risk factors, particularly serum lipid levels (moderate). Modest consumption of dark chocolate or cocoa is associated with reduced CVD risk (moderate). Potential health benefits must be balanced with caloric intake.

Discussion

Dr. Pi-Sunyer asked about n-3 fatty acids and cognitive function, especially the drop in verbal IQ due to lack of seafood during pregnancy, in the Brenna and Lapillone data. The reference should be listed in the chapter. The members discussed the issue, especially regarding methyl mercury fears among pregnant women. The benefits-risk analysis showed that women can safely consume 12 oz seafood per week as long as they choose seafood low in mercury. Data from Connecticut indicate that seafood can be consumed daily without posing a risk. Obstetricians are frightening pregnant women about this issue. People have to pay attention to local and state advisories about locally-caught fish, but the high-mercury fish are not commonly consumed in the US and the food supply is global. The Brenna and Lapillone reference needs to be discussed more and put into context, since the chart is easily misinterpreted. There was discussion on the paper, which was by Joseph Hibbeln. The Subcommittee will review the original paper.

Dr. Slavin asked if the benefit carries over to fish oil supplements. Dr. Pearson said the literature review was limited to whole foods, not supplements. Some studies show benefits from supplements, but the statement is about fish intake. Dr. Pi-Sunyer asked how to increase MUFA without getting more saturated fat and calories. Dr. Pearson said that would be a challenge for the food manufacturers. Chair Van Horn emphasized the importance of matching up this chapter with Food Safety for consistency, especially of references. Dr. Appel said the specific lipids being referenced and exact health outcomes should be specified.

Dr. Pérez-Escamilla asked about the unsalted nuts recommendation and whether it matched the evidence. Dr. Pearson said unsalted nuts were listed in order to avoid inadvertently increasing sodium intake with consuming more nuts. Dr. Appel suggested the language, "In the context of other recommendations, these should be unsalted versions." Dr. Slavin pointed out that people don't generally eat unsalted nuts. There was discussion of addressing it by giving context to the conclusion.

Carbohydrates & Protein Subcommittee (Protein Chapter) Chair: Joanne L. Slavin, PhD, RD

Joanne L. Slavin, Chair of Subcommittee, which created two chapters, thanked the Subcommittee members and staff. Protein was not covered in 2005, and it overlaps more than one food group. The first question was, "What is the relationship between the intake of animal protein products and selected health outcomes?" There were inconsistent relationships between intake of animal protein products, mainly red and processed meats, and cardiovascular disease (moderate). No clear association was found between intake of animal protein products and blood pressure. Limited inconsistent evidence suggests that intake of animal protein products, mainly processed meat, may have a link to T2D. There was insufficient evidence to link animal protein intake and body weight.

Moderate evidence reports inconsistent positive associations between colorectal cancer and the intake of certain animal protein products, mainly red and processed meat. Little evidence shows that animal protein products are associated with prostate cancer incidence. The limited evidence showed no association between intake of animal protein products and overall breast cancer risk, however in premenopausal and estrogen receptor positive subjects, animal protein product intake may alter risk for breast cancer.

The second question was, “What is the relationship between vegetable protein and/or soy protein and selected health outcomes?” The conclusions were limited by the number of vegetarians and vegans available to study and inconsistent reporting. The limited body of evidence suggests that vegetable protein does not offer special protection against T2D, CHD, and selected cancers. Intake of vegetable protein is generally linked to lower blood pressure (moderate). Soy protein may have small effects on total and LDL-cholesterol in adults with normal or elevated blood lipids (moderate), although results from systematic reviews are inconsistent. A moderate body of consistent evidence finds no unique benefit of soy protein on body weight. Limited evidence suggests that soy protein may lower blood pressure in adults with normal blood pressure.

The next question was, “How do the health outcomes of a vegetarian diet compare to that of a diet which customarily includes animal products?” Limited evidence is available documenting that vegetarian diets protect against cancer; however, there is suggestive evidence that vegetarian and vegan diets are associated with lower BMI and blood pressure. Vegan diets may increase risk of osteoporotic fractures.

Discussion

Dr. Rimm suggested clarifying the grading descriptors on red and processed meat conclusions. There was a discussion of the animal protein and CVD conclusion. The group agreed that “inconsistent positive” was not a clear term and should be changed. The word “inconsistent” has multiple meanings. Recent research points more toward processed meat than red meat as a causal factor in CVD and CRC. However, the review did not break down animal protein into red and processed meats, and there was not enough data to make that part of the conclusion. Dr. Rimm offered to provide a metaanalysis by Taheri Mozaffari on red and processed meat and CVD. The members emphasized consistency across chapters, especially with the dietary patterns discussion.

Dr. Pearson suggested clarification on the conclusion on soy protein and blood pressure, since “There is limited evidence” can be misunderstood as a positive assertion. This raised discussion on the language of the ratings. For greater clarity, it was agreed that the wording be “There is limited evidence that soy protein may lower blood pressure”.

Vice Chair Fukagawa pointed out that osteoporotic fractures in vegans is due to low calcium intake, not the protein. Dr. Appel noted that sodium intake also contributes to the fractures. These are addressed in the implications. These issues are linked to the Nutrient Adequacy Chapter. The conclusion on breast cancer and animal protein was divided into two sentences for clarity. The conclusion was also modified to make a distinction among limited evidence, inconsistent evidence, lack of evidence, and moderate evidence of no relationship. There was

discussion of simplifying the conclusion to address overall breast cancer risk as moderate evidence of no relationship and to qualify where there is evidence on the survivor subgroups.

Member Slavin addressed the next question, “What is the relationship between the intake of milk and milk products and selected health outcomes?” Milk and milk products provide no unique role in weight control (strong). Milk and milk products are linked to improved bone health in children (moderate). Limited evidence suggested a positive relationship between the intake of milk and milk products and bone health in adults, but the results were inconsistent. Milk and milk products are protective against CVD (moderate). A moderate body of evidence suggested an inverse relationship between the intake of milk and milk products and blood pressure. Moderate evidence associated milk and milk products with a lower incidence of T2D in adults. Limited evidence associated milk and milk products with reduced risk of metabolic syndrome; they may be protective in certain population groups. Insufficient evidence was available to assess the relationship between milk and milk products and serum cholesterol levels. She quickly summarized the implication: that milk and milk-products are nutrient-rich.

Discussion

Dr. Pearson noted that, for the metabolic syndrome conclusion, reduced risk and a protective effect are the same thing. The language was removed, and the subgroup data will come out in the chapter. Dr. Pérez-Escamilla pointed out that if the studies are not isocaloric, it is difficult to separate the effects of milk from those of dietary patterns. Dr. Appel raised concerns about the CVD conclusion, since the results can be dependent on the type of milk (low-fat, fat-free, whole). There was discussion on the difficulty of finding clear conclusions when looking at food groups rather than nutrients or food patterns and on the risks of relying on systematic reviews. There was discussion of downgrading the evidence from “moderate” in relation to milk’s protective impact on CVD. One concern was that increasing calcium intake in older men can increase risk of prostate cancer, according to language from an AICR report. Another topic of discussion was to include the recommendation that people drink low-fat milk due to caloric concerns versus concerns of inadvertently discouraging people from consuming dairy.

Member Slavin addressed the last protein question, “What is the relationship between the intake of dry beans and peas and selected health outcomes?” People don’t eat many of these, and there was very little evidence. Limited evidence exists to establish a clear relationship between intake of dry beans and peas and body weight. Limited evidence suggests that dry beans and peas have unique abilities to lower serum lipids; most of the lipid lowering seen in studies is related to the soluble fiber content of these products. Limited evidence is available to determine a relationship between the intake of dry beans and peas and T2D.

Discussion

It was suggested that the word, “cooked” should appear in front of “dry beans”, to make it clear that canned beans could be used, and they are not meant to be eaten dry. This change will be implemented throughout the report. There was also discussion of the language on lower serum lipids. Dr. Slavin agreed that the intent of the language was to state the lack of evidence, not a positive finding. Dr. Achterberg noted the need for future studies on dried beans and peas.

Carbohydrates & Protein Subcommittee
(Carbohydrates Chapter)
Chair: Joanne L. Slavin, PhD, RD

Member Slavin presented on the second chapter the Subcommittee produced. The first question on carbohydrates was, “What are the health benefits of dietary fiber?” Dietary fiber from whole foods protects against CVD, obesity, and T2D and is essential for optimal digestive health. This was based on an update of a 2008 American Dietetic Association review.

The second question was, “What is the relationship between whole grain intake and selected health outcomes?” A moderate body of evidence showed a protective effect against CVD. Limited evidence associates whole grains with lower body weight and reduced incidence of T2D. There were two implications. Americans are not consuming enough whole grains and should consume both whole grains (for fiber) and fortified grains (for folate). Recommendations to consume more grains are not supported, rather more grain choices should be whole grains.

Discussion

There was discussion on the lack of standards for whole grain content in foods and for measuring whole grains, which confounds the literature. Dr. Pearson commented that there was more than limited evidence of a relationship between whole grain and body weight. Dr. Slavin pointed out the mixed results and differing studies from not only whole grains but legumes as well. In the whole grains and health conclusions it was determined, after discussion, that the word, “limited” should be replaced with “moderate” in the conclusion on whole grains and the association with body weight, especially considering the established effects of dietary fiber.

Member Achterberg addressed the question, “What is the relationship between the intake of vegetables and fruits, not including juice, and selected health outcomes?” Consistent evidence suggests at least a moderate inverse relationship between vegetable and fruit consumption with MI and stroke, with significantly larger effects at above five servings per day, but insufficient evidence exists to assess the relationship between vegetable and fruit intake and blood pressure or serum cholesterol. Evidence for an association between increased vegetable and fruit intake and lower body weight is modest with a trend towards decreased weight gain over 5+ years in middle adulthood; no conclusions can be drawn on the efficacy of increased vegetable and fruit consumption in weight loss diets (moderate). Limited and inconsistent evidence suggests an inverse association between total vegetable and fruit consumption and the development of type 2 diabetes. Evidence indicates that some types of vegetables and fruits are probably protective against some cancers. There were two implications. Vegetables and fruits are nutrient-dense and relatively low in calories, so Americans should emphasize vegetables and fruits in their daily food choices, without added solid fats, sugars, starches or sodium. Second, significant favorable associations between vegetable and fruit intake and health outcomes seem to be linked to a minimum of five servings per day, and positive linear effects may be noted at higher consumption levels. While the impact of increased vegetable and fruit consumption is unclear for some chronic diseases and markers, improvements in preventing CVD and certain cancers may occur with increased consumption.

Discussion

Dr. Pérez-Escamilla commented that RCTs showed weight loss due to the low energy density of fruits and vegetables. He and Dr. Achterberg agreed to compare their information on studies on this topic. Dr. Achterberg said she will add that vegetables and fruits per se do not lower body weight, rather that they affect the dietary pattern. Dr. Nelson raised the distinction between weight loss and weight status.

Dr. Pearson said the evidence on cancer is not specific enough. Dr. Achterberg said she has the data for conclusions on specific fruits and vegetables and specific cancers. For the discussion of vegetables and fruit and cancer, the DGAC Report should include the table from the AICR Report showing that data. The Subcommittee had to remove several recommendations from the chapter for space, including recommendations for more nuanced research on specific vegetables and fruits and cancers and health effects. Vice Chair Fukagawa warned against overly-specific research. The research recommendations may be reintroduced.

Member Pi-Sunyer addressed the question, “What is the relationship between glycemic index (GI) or glycemic load (GL) and selected health outcomes?” There were four conclusions. Strong and consistent evidence shows that glycemic index and/or glycemic load are not associated with body weight and do not lead to greater weight loss or better weight maintenance. Abundant, strong epidemiological evidence demonstrates that there is no association between glycemic index or load and cancer. A moderate body of inconsistent evidence supports a relationship between high glycemic index and T2D, but strong, convincing evidence shows little association between glycemic load and T2D. Due to limited evidence, no conclusion can be drawn to assess the relationship between either glycemic index or load and CVD.

Member Slavin addressed two questions about sugar-sweetened beverages: “In adults, what are the associations between intake of sugar-sweetened beverages and energy intake?” and “In adults, what are the associations between intake of sugar-sweetened beverages and body weight?” Limited evidence links sugar-sweetened beverages to higher energy intake in adults. Greater consumption of sugar-sweetened beverages is associated with increased body weight, but in isocaloric conditions, added sugars, including sugar-sweetened beverages, are no more likely to cause weight gain than any other source of energy (moderate). The implication was that added sugars are no different from other extra calories for energy intake and body weight. Reducing intake of added sugars is a recommended strategy to reduce calorie intake. Intake of drinks high in calories and low in nutrients should be reduced in consumers needing to lower body weight.

Discussion

Dr. Rimm pointed out that nothing would cause weight change in isocaloric conditions. Dr. Nickols-Richardson pointed out that America is not under isocaloric conditions. Chair Van Horn said future literature may find special effects of different kind of sugars, but the studies have not yet been done in humans. Dr. Pearson and others suggested an implication on high fructose corn syrup to counteract popular misconceptions. Dr. Appel said recent evidence is stronger than prior

evidence on the impact of sugar sweetened beverages on increased weight due to better methods, and that will be reflected in the chapter.

Member Slavin addressed the question, “How are non-caloric sweeteners related to energy intake and body weight?” Using non-caloric sweeteners will affect energy intake only if they are substituted for higher calorie foods and beverages (moderate). A few observational studies reported that individuals who use non-caloric sweeteners are more likely to gain weight or be heavier. This does not mean that non-caloric sweeteners cause weight gain; they are more likely to be consumed by overweight and obese individuals.

Discussion

Member Slavin pointed out that there is not much data. Dr. Nelson expressed concern over the increased consumption of non-caloric sweeteners in those attempting to decrease sugar in their diet, since she does not want to encourage increased the amount of artificial flavorings in the food supply. There was also the hypothesis of sweeteners training the palate for sweeter flavors, as due to the sweeteners.

Member Slavin’s next question was, “What is the impact of liquids versus solid foods on energy intake and body weight?” Evidence is conflicting as to whether liquid and solid foods differ in their effect on energy intake and body weight. However, soup may lead to decreased energy intake and body weight (limited).

Discussion

Dr. Slavin pointed out that the effect of soup consumption reflects people eating less after eating soup. Dr. Appel asked about “conflicting” in that conclusion. Dr. Slavin said there was no consistent design across the studies, leading to conflicting evidence.

Member Salvin’s next question was, “What is the role of carbohydrate, fiber, protein, fat, and food form on satiety?” Most studies are conducted in laboratory settings, so results may not be generalized to the outside world. Foods high in fiber generally are more satiating than low fiber foods, although some fibers added to drinks have little impact on satiety. Overall, small changes in the macronutrient content of the diet do not significantly alter satiety.

The next question was, “What is the role of prebiotics and probiotics in health?” Gut microflora play a role in health, but research in this area is still developing. Foods high in prebiotics (wheat, onions, garlic) or in probiotics (yogurt) may be consumed within accepted dietary patterns.

Sodium, Potassium, & Water Subcommittee

Chair: Larry Appel, MD MPH

Larry Appel, Subcommittee Chair, thanked the Subcommittee members and staff. The first question was, “What is the effect of sodium intake on blood pressure in children and in adults?” For both adults (strong evidence) and children (moderate evidence), as sodium intake decreases, so does blood pressure. There were several implications. The health benefits of reduced sodium

intake include fewer strokes, CVD events, and deaths, as well as substantially reduced health care costs, so children and adults should lower their sodium intake as much as possible by consuming fewer processed foods that are high in sodium and using little or no salt when preparing or eating foods. The food supply is replete with excess sodium, including the excessive sodium now added to some meats and fish through injections or marination; efforts to quantify the amount of sodium from this type of processing are warranted. Since sodium intake is linked to calorie intake, efforts to reduce calorie intake may lower sodium intake. The 2005 *Dietary Guidelines for Americans* recommended a daily sodium intake of less than 2,300 mg for the general adult population and an intake of 1,500 mg for hypertensive individuals, Blacks, and middle-aged and older adults. Because these groups now comprise nearly 70 percent of US adults, the goal should be 1,500 mg per day for the general population. A recent Institute of Medicine (IOM) report has provided a roadmap to achieve gradual reductions in sodium intake. Early stages of blood pressure-related atherosclerotic disease begin during childhood, so both children and adults should reduce their sodium intake. Individuals should also increase their dietary potassium because potassium helps to attenuate the effects of sodium on blood pressure.

Discussion

Dr. Pi-Sunyer suggested changing the language on the link between caloric and sodium intake to be more positive. Dr. Appel agreed, stating that the ratio is at 2 mg per calorie.

Member Appel next addressed the question, “What is the effect of potassium intake on blood pressure in adults?” Children were not reviewed due to lack of data. In adults, a higher intake of potassium is associated with lower blood pressure (moderate). The implication was that increasing dietary potassium intake can lower blood pressure and attenuate the adverse effects of sodium on blood pressure. Other possible benefits include a reduced risk of developing kidney stones and decreased bone loss. Increased intake of dietary potassium is warranted. The IOM set the AI for potassium for adults at 4,700 mg per day. Available evidence suggests that Blacks and hypertensive individuals especially benefit from an increased intake of potassium.

The next question was, “What amount of water is recommended for health?” The conclusion was that an IOM panel in 2004 concluded that the combination of thirst and usual drinking behavior is sufficient to maintain normal hydration. A minimum intake of water cannot be set. The implication was that water must be consumed daily to prevent dehydration. Healthy individuals with routine access to fluids who are not exposed to heat stress consume adequate water to meet their needs. Purposeful drinking is warranted for those exposed to heat stress or who perform sustained vigorous physical activity. In view of the obesity epidemic, individuals are encouraged to drink water and other fluids with few or no calories. Dr. Appel pointed out that the literature has not changed since the IOM report.

Discussion

Dr. Pérez-Escamilla asked if a statement for the elderly is warranted. There was discussion on reports that the elderly have low thirst and evidence in France and Chicago that the elderly were at risk during heat waves and died. The elderly may not understand they are thirsty, and some

may be underhydrated due to diuretic use or fears of incontinence. A statement for the elderly will be added to the implications.

Alcohol Subcommittee
Chair: Eric Rimm, ScD

Eric Rimm, Chair of the Subcommittee, thanked the Subcommittee members and staff. The first question was, “What is the relationship between alcohol intake and weight gain?” The conclusion (with moderate evidence) was that moderate drinking is not associated with weight gain, but heavier consumption over time is. The implications were that alcoholic beverages provide calories but are not a good source of nutrients. Consumption beyond 2 drinks a day may lead to weight gain, but consumption of less than 2 drinks a day does not appear to be associated with a faster rate of weight gain, as compared to non-drinkers.

The second question was, “What is the relationship between alcohol intake and cognitive decline with age?” Individuals who drink moderately have a slower cognitive decline with age (moderate), but heavy or binge drinking is detrimental to age-related cognitive decline (limited). The implications were that alcohol, when consumed in moderation, does not appear to quicken the pace of age-related loss of cognitive function. However, heavy drinking and binge drinking impair short and long-term cognitive function and should be avoided.

The next question was, “What is the relationship between alcohol intake and CHD?” Compared to non-drinkers, individuals who drink moderately have lower risk of CHD (strong). However, there was insufficient evidence to determine if drinking patterns were equally predictive of risk, although heavy or binge drinking is detrimental (moderate). The implications were that an average daily intake of one to two alcoholic beverages is associated with a low risk of CHD among middle-aged and older adults. The average was a weekly average with no binge drinking (binge drinking is defined as ≥ 4 drinks/day for women and ≥ 5 drinks/day for men). Binge or heavy irregular drinking is to be avoided.

The next question was, “What is the relationship between alcohol intake and bone health?” Evidence suggests a J-shaped association between alcohol consumption and incidence of hip fracture, though there was a suggestion that heavy or binge drinking was detrimental to bone health (moderate). The implications were that there is insufficient evidence to make a strong conclusion related to patterns of alcohol intake and bone health, but the increased risk of fracture among individuals who drink more than one to two drinks per day may be due to accidents following heavier consumption. This was linked to the question on unintentional injury.

The next question was, “What is the relationship between alcohol intake and unintentional injury?” The conclusion was that drinking in excess increases the risk of unintentional falls, motor vehicle crashes, and drowning (strong). With moderate intake, the evidence for risk of unintentional injury is less well-established, but abstention from alcohol is the safest.

The next question was, “Does alcohol consumption during lactation have adverse health effects?” There were two sub-questions: “What is the relationship between alcohol consumption and the quality and quantity of breast milk available for the offspring?” and “What is the

relationship between alcohol consumption and postnatal growth patterns, sleep patterns, and/or psychomotor patterns of the offspring?” When a lactating mother consumes alcohol, alcohol enters the breast milk, and the quantity of milk produced is reduced, leading to reduced milk consumption by the infant (moderate). Alcohol consumption during lactation was associated with altered post-natal growth, sleep patterns and/or psychomotor patterns of the offspring (limited). There were several implications. A woman who chooses to breastfeed need not completely abstain from alcohol. Because the level of alcohol in breast milk mirrors the mother’s blood alcohol content, after latch-on has been perfected and a pattern of consistent breastfeeding has been established (around age 2 to 3 months), a mother could wait 3 to 4 hours after a single drink (the time it would take to metabolize the ethanol) before breastfeeding and the infant exposure to alcohol would likely be negligible. It is not sufficient for a woman to express breast milk after alcohol consumption to prevent exposure to the infant because the concentration of alcohol in breast milk will remain at levels in the blood until all the alcohol is metabolized. Consumption does not enhance lactational performance; rather, it reduces milk production and decreases infant milk consumption in the 3 to 4 hours after alcohol is consumed. There is still insufficient evidence to conclude definitively that alcohol exposure to an infant during lactation affects the postnatal growth of the child; nonetheless, alcohol exposure to the breastfeeding infant (by breastfeeding too soon after consuming a single drink) should be avoided.

There were three implications and contextual issues related to the entire chapter. First, abstention is an important option; approximately one in three American adults does not drink alcohol. Second, adverse effects for unintentional injury or for certain people and situations can occur at even moderate alcohol consumption levels. Third, for individuals who choose to drink, recommendations should be interpreted as average over the course of the week and not necessarily every day or all concentrated on a few days.

Food Safety & Technology Subcommittee
Chair: Roger Clemens, DrPH

Roger Clemens, Chair of the Subcommittee, thanked the members and staff. Because the Committee members had seen the presentation before, Dr. Pérez-Escamilla briefly summarized the issue of food safety in the home. Across life cycle and socioeconomic status, The US population is not following food safety recommendations when they prepare food in the home or in the foods they consume outside of the home. The largest issues for the Subcommittee were hand washing and kitchen sanitation, prevention of cross-contamination, and cooking and storing prepared foods at the right temperatures. The Subcommittee also reviewed the consumption of undercooked or raw animal source food products. They concluded that, even though incidence of food-borne illness outbreaks or food-borne intoxicants related to these behaviors may not be that frequent, they can be extremely serious when they do occur.

For seafood consumption, the studies give favorable benefit/risk ratios, including for vulnerable subgroups (pregnant women, lactating women, women of reproductive age, or young children). It is important for the American public at large to have access, to make wise selections, and to know which types of seafood should be avoided or limited. Given the very low levels of consumption of seafood, the U.S. population could benefit in cardiovascular health and neural development of its infants through the consumption of seafood without significant risk. He recommended more support

to deliver food safety education. Dr. Clemens added that much of the food safety equipment used in the industry is not available in the home, and what is in the home is often improperly used.

Discussion

Dr. Appel said food safety education should be part of a systematic strategic plan. This will be included in the Integration chapter. Dr. Nelson asked about outbreaks being a result of individual actions versus food supply. Dr. Pérez-Escamilla said the data on outbreaks from home practices is not available largely due to under-reporting. Discussion acknowledged that food safety issues are more than individual behaviors, and it is important to also emphasize the food safety roles related to our nationally-based food supply and distribution networks. Dr. Clemens noted that there are new traceability efforts “from farm to fork.” Dr. Pérez-Escamilla said informing the consumers of what industry and government does and making them aware that the consumer is the last line of defense is important.

Vice Chair Fukagawa said it is important to make the message consistent with the Translational Integration chapter’s statements on local foods. It was requested that a statement be added to the chapter regarding the need for food safety messages that encompass trends toward local/regional-based food production, and to ensure consistency of statements with the Translation/Integration chapter on the importance of food safety in a systems approach, nationally. Dr. Pearson said the message should address personal responsibility. Sodium, saturated fat, and processing were discussed regarding their contributions to food safety and shelf life.

Co-executive Secretary to the DGAC, Ms. Kathryn McMurry asked for clarification regarding the 8 oz recommendation from the Fatty Acids Subcommittee in relation to the indication that 12 oz are safe from the Food Safety & Technology Subcommittee. Members of these two subcommittees clarified that the end message is that 8 ounces is important for health; however, more than 8 ounces can be consumed and still can be safe, given that choices low in contaminants are chosen.

Meeting Wrap-Up

Chair Van Horn said the Committee had reached consensus on many issues. The next step is to fine tune and finalize the conclusion statement over the next couple of weeks based on the discussion at this meeting. She emphasized editing for consistency among the chapters, including describing the strength of the evidence agreed upon. She thanked the members and staff.

Dr. Appel said the paper on energy expressed as calories regarding sugar-sweetened beverages must be included so the data is expressed as calories rather than grams of sugar. There was discussion on the logistics of communicating about changes to the chapters and conclusions and implications. The Subcommittee members should work through DGMT leads. Ms. Spahn, Director of the CNPP Evidence Analysis Library Division, said staff will track changes to conclusion statement made at this meeting.

Closing Remarks:

Dr. Post said the meeting produced a clear direction on the content of the conclusions. The changes will be to refine the text. He thanked the Committee and staff, the Designated Federal Officer, Co-executive Secretaries, Dietary Guidelines Management Team, NEL staff, National Agricultural Library, National Service Volunteer Abstractors, and contract staff, including the Graduate School. The report will go to the Secretaries, be posted public comment, and then become the basis of *2010 Dietary Guidelines for Americans*, which will be released by the end of the year. Consumer outreach and communications will start in 2011.

Drs. Appel and Nelson said the Committee can provide a letter on improving the process to the Departments and the nutrition community for the benefit of the next Committee.

Dr. Braund commended the members for both their fidelity to science and their inclusion of implications, which can translate into action steps.

(Adjournment 5:34 p.m.)