

## *Dietary Guidelines Advisory Committee Meeting*

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

*Held at the*  
**Hubert Humphrey Building, Room 800**  
**200 Independence Avenue, SW**  
**Washington, DC**  
**September 23-24, 2003**

### *Meeting Summary*

*Tuesday, September 23*

(9:15 a.m.)

#### *Participants*

**Dietary Guidelines Advisory Committee:** Dr. Janet C. King (Chair), Dr. Lawrence J. Appel, Dr. Yvonne L. Bronner, Dr. Benjamin Caballero, Dr. Carlos A. Camargo, Dr. Fergus M. Clydesdale, Dr. Vay Liang W. Go, Dr. Penny M. Kris-Etherton, Dr. Joanne R. Lupton, Dr. Theresa A. Nicklas, Dr. Russell R. Pate (attended September 24), Dr. F. Xavier Pi-Sunyer, Dr. Connie M. Weaver

**Executive Secretaries:** Ms. Carole Davis, Ms. Kathryn McMurry, Dr. Pamela Pehrsson, Dr. Karyl Thomas Rattay

**Others:** HHS Secretary Tommy G. Thompson, Mr. Eric Bost, Dr. Cristina Beato, Ms. Carter Blakey, Dr. Linda Meyers, Dr. Eric Hentges

#### *Welcome and Introduction of the Committee*

**Dr. Cristina Beato, Acting Assistant Secretary for Health, HHS,** welcomed participants to the first meeting of the 2005 Dietary Guidelines Advisory Committee on behalf of Secretaries Tommy Thompson and Ann Veneman. She noted that the *Dietary Guidelines*, issued jointly by the two departments since 1980, serve as a cornerstone of Federal nutrition policy and are considered a gold standard for science-based consumer nutrition. They also serve as a vehicle for the government to speak with one voice on nutrition and health promotion. Dr. Beato noted that Congress has mandated that the *Dietary Guidelines* be reviewed every five years and that the Advisory Committee will review the scientific literature and recommend changes to the 2000 *Dietary Guidelines* as necessary. Ultimately the goal is better health through food choices and physical activity.

Dr. Beato introduced the members of the 2005 Dietary Guidelines Advisory Committee (DGAC) and thanked them for volunteering their valuable time and services to assist HHS

and USDA. She then introduced Eric Bost, Under Secretary for Food, Nutrition and Consumer Services at USDA. She acknowledged the close collaboration between HHS and USDA under Secretaries Thompson and Veneman and Under Secretary Bost.

### ***Review of the Committee Assignment/Charge to the Committee***

**Eric Bost, Under Secretary for Food, Nutrition and Consumer Services**, passed on greetings from Secretary Veneman, who could not attend because of responsibilities associated with clean up after Hurricane Isabel. He noted that the Services' 15 nutrition programs collectively reach one out of every five Americans. He recognized the challenging responsibility facing the 2005 DGAC and that the impact of their work would be felt not only in the United States, but also around the world. He presented the charge to the Committee about its critical role and responsibility to the American people, and to the Secretaries of HHS and USDA.

He then read the charge to the DGAC:

The Committee, whose duties are solely advisory and time-limited, will:

- Examine the 2000 Edition of the *Dietary Guidelines* in relation to current scientific and medical knowledge on the relationship between diet and health.
- Determine whether compelling evidence exists that warrants revision of the 10 statements or accompanying text, which we refer to collectively as the Dietary Guidelines.
- If the Committee decides that no changes are necessary, the Committee will so inform the Secretaries of the Departments. This action will terminate the Dietary Advisory Guidelines Committee.
- If the Committee decides that changes are warranted, based on the preponderance of the scientific and medical knowledge, the Committee will determine what issues for change need to be addressed.
- The focus of the Committee should be on the review of the new scientific evidence.
- The Committee shall make and submit its technical recommendations and the rationale for these recommendations in a report to the Secretaries. The Committee's focus should be its recommendations and the supporting science rather than translating the recommendations into a communication document.
- Upon the submittal of the Committee's recommendations, the Dietary Guidelines Advisory Committee will be terminated.

### ***Swearing In of the Committee***

Tommy G. Thompson, Secretary of the Department of Health and Human Services, thanked Dr. Beato and Mr. Bost for their work and recognized Secretary Veneman's strong support and close collaboration. He also welcomed and thanked the DGAC members for volunteering their time to promote health and prevent disease.

Secretary Thompson stressed that the guiding principle of the Department—prevention, prevention, prevention—reinforces the critical role that nutrition and exercise play. His job as

HHS Secretary is to ensure that Americans are strong, healthy, and independent. Encouraging healthy habits is key. Many want to eat healthier, but are confused about how to do so. HHS has been working to provide more information to consumers, such as ensuring that *trans* fat be listed on food labels. This has stimulated some companies to change their manufacturing processes. Working to improve people's understanding of how to combine foods to make nutritious meals is also needed. The Committee's independent evaluation of current nutrition science, and recommendations about healthy eating and physical activity, will assist the two Departments in their efforts.

Secretary Thompson briefly summarized some of the statistics that show the need for prevention efforts. For example, 125 million Americans have one or more chronic diseases, and 75% of the health budget of \$1.4 trillion goes to treat chronic illnesses in America. Many diseases can be prevented by making healthy lifestyle choices. Tobacco-related illness results in 400,000 deaths per year and an annual cost of approximately \$155 billion. Type 2 diabetes results in 200,000 deaths per year and \$132 billion spent yearly. And fastest growing is obesity, on which \$117 billion is spent yearly on related illnesses and is associated with 300,000 deaths annually in this country.

President Bush's HealthierUS Initiative was recently launched and is based on four pillars:

- Daily physical activity
- Diet consistent with the *Dietary Guidelines for Americans*
- Preventive medical screenings
- Making healthy choices

In response to that directive, HHS has created *Steps to a HealthierUS*, an initiative that helps Americans realize that even small steps can make a dramatic difference in good health and prevention of chronic disease.

Secretary Thompson concluded by expressing his confidence in the DGAC and asking members to raise their right hands as he administered the oath of office.

### *Committee Operations*

**Dr. Beato** reviewed the "rules of engagement" of the DGAC in keeping with the Federal Advisory Committee Act to ensure an open, public process:

- Public comment must go to the full committee; therefore, all communications to the committee must go through staff.
- Written comments from the public are accepted throughout the process. They should be clear and concise, with the scientific justification presented along with views.
- If committee members are contacted by the public, they should refer the comments to the staff.

She then turned the meeting over to Dr. Janet C. King, Chair of the DGAC.

## ***Review of Agenda***

**Janet C. King, Chair, Dietary Guidelines Advisory Committee**, said she spoke on behalf of the Committee in recognizing both the challenges and the important role that the Committee plays in the field of nutrition. Committee members are pleased to have been selected and are looking forward to working together. She then reviewed the agenda for the rest of the day.

## ***Administrative Matters***

**Carter Blakey, Acting Director of the Office of Disease Prevention and Health Promotion**, reviewed housekeeping details and noted that minutes of the meeting would be posted within 60 days at [www.health.gov/dietaryguidelines](http://www.health.gov/dietaryguidelines). Documents pertaining to committee deliberations would be available for public inspection and copying in Room 738-G. Those interested should call 202-690-7102 to schedule an appointment.

(Break: 9:45-10:15)

## ***Historical Overview of the Dietary Guidelines***

**Dr. Linda Meyers, Director Designate of the Food and Nutrition Board of the Institute of Medicine**, introduced her presentation with the hope that putting the past in context might help chart the future. She acknowledged the input of Michael McGinnis, whose experience with the Dietary Guidelines stretches back many years. She said that he usually began a historical presentation by observing that the first attempt at dietary guidelines began with the Greeks. In 1894, W.O. Atwater made the observation that Americans' diets should consist of 15% calories from protein, 33% from fat, and 52% from carbohydrates. The four food groups were presented in the 1950s.

However, the real impetus behind the Dietary Guidelines began in the 1970s with the growing recognition that disease caused by nutrient deficiency was less common and that diet plays a role in reducing the risk of chronic diseases. In 1977, the Senate Select Committee on Nutrition and Human Needs set quantitative goals, which was met with a lot of debate.

In response, Julius Richmond, then Surgeon General and Assistant Secretary for Health, asked Jules Hirsch, a leader in the American Society for Clinical Nutrition, to put together a panel to look at the literature. Their results were published in a 1979 article in the *American Journal of Clinical Nutrition*. It was also drawn on for the Surgeon General's Healthy People report, which talked about the relationship between diet and disease in general terms but without guidelines or quantitative goals.

The question arose about the feasibility of issuing dietary guidelines so that the government could speak with one voice. At a meeting attended by representatives from USDA and the Department of Health, Education, and Welfare (HEW, now HHS), the consensus was that the effort to develop a single voice of dietary advice was worth doing. Michael McGinnis and

Mark Hegsted were tasked with making it happen.

In 1980, a 20-page brochure was published that listed seven guidelines. The lore is that final agreements were hammered out at someone's dining room table. This 1980 edition was presented as the best consensus of the National Institutes of Health, the Food and Drug Administration, and USDA. Then-Agriculture Secretary Bob Bergland, described the Dietary Guidelines as a call for moderation, rather than a prescription. It received extensive media attention. Subsequently, the Senate Committee on Appropriations put in language to establish a committee to review the scientific evidence and recommend revisions.

For the 1985 edition, a committee of nine people was charged with the task of reviewing the latest scientific information, determining if additions or modifications were appropriate, reviewing public comment, and making recommendations, backed with scientific references, to the Secretaries. The 1985 *Dietary Guidelines* had two main changes from 1980: (1) "ideal" was changed to "desirable" weight; and (2) "alcohol" was changed to "alcoholic beverages."

In 1987, Congressional language requested review of the Dietary Guidelines on a regular basis. At the time, which Federal agency had the lead for nutrition was somewhat contentious. To make clear that it was a joint effort between the two Departments, joint Executive Secretaries were appointed, and decisions about who to appoint to the committee were made jointly.

For the 1990 Dietary Guidelines, the Committee had the same charge of reviewing the previous Dietary Guidelines and recommending changes if necessary. Since 1985, several consensus reports had been issued to help in their task. The Committee recommended a diet with no more than 30% of calories from fat. (Dr. Meyers, while acknowledging that the precise wording was significant at the time, did not recall what the exact language was.) In addition, a more positive tone was used throughout the *Dietary Guidelines*, and more advice and tips for implementation were presented. The 1990 Dietary Guidelines also defined healthy weight and presented a quantitative definition of moderate drinking. Like all others, it was a policy piece and was also used to give advice to consumers.

The National Nutrition Monitoring and Related Research Act of 1990 mandated the publishing of *Dietary Guidelines* every five years that would:

- Provide nutrition and dietary information
- Be based on the preponderance of scientific and medical knowledge
- Be promoted in any Federal food, nutrition, or health program.

The process for the 1995 *Dietary Guidelines* also relied on an advisory committee and co-executive secretaries from the two Federal departments. It put more emphasis on the beneficial aspects of physical activity and of fruits and vegetables. It also took a more positive tone regarding alcoholic beverages, and was the first to highlight the Food Guide Pyramid and the role of nutrition labels as useful educational tools.

The 2000 *Dietary Guidelines* presented 10 guidelines, adding one on food safety and one on

physical activity. It grouped the guidelines in an A (Aim), B (Build), C (Choose) format. Key resources included the 1996 *Surgeon General's Report on Physical Activity and Health*, 1998 *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity*, and the 1997 and 1998 Dietary Reference Intake (DRI) reports.

Although the process has evolved over time, there have been some constants:

- The Dietary Guidelines have been reviewed every five years
- USDA and HHS have jointly issued them
- Scientific advisory committee has been charged to review them
- Science-based guidance has been produced
- Explanation of the rationale has become increasingly detailed
- One voice in dietary guidance policy has resulted
- The Dietary Guidelines have served as the framework for additional materials by the government and others.

As the 2005 DGAC begins work, Dr. Meyers noted that it is now well accepted that diet and disease risk are linked. She noted that new demands on people's time, new ways of receiving information, and an epidemic of obesity are newer challenges. She concluded that the Committee's advice and wise voice about health and dietary patterns are needed.

### *Discussion*

When asked, Dr. Meyers described how the 2005 DGAC might direct its efforts. She noted that the last three Committees found it difficult to think about how to communicate the science to consumers. Coming up with clear messages based on the best science will be a challenge, and dissemination of the report in meaningful ways has always been a challenge.

When asked whether there has ever been an effort to rethink the process and boil down the Dietary Guidelines to two or three messages, she responded that every committee has questioned whether a simpler way existed. She noted that the public record from 1990 and 1995 contained discussions about breaking out the Dietary Guidelines in different ways.

### *Dietary Guidelines' Role in Nutrition Programs and Policy Food Guide Pyramid Reassessment Update*

**Dr. Eric Hentges, Director, Center for Nutrition Policy and Promotion**, first reviewed how the Dietary Guidelines have influenced policy and programs in government, with the public, and in industry.

He presented many examples of the influence of the Dietary Guidelines over the past 22 years. They cast a big shadow by:

- Forming Federal nutrition policy
- Setting research agendas in science, including behavioral and consumer science, and production and food processing

- Guiding education programs and the government to speak in one voice about nutrition
- Providing a framework for public debate on nutrition and health.

A vast audience is influenced and has a stake in the Dietary Guidelines, including policy makers, nutrition and health educators, health care providers and organizations, industry, the media, and consumers. Citing sodium as an example, he noted that the research agenda is also influenced. Healthy People 2010, the National Health and Nutrition Examination Survey (NHANES), and the Healthy Eating Index all rely on aspects of the Dietary Guidelines. Two of the four pillars of President Bush's *HealthierUS* Initiative directly relate to the Dietary Guidelines, as do many other initiatives and USDA's food assistance programs. The Dietary Guidelines also help direct product development, food processing, food marketing, and as public-private collaborations and partnerships.

Dr. Hentges then shifted to the topic of the ongoing reassessment of the Food Guide Pyramid. He noted that food guidance has a long history at USDA, dating from 1916, to the latest revision in 1992. With new food consumption information and food composition data in the intervening 10 years, the Food Guide Pyramid is now undergoing reassessment.

In the 1980s, philosophical goals for the Food Guide were established: to promote overall health, be based on up-to-date research, address the total diet, be useful and realistic, refer to commonly used foods, and be evolutionary. These goals guide the reassessment. Three tasks are involved in the reassessment:

- Technical research
- Consumer research
- Stakeholder input.

The technical reassessment is now in the forefront. A Notice of Proposed Technical Updates to the Pyramid appeared in the Federal Register (9/11/03), with the comment period under way. A summary of the information received will be posted on the Internet and made available to the DGAC at its second meeting. More information is available at [www.cnpp.usda.gov](http://www.cnpp.usda.gov). Dr. Hentges clarified the two-track process in which the revisions of the Food Guide Pyramid and of the *Dietary Guidelines* are happening at the same time. Both are based on current science.

This winter, USDA will start looking at consumer research to determine what kind of graphic representation will best communicate the Food Guide. Dr. Hentges expected that shortly after the 2005 *Dietary Guidelines* is issued, the revised food guidance will be released. Should the DGAC change or add nutritional standards, he said that these would be incorporated into the Food Guide graphic and that the two documents would be in complete harmony.

Dr. Hentges concluded by noting that the Dietary Guidelines will not only influence Federal policy and communications on nutrition and health, but also will guide the health and well-being of all Americans.

### ***Discussion***

Dr. King asked Dr. Hentges, regarding the DGAC's role in food and nutrition policy, whether he preferred dietary recommendations that are more detailed and specific, or more general and overarching. Dr. Hentges responded that they should be specific enough to direct those who must carry them out. A host of programs depend on the clarity of the *Dietary Guidelines*.

Dr. Go asked whether the scientific database developed for work on the Food Guide Pyramid would be available to the DGAC. Dr. Hentges noted that it would be provided to them.

When asked whether the Food Guide Pyramid itself might be changed, Dr. Hentges responded that the question remains open, but they have purposely separated the technical foundation from the educational messages and the graphic representation. The bottom line is getting people to follow the *Dietary Guidelines* more completely.

A short discussion ensued about avoiding discrepancies between the two efforts. Dr. Hentges stressed that they will not set any nutrition standards and that the Food Guide will reflect any changes or additional standards set by the DGAC. The Food Guide is an educational tool to communicate the *Dietary Guidelines*, Dietary Reference Intakes, and other documents.

Dr. Kris-Etherton queried Dr. Hentges and Dr. Meyers about the absence of the word "calorie" in the *Dietary Guidelines*, particularly in view of the epidemic of obesity. Dr. Meyers noted that the 2000 *Dietary Guidelines* refer to "healthy weight" and that much discussion centered on wording. Ms. Kathryn McMurry, Co-Executive Secretary who was involved with the 2000 DGAC, noted that the intention was to be realistic and stress not gaining weight, with the Committee recognizing that the success rates for sustained weight loss are not high. Dr. Meyers observed that the rising numbers of obese might imply a changed climate.

Dr. Bronner commented that one of the real issues, from a consumer perspective, is that the Dietary Guidelines make sense and can be implemented. Dr. Hentges replied that implementation remains the challenge, but the influence of the Dietary Guidelines goes beyond the document itself to the messages that can be taken from them and used in all other programs.

(Break: 11:20-1:45)

### ***Review of Timeline, Milestones, and Staff Responsibilities***

Dr. King referred Committee members to Tab 6 of their notebooks. Tab 6 contained a summary of the timeline and milestones under which the Committee will operate so that if changes to the Dietary Guidelines are deemed warranted, a report could be submitted to the Secretaries in June 2004.

- From October 2003 to January 2004, the Subcommittees, with staff assistance, will gather information and conduct literature reviews, prepare scientific reviews, and identify key scientific findings. Milestones for the current meeting are deciding



whether to proceed with the scientific review and, if so, deciding upon the approach to be used.

- At the second DGAC meeting (January 2004, dates to be scheduled), the DGAC will hear expert presentations and public testimony (if decided upon), and receive an update on the Food Guide Pyramid reassessment and its relationship to the revision of the *Dietary Guidelines*.
- From January to March 2004, the information gathering will be completed. Subcommittees will draft key recommendations and rationale to present to the entire DGAC.
- At the third DGAC (March 2004), the DGAC will review the proposed key scientific recommendations and the scientific rationale. They will work toward consensus on which recommendations to include and which revisions need to be made.
- From March to May 2004, the draft DGAC report will be prepared.
- At the fourth and final DGAC meeting (May 2004), the DGAC will review, refine and finalize the report to the Secretaries.
- In June 2004, the report will be submitted to the HHS and USDA Secretaries.

Dr. King also referred the Committee to the list of responsibilities of the Dietary Guidelines management team. She praised the staff assigned to the DGAC, noting that several had worked with past Committees.

She then reviewed the topics that would be discussed during the afternoon (nutrient adequacy and lifecycle needs, food safety, fluid and electrolytes, and ethanol) and the next day (carbohydrates, fatty acids, energy balance and weight maintenance). She asked presenters to focus on the following areas:

- What are the recent scientific advances in this area?
- What is the established science in this area?
- Where is there consensus?
- What issues need further discussion and/or further evaluation of the science?
- What issues need additional expertise (guest speakers)?
- What issues require additional information (e.g. consumption data)?

***Nutrient Adequacy and Lifecycle Needs***  
***Discussion Leaders: C. Weaver, T. Nicklas, Y. Bronner***

- **Dr. Connie Weaver** told the group that she recently attended the American Society for Mineral and Bone Research (ASMBR) meeting, which covered recent scientific and policy information and trends. She divided her presentation into five areas:
- Awareness of the escalating incidence of obesity, along with an increase in chronic diseases such as diabetes, metabolic syndrome, and osteoporosis. Obesity and bone health are closely related, so that aspects of diet that are good for controlling weight are good for bone. There has also been an increase in the number of bone fractures in children, which has been attributed to more overweight children falling on

underdeveloped bones. The ASMBR meeting had many posters on the inadequacy of calcium and Vitamin D in children around the world.

- The health benefits of fruits and vegetables and low-fat dairy products have been reported through many studies. Studies to look at include those that involve the Dietary Approaches to Stop Hypertension (DASH) diet. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) advocates a DASH diet to control hypertension. The Coronary Artery Disease Risk Development in Young Adults (CARDIA) study has looked at a high number of subjects and the relationship between diet and disease.
- Since 2000, there were several new DRI reports, and new information on calcium, Vitamin D, and bone. In particular, there is now much attention on Vitamin D, including the effects of a deficiency on special subgroups (such as those living in northern latitudes and those with darker skins). There is an increased incidence of rickets in babies born to mothers with inadequate Vitamin D. Oncologists say to avoid sun to avoid skin cancer, so how do we get adequate Vitamin D? More research on how much Vitamin D is necessary and how that translates to diet is needed. There is also a new DRI on fiber, and new information on the adequacy and functionality of micronutrients such as folic acid.
- Since 2000, more foods contain hidden nutrients, through processes such as fortification. The food composition databases cannot keep up. How do we assess whether these foods are meeting people's dietary needs when good databases of what the foods contain do not exist? Questions are also raised about the bioavailability of these nutrients.
- The public and health professionals are now more accepting of constituents of the food supply that promote health other than the traditionally known essential nutrients. Advances in the last five years have emphasized liberal amounts of fruits and vegetables.

**Dr. Theresa Nicklas** focused on changes in food consumption patterns among children. Using the data from the Bogalusa Heart Study, from 1973 to 1994, there was an increase in 10-year olds' consumption of mixed meals (e.g. combination dishes such as lasagna and pizza), poultry, salty snacks, fruit juice, and cheese; decrease in desserts and candy in this study (although an increase nationally); and a decrease in milk consumption. Recent data show that soft drink consumption varies by region. The consumption of sweetened ice tea drinks among children also rose in the Bogalusa study population.

Another area of concern has been portion size. The Bogalusa study shows that total grams consumed has increased, especially in restaurant portions. She noted that an increase from 360 to 870 calories daily, accompanied by increased sedentary activity, might have policy implications. Using the Healthy Eating Index, 72% of children have a diet that needs improvement and 9% have a poor diet. A very small percentage (1%) of children are meeting the Food Guide Pyramid recommendations. Only 5% met the recommendation for four or more food groups, and 16% did not meet any of the Food Guide Pyramid recommendations.

Average intake of most vitamins and minerals for children age 2 to 11 meet or exceed the 1989 RDAs. However, there is an increase among children over age 11 who are not meeting

the RDAs, especially for calcium, magnesium, iron and zinc, but also other vitamins and minerals. Dr. Nicklas then focused on calcium, noting that a similar presentation could be made for other nutrients. At age 10, 46% of children met the RDA for calcium. Using the current DRI (which increases the recommended calcium intake for age 10), the percentage decreased to 12%. Among young adults, only 25% meet the DRI of 1000 mg daily of calcium. The percentage is lowest among African Americans and among females in both age groups.

Fiber consumption ranges from 12.3 grams to 17.4 grams for individuals 19 years of age and under, mostly from vegetable soups, fruits, and fruit juices. Only a small percentage of children and adolescents ages 2 to 18 years consume whole grains.

Among children, 50% consumed at least one food from each food group daily. That number decreased to 19% for young adults.

A study by Kant in 2003 showed that children and adolescents who consume the highest percentage of low nutrient-dense foods had significantly higher total energy intake. They also consumed less dairy, fruits and vegetables, grains, and meat or meat alternates. The impact of dietary supplements is poorly understood. A recent study showed that 16% of adolescents use a supplement, mostly a daily multivitamin without minerals.

Dr. Nicklas reiterated Dr. Weaver's concern about uncertainty about the increasing fortification of foods and beverages. She cited one study from Canada that showed that fortified foods led to about 10% of men exceeding the maximum calcium intake, but not in women. This seems to suggest that fortification is not a realistic way to meet nutrient needs.

A final area to consider is eating patterns, including eating more meals and snacks, and eating in restaurants more frequently.

**Dr. Yvonne Bronner** focused her comments on the consumer side of the Dietary Guidelines mandate. In 2001, she and Ellen Harris wrote a book that concluded that the average African American diet is not meeting the Food Guide Pyramid recommendations. Using the CSFII 1994-96 database for their analysis, they found that higher income and education did not play a role in improved diet. They looked at consumption of fruits and vegetables, fat, and whole grains.

Dr. Bronner urged attention on how to take messages and apply them in communities, particularly those with considerable levels of disease and disability. She noted that overweight and obesity disproportionately affects minority communities across all ages and income levels. She urged recognition of the contextual environment when applying Dietary Guidance and looking at social marketing principles for help. For example, guidance is needed on fruit and vegetable consumption in communities without grocery stores and where fresh produce is difficult to obtain and to store. It comes down to more than science. The same contextual concerns relate to physical activity in communities with violence and without sidewalks or playgrounds.

In terms of needs through the life cycle, Dr. Bronner discussed the impact of how a poor start in life might affect the onset of chronic diseases later in life. Thus, implementation of the *Dietary Guidelines* during pregnancy is important. Osteoporosis was originally considered to be a condition that would not be of major importance in the African American community, but it is now affecting increasing numbers of women above age 65.

### *Discussion*

When questioned whether there is enough information to discuss nutritional programming in pre-conception, Dr. Bronner responded that there is enough information for the period during pregnancy, but not earlier.

Dr. Weaver asked about what data are available on tracking eating patterns throughout life, particularly in the later years. Dr. Nicklas noted the relationship between eating patterns and obesity. Dr. Clydesdale recommended an article by Jim Hill in *Science* on obesity. In the literature, there are a lot of associations, but little explanation of the relationship between BMI and eating pattern variance. In an article in *Preventive Medicine*, Dr. Nicklas and colleagues looked at the association between eating patterns (e.g., skipping meals and snacking) and obesity. She said that there were some associations, but these patterns could explain only 3% of BMI variance.

Dr. Appel urged caution about methodological issues, particularly related to the obesity epidemic, and urged looking within and across cultures. He asked Dr. Weaver about other nutrients that were discussed at the ASMBR meeting. In addition to Vitamin D, she reported that there was more attention to sodium's effect on urinary calcium and variance by race. In terms of fruits and vegetables, the consensus is on the need to consume more, although the exact link to bone health is not conclusive.

Dr. Go urged examining data, particularly from the United Kingdom, on fetal development and later diseases. Dr. King reiterated that the Dietary Guidelines are for everyone over age 2, including pregnant and lactating women, and to therefore keep in mind special needs. She summed up main points from the three presentations and also asked additional follow-up questions:

- There is increased concern about Vitamin D, and this is an emerging issue.
- In the past, bone health was linked to dairy products. This has been expanded to include fruits and vegetables. Some studies are now coming out that indicate that protein does not contribute to urinary calcium excretion.
- Soft drink intake has decreased in the Bogalusa cohort, but is still high. There is concern in the literature about soft drinks as a displacement for calcium-rich beverages.
- In terms of physical activity and bone development, Dr. Weaver said that several studies showed dramatic improvements with short interventions early in life, but consensus hasn't been reached about later in life.
- Dr. Nicklas said the largest gaps in nutrient adequacy seem to be iron and zinc in females, low consumption of fruits and vegetables and whole grains, and high consumption of low nutrient-dense foods. Dr. Weaver added Vitamin D to the list,

although it was pointed out that sometimes consumption of Vitamin D is poorly reported.

- Although data exist on nutrients in fortified foods, Dr. Weaver reported that changes are happening so frequently and the databases cannot keep up.

Dr. Caballero reminded the Committee that the DRIs provide the ability to do a group assessment through an Estimated Average Requirement (EAR) as well as individual assessments through the RDAs.

Dr. Bronner noted that more information will be needed to document consumption in the African American community.

USDA is doing more work on surveying fortified vs. non-fortified foods. In terms of supplements, according to Dr. Nicklas, the few studies on the role of dietary supplements in improved dietary adequacy in children have some methodological limitations, but are worth looking at.

Although it was not addressed in the 2000 *Dietary Guidelines*, the importance of variety in the diet was reiterated, given the low percentage of children who eat from all food groups. Also, portion size cannot be ignored. Ms. McMurry reported that the 2000 DGAC also wrestled with adequacy versus variety issues, and moved from variety to a focus on the Food Guide Pyramid.

Dr. Penny Kris-Etherton noted the role that nutrient-dense foods can play, especially for the elderly and children, in making sure that they get enough nutrients even though they have decreased energy needs.

(Break: 3:05-3:15)

***Food Safety***  
***Discussion Leader: F. Clydesdale***

**Dr. Fergus Clydesdale** noted that a lot of research on food safety exists in relation to industry, governments, academics, but not restaurants or consumer behavior. It is important to have a guideline on food safety. He noted that the current guideline is based on the **Fight BAC!** program.

In a 2003 survey, consumers considered themselves at least as, or more, responsible than manufacturers, stores and the government in ensuring that the products they purchase from the grocery store are safe. It would be valuable to know, Dr. Clydesdale said, whether the 2000 *Dietary Guidelines* contributed to that sense of responsibility. He also said it would be valuable to know how pathogens develop in home-based outbreaks as a way to prioritize messages.

The International Food Information Council (IFIC) Foundation conducted a more open-ended

survey to ask consumers what food safety issues most concern them. Food handling/preparation and disease/contamination were of greatest concern. The increased attention to these topics in the media may have had an impact.

Dr. Clydesdale noted that we have enhanced detection capabilities, and a number of tools and technologies to keep foods safe, from Hurdle Technology to chemical dips to broadened surveillance and tracking by regulatory agencies. However, at the end of the day “the cat is still welcome on the table,” i.e., people still will practice unsafe food practices in their homes. A 1998 survey found that fewer than 1% of 106 U.S. and Canadian homes surveyed met the minimum criteria for acceptable performance as outlined in the 1997 FDA Food Code for Food Service Operations. The most frequent critical violations included cross-contamination of food, neglected hand washing, and improper cooling of leftovers. It would be interesting to look at the data now to see if the 2000 *Dietary Guidelines* have had any effect.

Consumers must take a proactive stance in relation to keeping food safe. They must recognize that food is not sterile, nor should it be. Physicians have said that they welcome questions about food safety, but usually only bring it up with special populations: patients with a food borne illness, patients traveling abroad, immune-compromised patients, or mothers of infants.

He also raised additional issues for the Committee to consider:

- As people change their eating behaviors (he cited as an example a colleague who ate raw tuna in a salad and was hit by a parasite), this might have implications for the Committee’s recommendations.
- The continued emergence of virulent forms of bacteria might lead to such recommendations as not eating rare meat.
- Major outbreaks in the home still coincide with those listed in the 2000 *Dietary Guidelines*, with similar ways to avoid problems.
- The 2005 *Dietary Guidelines* may want to incorporate allergens, antibacterial hand cleaners and their effectiveness/risk, supplement use, and mercury in fish.

### ***Discussion***

Dr. Weaver commented that sometimes the public is unsure what they are keeping themselves safe from. Dr. Clydesdale responded that the *Dietary Guidelines* should address this more and perhaps address different risks during the lifecycle, such as mercury in fish as a greater concern during pregnancy.

In terms of mercury in fish, it is often a factor of where the fish lived (farm versus wild, area of the country). There are often conflicting messages. On the one hand, people are told about the benefits of omega-3 and 6 fatty acids in fish, but they may also be told to avoid fish because of mercury. A similar concern about conflicting messages relates to allergens.

To clarify some of the issues around supplements and safety, Dr. Clydesdale pointed Committee members to information from FDA on the [www.safety.gov](http://www.safety.gov) Web site. Interactions of supplements with certain foods can cause acute conditions. Dr. Kris-Etherton also noted

such concerns as statin drugs and grapefruit, and Coumadin and vegetables high in Vitamin K.

Although all are at risk of food borne illnesses, the elderly, young, and immune-compromised people are at highest risk of being hit by a pathogen perhaps resulting in death.

In a discussion about the contribution of fish oil supplements to consuming one's omega fatty acids, Dr. Clydesdale said that most supplements are pretty well oxidized, and therefore, inactive.

Dr. Pi-Sunyer asked whether food safety issues are worsening, improving, or staying the same over time. The data are not clear, although regulatory agencies, industry, and research have contributed to delivering a better product.

In summing up, Dr. King noted that consensus existed that food safety should remain part of the 2005 Dietary Guidelines, as it is in other countries. The topic of allergens should be discussed further. Bottled water, it was felt, should not be part of the *Dietary Guidelines* with their focus on the individual, rather than government and industry.

### ***Fluid and Electrolytes*** ***Discussion Leader: L. Appel***

Dr. Appel focused his presentation on an update of the effects of sodium and potassium on health. He noted that the 2000 Dietary Guidelines called for choosing and preparing food with "less" salt, without being specific. It is generally accepted that the primary benefit of reduced sodium intake is that it lowers blood pressure, and thus lowers the risk of blood pressure-related conditions. Lowered sodium intake also reduces urinary calcium excretion.

Dr. Appel referred to a number of studies:

- A large 2002 meta-analysis by the Prospective Studies Collaborative Group using 61 prospective studies that documented direct progressive relationships between stroke and usual systolic blood pressure and usual diastolic blood pressure in all adult age groups.
- The JNC 7 published new guidelines about what constitutes normal, pre-hypertensive, and hypertensive levels of blood pressure.
- The Framingham studies that estimate the lifetime risk of developing hypertension as 90% for adults who reach age 50, which he said constitutes an epidemic.

Non-pharmacologic approaches such as sodium reduction reduce blood pressure and, indirectly, cardiovascular events. Potentially, they prevent the age-related rise in blood pressure and could also be an adjunct or substitute to medications. Even a small reduction in systolic blood pressure lowers the risk for stroke mortality, coronary heart disease (CHD), and total mortality. Dr. Appel then turned to some of the evidence supporting sodium reduction as a means to lower blood pressure:

- Dietary Approaches to Stop Hypertension (DASH) Sodium Trial
- Trial of Hypertension Prevention (TOHP) Phase 2
- International Study of Sodium, Potassium, and Blood Pressure (INTERSALT)
- Trial of Nonpharmacologic Interventions in Elderly (TONE) Clinical Trial

Dr. Appel noted that he was an investigator on the DASH Sodium Trial, which he differentiated from the original 1997 DASH Trial. In this feeding study, patients began with a control diet, then were randomized so that some continued with the control diet and others with the DASH diet of 8 to 10 servings of fruit per day, three servings of dairy, whole grains, nuts, and fish. Overall, the DASH diet was lower in fat than the control diet, somewhat higher in protein, and much higher in fiber and potassium. Three sodium levels (143 mmol/d, 106 mmol/d, and 65 mmol/d) were given to the participants.

Blood pressure was reduced with reduced intake of sodium, both in the control and DASH diets. Dr. Appel noted that there has been much interest in comparing subgroups of the study—hypertensives and non-hypertensives, African Americans and non-African Americans, and others. Sometimes it is difficult to interpret results because of the inherent variability of individuals' blood pressure and how it is measured.

Dr. Appel went on to discuss the effects of one's sodium level on urinary calcium excretion. In both the control and DASH diets, sodium reduction lowered urinary calcium excretion. Sodium had no effect in LDL or HDL levels across the spectrum.

The question comes down to the feasibility of reducing sodium intake and achieving multiple lifestyle changes. Dr. Appel noted that in behavior intervention studies that represent optimum conditions with motivated individuals, the TOHP study showed a reduction from 155 mmol/d to 97 mmol/d, and the TONE study showed a reduction from 144 mmol/d down to 99 mmol/d. Sodium reduction is harder to achieve when considering multiple dietary changes.

Two major studies that have looked at the relationship between sodium and cardiovascular disease are the NHANES Follow-up and a study by Tuomelehto. The latter showed that a 100 mmol/d increase in urinary sodium excretion is linked to increased coronary heart disease.

Turning to increased potassium intake, benefits include lowered blood pressure, reduced sensitivity to the blood pressure-raising effects of salt, and reduced calcium excretion. Key studies in this area include a 1997 meta-analysis by Whelton (1997), a small study in 1999 by Morris, and a clinical trial that looked at reduced risk of kidney stones by Barcelo in 1993. Morris studied 24 African Americans and 12 non-African Americans in a crossover study with seven-day periods that showed reduced sensitivity to sodium with increased intake of potassium.

### *Discussion*



In response to a question about post-intervention follow-up to see if participants maintained the lower salt diets, Dr. Appel noted that follow-up data show recidivism. The TONE study is the best case of changes maintained over time. Older participants on antihypertensive medicine kept their weight off and continued with lowered sodium intake after 2.5 years. He noted that food labeling for low sodium products does not seem to be an effective way to reduce sodium intake as consumers often shy away from these products. He thought it might be better to do it quietly: for example, putting in less milligrams of salt in a packaged food without highlighting the fact.

Looking at sodium intake for those with low blood pressure, Dr. Appel said anecdotally, that these people might still have or develop high blood pressure long-term.

Dr. Clydesdale remarked on the TONE results with the elderly, particularly since older people often lose their sense of smell and thus might want salt to increase taste. Dr. Appel observed that they were provided with alternative flavorings (such as different spices) and behavioral strategies to avoid salt. Practical recommendations such as these for avoiding salt might be useful.

A very small amount of salt is needed daily to meet iodine requirements—the equivalent of 1/4 teaspoon. Perhaps marathon runners or others doing extreme physical activity might need to worry about insufficient amounts, but he did not see it as a problem in the general U.S. population. In fact, there are populations who engage in massive physical activity, such as the Yanomamo Indians in Brazil, who consume less than 10 mmol/d of sodium with no adverse effects.

Dr. Appel noted that, although there are no recent data, an estimated 75% of one's daily salt intake comes from packaged foods, 15% is added in food preparation, and 10% or less is intrinsic to the foods themselves.

Dr. Appel reiterated that both sodium and potassium affect blood pressure, and that some researchers have looked at the ratio between the two as more predictive than either amount individually. Dr. King ended this session by noting that if hydration should be part of the DGAC report, some additional expert information would be needed.

### ***Ethanol***

#### ***Discussion Leader: C. Camargo***

Dr. Camargo reviewed how alcohol has been dealt with in previous *Dietary Guidelines*. In 1980, language said if one drinks, do so in moderation. In 1985, "alcohol" was changed to "alcoholic beverages," but the explicit call for moderation did not change. In the 2000 *Dietary Guidelines*, the harmful effects of excess intake were discussed as well as some specificity about possible cardiac benefits of consumption.

Dr. Camargo found that the studies he identified in a MEDLINE search largely supported the 2000 *Dietary Guidelines*. His suggestion was to keep the recommendations in the 2005

*Dietary Guidelines* generally the same but to reorganize them slightly: first discussing the role of alcohol in a total diet as providing few nutrients, then addressing the harmful effects of excess and that some people should not drink at all. The *Dietary Guidelines* could then address moderation, then the potential cardiac benefits and possible breast cancer risk. The two drinks/day for men and one drink/day for women, he noted, should be presented as maximum recommended amounts, not goals.

Another possible area of change might be a recommendation that the elderly (men and women) should drink no more than one alcoholic beverage per day. In recognition of changing eating patterns, he suggested changing “drinking with meals” to “drinking with food.”

### *Discussion*

Dr. Caballero asked whether the research shows the benefits of one type of alcoholic beverage (e.g., red wine) over others. Dr. Camargo noted that a lot of papers have addressed the topic, but that patterns of consumption are too confounding. People who prefer different beverages (beer versus wine versus hard liquor) tend to have varying demographics (such as cultural, socioeconomic and educational).

Even with one-half a drink, the cardiovascular benefits of alcoholic beverages are seen. However, Dr. Camargo warned against recommending or not recommending drinking, noting that the *Dietary Guidelines* can suggest other alternatives than alcohol to lower the risk of cardiovascular disease. Dr. Go questioned whether alcohol-based substances, such as cough syrup, might be a confounding factor, but Dr. Camargo did not feel that the discussion was necessary in the *Dietary Guidelines*. More relevant, however, is concern about alcoholic beverages interacting with some, but not all, over-the-counter and prescription medicines.

Dr. Kris-Etherton tied the discussion about alcohol to micronutrient levels. For example, she queried, should the DGAC recommend not drinking if one does not have a good diet. She referred to one study that showed that alcohol’s elevated breast cancer risk can be eased with adequate folate consumption. Dr. Camargo noted that saying that alcohol is empty calories addresses the nutrient issue, but felt getting into the specifics about breast cancer would be too confusing in such a general document. Dr. King questioned whether alcohol promotes fat storage. Observational data show, according to Dr. Camargo, that moderate drinkers weigh less than others. The role of alcohol in the diet is controversial. It goes back to the discussions about empty calories versus total calories.

Dr. Nicklas observed that the *Dietary Guidelines* have not been specific about age. Dr. Camargo felt that a reorganization of the 2005 *Dietary Guidelines* would clarify that. We are most interested in age limits, as well as making clear that excess for all ages is bad. Studies over the last few years about heart benefits are vague when referring to “younger people.” However, he did say that the Committee might want to be more specific about alcohol consumption by the elderly.

In response to a question about including a “if you don’t drink, don’t start” message in the

*Dietary Guidelines*, Dr. Camargo noted that a reasonable clinician could work with a reasonable patient but did not feel that the *Dietary Guidelines* should have such general recommendations.

Dr. Weaver brought up whether tobacco use should be addressed in the *Dietary Guidelines*. Dr. King suggested the *Dietary Guidelines* stay focused on diet.

Some ethnic groups have been shown not to tolerate alcohol, and the question was raised about whether the *Dietary Guidelines* should address this. Dr. Camargo thought that the *Dietary Guidelines* would not have a large impact on behavior in these individuals; rather, people with an intolerance would avoid alcohol with or without a guideline.

Dr. Clydesdale asked if data existed about how many males drink two alcoholic beverages daily, and how many females drink one. Dr. Camargo noted that most cohorts studied tend to be moderate drinkers, many Americans do not drink at all, and a subset drinks in excess, with the caveat that some define “moderate” drinking as three drinks per day. This reinforces his opinion that more specific recommendations for the elderly might be useful in the 2005 *Dietary Guidelines*.

(Recess: 5:00 p.m.)

### ***Wednesday, September 24***

(9:05 a.m.)

Dr. King opened the second day’s session by briefly reviewing key points made in the presentations made the previous afternoon.

#### **Nutrient Adequacy and Life Cycle Needs:**

- Topics of concern include the link between obesity and bone health, Vitamin D deficiency, a new definition for fiber, an increase in the number of fortified foods, increased interest in the health-promoting constituents in foods, and other nutrients important to bone health.
- Regional differences in soft drink and other beverage consumption by children exist. Children are not meeting the Food Guide Pyramid recommendations, with the amount of iron and zinc in girls and overall food variety of particular concern.
- Increased income and education levels do not improve nutritional intake among African Americans.
- Obesity is having a disproportionate impact on minority populations.
- Established science for review include the DASH, CARDIA, and Bogalusa studies, as well as data from the United Kingdom on fetal development and later disease, Popkin’s studies on portion size, USDA work on fortified foods, and an Institute of Medicine (IOM) report on food labeling.
- A consensus exists on the importance of fruits and vegetables, as well as weight-bearing activity, on bone health.

- Additional information is needed on Vitamin D deficiency; safety and efficacy of health-promotion constituents in food; intake, bioavailability, and safety of fortified food; children's eating patterns; communication of science; guidelines for pregnancy and throughout the life cycle; the impact of carbonated beverages on bone health, and the micronutrient density of diets.
- Expertise in social marketing, life cycle issues particularly for older adults, and food pattern development and trends would be beneficial for the Committee.
- Practical advice is needed on how to get people moving, how children can meet the Food Guide Pyramid, and how to provide better messages to minority populations.

**Food Safety:**

- Recent scientific advances include information on whom consumers rely for food safety information, Food Marketing Institute food safety trends, consumer concerns data, technologies for keeping food safe, and the survey of food safety in the home.
- The consensus is that a guideline is needed on food safety.
- Issues for further discussion include changes in consumer behavior since release of the 2000 *Dietary Guidelines* and prioritization of messages in fighting bacteria. Possible other topics: antibacterial cleansers, allergens, supplements and botanicals, mercury and fish oil (especially for special population groups), and consumers' understanding about food safety issues (or problems).
- No additional expertise was identified as being needed.
- Additional information that would be of benefit includes the relative risk of different geographical locations on food safety, data related to botanicals, and food interactions.

**Fluid and Electrolytes:**

- Recent scientific advances include recognition of the benefits of potassium and of reduced sodium. Established science includes the Prospective Collaborative Studies, Framingham Heart Study, DASH, TOHP, and INTERSALT studies.
- Consensus exists on the benefits of lower blood pressure and the fact that blood pressure rises throughout one's lifetime. Issues for further discussion include the role of calcium and its interaction with sodium, salt as a source of iodine, and the link between sodium intake and cardiovascular disease.
- Recent advances in understanding the benefits of potassium include its contribution to lowering blood pressure and reduced sensitivity to sodium intake, as well as the importance of the sodium-potassium ratio.
- Additional expertise may be needed on the topic of water hydration.
- Additional information may be needed on the composition of processed food, clarification from the 2000 *Dietary Guidelines* on what "little" and "low" related to sodium intake really mean, and practical recommendations to help consumers reduce their sodium intake.

**Ethanol:**

- Recent scientific advances support the 2000 *Dietary Guidelines*. Moderate drinking can lower the risk of cardiovascular disease, but even one drink per day can increase

breast cancer risk. Moderate drinkers tend to weigh less, but alcoholic beverages represent empty calories from a nutritional point of view.

- The current Dietary Guidelines are sufficient, but need some reorganization and wordsmithing. Specifying moderate drinking as one drink daily for the elderly might also be necessary.
- No additional expertise was identified as necessary.
- Additional information needed is on the interaction of alcohol with the absorption of certain nutrients, compliance with the current Guideline, and recommendations for the elderly.

Dr. King then introduced the next three topics: carbohydrates, fatty acids, and energy balance and weight maintenance.

### *Carbohydrates*

*Discussion Leaders: J. Lupton, B. Caballero, X. Pi-Sunyer*

**Dr. Joanne Lupton** divided her presentation into three parts: a review of references to carbohydrates in the 2000 *Dietary Guidelines*, new information that has appeared since then, and considerations for the 2005 *Dietary Guidelines*.

Information about carbohydrates appears in several places in the 2000 *Dietary Guidelines*:

- Let the Pyramid guide your food choices
- Choose a variety of grains daily, especially whole grains
- Choose a variety of fruits and vegetables daily
- Chose beverages and foods to moderate your intake of sugars.

The Macronutrient Report has come out since the 2000 *Dietary Guidelines* and four members of the DGAC served on that National Academy of Sciences (NAS)/IOM Panel. The IOM panel reviewed all human studies before making any conclusions related to carbohydrates. A preliminary copy of the report has been released. Major findings include the following:

- Establishment of an Recommended Dietary Allowance (RDA) for carbohydrates of 130 grams per day (lower for infants, higher for pregnant and lactating women), based on the amount of glucose needed by the brain
- Establishment of an acceptable range for carbohydrates as a percentage of calories
- Recommendations on added sugar consumption
- Substantial discussion on glycemic index, glycemic load, and glycemic response.

The report contains a chapter on fiber, including a definition of fiber and establishment of adequate intake (AI) for fiber.

One item from the report that might influence the 2005 Dietary Guidelines is the Acceptable Macronutrient Distribution Range (AMDR), which the report presents as:

- Carbohydrates, 45 to 65% of Kcals (If it is lower than 45%, it is hard for an individual

to meet his or her AI for fiber and it might be offset by too high a percentage of Kcals coming from fat. Higher than 65% may lead to hypertriglyceridemia and one's fat or protein intake may be too low).

- Lipids, 20 to 35% of Kcals
- Protein, 10 to 35% of Kcals

Dr. Lupton noted that the “added sugar” recommendation was getting much attention. Using the USDA definition of added sugars, major sources include soft drinks, cakes and cookies, and other sweet drinks and snacks. The Macronutrient Report recommends at maximum, 25% of one's total Kcals should come from added sugar. When this 25% amount is approximately reached, it has been shown that the intake of a number of micronutrients decreases, including calcium, magnesium, and zinc.

The IOM Macronutrient Panel discussed glycemic index (GI), which is essentially a classification of the effect of carbohydrate-containing foods on blood glucose levels. The higher the GI, the more rapidly foods are digested and metabolized, resulting in higher blood sugar levels. Each food has a GI, such as 1.31 for carrots, 1.21 for potatoes, 1.00 for white bread, 0.92 for sucrose, 0.86 for pizza, and 0.52 for an apple. The Panel realized that GI should not be the only thing to consider (i.e., using this classification, pizza is better than carrots). Instead, the Panel looked at Glycemic Load (GL), which is the GI times the amount of carbohydrates in a serving. By this measure, carrots have a moderate Glycemic Load, less than potatoes or white bread.

Dr. Lupton noted that a number of studies link GL with one's relative risk of type 2 diabetes. Those with a diet low in cereal fiber and with a high GL, run a risk of getting type 2 diabetes that is 2.05 times greater than those with a low GL and high-fiber diet. More studies are looking at GL and its link with other diseases. Although more research is needed, the Panel felt that it was important to understand that there are differences in absorption between carbohydrates – not all carbohydrates are created equally.

In looking at increased fiber intake, the Panel reviewed studies to understand how fiber affects health. Surprising to many, it wasn't as a protection against colon cancer but against coronary heart disease, that the strongest link was established. The AI numbers are based on three studies: the Health Professionals Study, Nurses Study, and Finnish Men's study. The Panel came up with a recommendation for fiber intake that ranged from 21 grams per day (for women over age 50) to 38 grams per day (for men under age 50). Recommendations are based on 14 grams of fiber per 1000 calories. Generally, Americans are eating about one-half the amount of fiber that they should be.

Topics for discussion for the 2005 Dietary Guidelines:

- Fiber recommendations
- Recommendations about added sugars
- Glycemic potential of carbohydrates (“all carbohydrates are not created equal”)
- Do the current Dietary Guidelines and the Food Guide Pyramid place too much emphasis on grains?

### *Discussion*

In response to a question from Dr. Weaver, Dr. Lupton noted that the Macronutrient Report presents tables that show what foods would help a person reach the AI for fiber. Generally, if one has a good diet—with whole grains, fruits, and vegetables—then chances are that enough fiber is being consumed. The IOM Panel did not look at various weight loss diets, such as low-carbohydrate diets, and their impact on health.

**Dr. Xavier Pi-Sunyer** introduced his presentation with an overview of some aspects of the typical American diet:

- Carbohydrates (50% of total calories):
  - Starches: 17%
  - Food sugars: 17% (mostly in fruit and milk)
  - Added sugars: 16% (mostly in soft drinks, sweets, and fruit drinks)

The body does not recognize a carbohydrate from added sugar differently than another carbohydrate. The issue is the low micronutrient density of carbohydrates from added sugar so that the body is short of some nutrients. Of the various types of added sugars, use of high fructose corn syrup has increased in the past decade, and higher fructose intake is related to increased triglyceride levels. Common starch sources include: corn, tapioca, flour, pasta, and cereals.

Although fiber intake is a positive aspect of grains, especially whole grains, the question can be asked whether we need 6 to 11 servings daily. In a population that is overeating, carbohydrates might rise above 55% of the total food consumed daily, which might increase triglyceride level (an independent risk factor for coronary artery disease) and lower HDL level. In addition, some people might substitute carbohydrates for monounsaturated fats. Although there are populations around the world that consume a higher percentage of carbohydrates than Americans, their total caloric intake is lower.

Dr. Pi-Sunyer presented a hypothesis stating that high glucose leads to higher insulin levels, which can lead to increased food intake, increase  $\beta$ -cell exhaustion and diabetes, and lead to insulin resistance and coronary artery disease. However, he noted that this remains a hypothesis only. Observational studies show that increased insulin resistance leads to diabetes. There have not been long-term interventional studies of glycemic load.

He noted that consuming more fiber could solve a lot of issues related to glycemic index. By eating more fruits, vegetables and whole grains, a person is consuming more fiber and a lower GI diet.

**Dr. Benjamin Caballero** was the final presenter of the Carbohydrates session and also was a member of the IOM Macronutrient Panel. Although the mandate of the DGAC is to recommend guidelines for healthy individuals, he questioned how to deal with the majority of Americans who have a Body Mass Index (BMI) above 25. He suggested tackling this issue in

the context of energy balance.

Regarding protein, Dr. Caballero reported that the scientific basis for dietary recommendations has not changed much, and are still based on nitrogen balance studies. Some specific issues for further research include the protein requirements of the elderly and of infants. The body of knowledge is not sufficient to replace the traditional approach of nitrogen balance in considering protein intake.

### *Discussion*

Discussion first centered on the recommendation to increase fiber intake. Dr. Lupton noted that the IOM Macronutrient Panel's recommendation was based on grams of fiber per 1,000 calories. It is a relative proportion so that those eating few calories (such as small children) would eat less fiber. Many children are not meeting the DRI for carbohydrates, Dr. Nicklas noted, and she asked for the rationale behind the notion that "there is too much emphasis on carbohydrates in the Pyramid." Dr. Lupton noted that most Americans are getting about 52% of their calories from carbohydrates and are thus falling within the AMDR range.

The Committee also discussed a measurement issue: different fruits have different GI levels, and even different pieces of a specific fruit, such as a banana, can differ based on different levels of fructose content. Mixed meals also present a challenge, since most of the measurements have been made on isolated carbohydrates.

The Macronutrient report devotes a chapter to translating its findings. It includes information on diets, physical activity, good food sources, and other information. Carbohydrates cannot be looked at in isolation, but in relation to the total diet. In terms of translating the science, Dr. Caballero reminded the Committee that the DRI process uses committee to come up with implementation suggestions, and IOM has commissioned a book to condense the DRI reports into one volume for dietitians and health professionals.

Turning back to fiber, Dr. Lupton was asked about the effect of all one's fiber coming from an isolated source, rather than throughout the diet. Fiber is divided into two parts: dietary fiber from food and functional fiber (part of the new definition) from plant extractions or laboratory synthesis. Getting all one's fiber from functional fiber would not give the same overall benefits. Data on how people are consuming fiber and other nutrients in the various food groups (for example, pasta versus cereals versus rice) would be useful to examine. The sources of carbohydrates, not just totals, are important to examine.

From an epidemiological point of view, Dr. Camargo reminded the Committee that various study designs are being examined. In some cases, randomized trials are urged, but in other cases, they do not seem as necessary.

(Break: 10:15 to 10:30)



## ***Fatty Acids***

***Discussion Leaders: T. Nicklas, P. Kris-Etherton, V.L.W. Go***

**Dr. Theresa Nicklas** presented an overview of what is known about fat intake, particularly in children. Over the past two decades, the percentage of the total diet from proteins and carbohydrates has increased, and from fat has decreased. The Continuing Survey of Food Intakes by Individuals (CSFII) data from 1994, 1996, and 1998 show that children ages 6 to 11 consume 14% daily from proteins, 55% from carbohydrates, and 33% from fat. In terms of fatty acids, about 12% is saturated fat, 13% is monounsaturated fat (MUFA), and 6%-12% is polyunsaturated fat (PUFA).

The new DRIs recommend a total of 20 to 35% fat daily, with lowered amounts of saturated fat. The issue is how to maintain moderate fat intake and also increase unsaturated fatty acids and maintain a balance between monounsaturated fat and polyunsaturated fat. She raised two questions:

1. Are there optimal levels for monounsaturated fat and polyunsaturated fat that should be recommended?
2. Should upper intakes for these two types of fatty acids be established?

Little has been published about how children consume their monounsaturated fats. The Bogalusa data show that consumption of MUFA decreased in children over 20 years from 14% to 12% and PUFA consumption increased. There are a wide variety of food sources of MUFA for children ages 6 to 11, including: peanut butter, potatoes as French fries, dairy products, salty snacks, and meat products. Asians and Pacific Islanders have the lowest MUFA intake and African Americans have the highest. MUFA intake increases up to age 19, and then stabilizes. Regionally, it is lowest in the Northeast, highest in the South among children, and highest in the Midwest after age 19.

The American Heart Association's Scientific Advisory and Coordinating Committee recommends eating a variety of fish at least twice a week to get omega-3 fatty acids, as well as flaxseed, canola oils, and other foods rich in alpha-linolenic acid. However, this brings in the discussion related to mercury and food safety.

*Trans* fat has recently been the subject of a number of studies. The Nurses Health Study, for example, showed that *trans* fatty acids were linked to increased coronary artery disease in women. There has also been a lot of discussion about fat and added sugars in Americans' diets. The CSFII study indicates that 45% of school-aged children's caloric intake comes from discretionary fat (defined as the top part of the Food Guide Pyramid) and added sugars combined. Finally, Dr. Nicklas recommended that the DGAC address the issue of fat substitutes.

**Dr. Penny Kris-Etherton** summarized the current recommendations made by various groups that go beyond the Dietary Guidelines, including the DRI Macronutrient Panel, American Diabetes Association, National Heart, Lung, and Blood Institute's Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) (NHLBI/NCEP-

ATP III), the *Dietary Guidelines for Americans*, and American Heart Association (AHA) Guidelines. Most recommend that fat intake range between 20 and 35%, with those less than 30% for weight control and reduction. NAS is not specific about the amount of saturated fat (“low as possible”); the others generally recommend less than 10%. They each deal with other types of fat in slightly different manners.

Dr. Kris-Etherton suggested that the DGAC address the issues of *trans* fat and omega-3 fatty acids closely. There has been much research and interest on these two topics.

The AI recommendation by NAS on the ratio between omega-6 and omega-3 fatty acids is around 10 or 11. She suggested referring to WHO and FAO recommendations on this. The United States is consistent with other countries in terms of recommendations for this ratio, with Sweden’s recommendations slightly higher, and Japan’s appreciably higher. The American Heart Association published guidelines on omega-3 intake using several studies conducted since 2000. Their recommendations were as follows:

- For patients without documented CHD: Eat a variety of (preferably oily) fish at least twice a week, and oils rich in alpha-linolenic acid (ALA) (such as flaxseed, walnuts, soybean and canola oil).
- For patients with documented CHD: 1 gram of Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA) per day, preferably from oily fish, or through supplements in consultation with a physician.
- For patients needing triglyceride lowering: 2 to 4 grams of EPA + DHA per day, provided as capsules under a physician’s care.

However, a recent study has challenged the “omega-3 dogma”, which she said merited a careful look. Dr. Burr et al. has shown that omega-3 supplements and fish did not help men with angina, but had adverse effects. She noted that the study must be reviewed carefully.

Within the context of what is implementable, Dr. Kris-Etherton presented a table from the DRI report that showed how low fat could go and still meet the recommendations for omega-3 and omega-6 fatty acid intake. She also shared the AHA’s major guidelines to achieve a healthy overall diet, healthy weight, desirable lipid levels, and desirable blood pressure. Their guidelines are food-based, rather than based on percentages of various macronutrients and micronutrients.

She concluded by pointing to five issues for consideration by the DGAC:

- New risk factor criteria for cardiovascular disease (CVD), diabetes, and hypertension leading to lower recommended levels for BMI and glucose;
- New evidence showing that lowering the major risk factors can do away with 80 to 90% of heart disease;
- The role of *trans* fat, omega-3 fatty acids, monounsaturated fat, and stearic acid in the diet;
- Developing an ideal fatty acid profile and an optimum fat to carbohydrate ratio;
- Communicating the “fat” message to the public. Now they have heard about “good”

and “bad” fats, and many are overdoing fats just as several years ago, people were overdoing low-fat, high-carbohydrate foods.

**Dr. Vay Liang W. Go** added final comments on fatty acids. The first issue was on fat substitutes and lipid inhibitors and their impact on absorption of micronutrients. The last DGAC did not address the relationship between fat and cancer, as there was no conclusive evidence at that time. Now the Committee can look at the American Institute for Cancer Research criteria related to diet and cancer prevention. One of the largest ongoing global studies is the European Prospective Investigation into Cancer and Nutrition (EPIC), with which the National Cancer Institute has had interaction. Within the United States, there are data from the Women’s Health Initiative, Women’s Nutrition Intervention Studies, and others.

Normal parameters of what constitutes “healthy” are being lowered. Normal blood pressure used to be considered 140/90; now it is 120/80. The BMI level considered healthy has been lowered to 25. What is considered a normal parameter for a lipid profile is also changing. Finally, he underscored the importance of translating findings so the public can use them.

### *Discussion*

There are no long-term data, but some data is available on olestra from the FDA.

One of the persistent beliefs remains that “eating fat makes you fat.” Dr. Camargo noted many studies show that a low-fat diet leads to weight loss, but the loss cannot be maintained. Issues such as satiety and the ability to stay on the diet come into play. A balance needs to be drawn between saying that fat is not so bad and avoiding a boomerang effect with people consuming too much.

The emphasis perhaps needs to be on total calories. In countries where people are generally leaner, they are eating fewer calories. Thus, for example, they are able to eat larger percentages of carbohydrates without the risk of higher triglyceride levels.

There is a fair amount of epidemiological evidence linking omega-3 fatty acids and decreased risk of disease. Dr. Kris-Etherton referred to a study that showed a lower risk of sudden death and arrhythmia. When it appeared that some studies showed a positive effect and some showed none, one investigator sorted the information by looking at people at high risk and those at lower risk. Then the data were clearer that high-risk people benefited from omega-3 fatty acids.

The role of stored fats in weight change after pregnancy and the impact on lactation is an area to be looked at.

The risks versus benefits of fish, given mercury levels, are now being studied at the Harvard Center for Risk Analysis.

Level of physical activity has an effect on overall caloric intake. The proportions of macronutrients needed might vary depending where a person is on the physical activity

continuum. Given this, Dr. Pate queried if the DGAC recommendations should be segmented depending on how active a person is, particularly those who are sedentary. However, it is not clear how much data there are on dietary limitations for the inactive.

The role of genetics in disease, and thus the resulting recommendations for diet, are being studied, but Dr. Pi-Sunyer considered this too preliminary for a Dietary Guideline. Dr. Go agreed, but suggested that recognition of the issue be made so that the next DGAC, especially in the post-genomic era, can revisit it. The Food Forum and IOM conducted a symposium on the topic, and it was suggested that the Committee contact some of the speakers. Dr. Caballero noted that some aspects of genetics come into play in determining an Estimated Adequate Intake (EAR), because a range within a healthy population is considered, with the variability perhaps attributed to genetics.

Regarding the risks and benefits of protein, one argument for increased intake is that there are population groups (such as the Masai in Africa) who consume an extremely high level of protein and fat, are lean, and have high levels of physical activity. The additional protein does not seem to have an adverse effect with regard to chronic diseases.

Dr. Caballero noted that “three variables” represent “two degrees of freedom.” If the percentage of fats and carbohydrates recommended are chosen, then the protein level fills in the remainder to reach 100%. That said, the Macronutrient Panel discussed the issue at some length and did not find compelling evidence to set an upper limit for protein within the ranges that resulted from their other recommendations. If protein comes from foods with lower digestibility, then more must be consumed. For years, protein recommendations were based on what was called the ideal protein. For many years, the international standard was based on milk or egg protein, but a theoretical protein was substituted about 10 years ago. A diet based on lower-quality protein will require higher nitrogen content. The Macronutrient Report has some examples, but not enough to be a practical tool.

Dr. Lupton noted that high levels of obesity and diabetes may make high protein contraindicated. She also noted that the Panel reviewed supplements and felt that upper levels for them were not warranted based on the available data. However, this may still be an area of concern.

(Break: 11:35 to 1:10)

### ***Energy Balance and Weight Maintenance***

***Discussion Leaders: X. Pi-Sunyer, R. Pate, and B. Caballero***

**Dr. Xavier Pi-Sunyer** launched this topic with some recent data about changes in overweight and obesity in the United States and how they affect disease patterns. The NHANES surveys show that each decade has seen great increases in numbers of Americans who are overweight or obese. In 1999, 61% of Americans were overweight or obese. The upward trend is because of a rise in obesity at a rate of 1% per year, or 10% per decade. People are moving from the normal to overweight status at the same rate as those moving from overweight to obese. The problem is worst for non-Hispanic blacks and for Mexican Americans. Levels are also rising in children, both sexes and at all age groups. Now, approximately 11 to 13% of children are

overweight, defined as those with a BMI above the 95<sup>th</sup> percentile of the earlier NHANES survey.

In the United States, an individual's weight tends to increase as one ages, which in other populations, weight remains stable after age 20. As weight increases, so does metabolic syndrome, and this translates to increased incidence of diabetes. Beginning at a BMI of 25, there is a definite increase in type 2 diabetes. Above a BMI of 35, there is a 40-fold to 90-fold increased risk of developing diabetes.

Individuals become obese when their energy intake stays the same or increases while their energy expenditure decreases. The message is that people should both decrease intake and increase expenditure. Dietary factors related to intake include macronutrient composition, energy density, and portion size. Variety and cost are also important.

Dr. Pi-Sunyer queried whether the DGAC wanted to keep or change the recommended percentages of a weight-reducing diet (carbohydrates 55% of energy, protein 15%, fats  $\leq$  30%, of which  $\leq$  15% is MUFA,  $\leq$  10% is PUFA, and 8 to 10% is saturated fat). One issue is whether the carbohydrate recommendation might be lower with an increase in monounsaturated fat.

Americans have become more sedentary. Some old data confirm that below a certain level of activity, the ability to regulate intake is gone. Regulating mechanisms no longer operate.

He pointed to four failures:

- Increased prevalence of overweight and obese Americans
- Rise in type 2 diabetes
- Rise in metabolic syndrome
- Increased degree of disparity by race and ethnicity.

**Dr. Russell Pate** addressed physical activity and its role in the Dietary Guidelines and, more generally, in energy balance. The 2000 Dietary Guidelines handled the topic well, and the recommendations would not be far off even now. However, in the intervening years, the rise in obesity argues for a re-examination of the physical activity components of the Dietary Guidelines.

The physical activity community is revising the public health physical activity guidelines and looking at broad issues related to disease risk and health promotion. Both the adult guidelines (30 minutes, most days of the week) and children's guidelines (60 minutes daily) are under review, and Dr. Pate was hopeful that the timeline works so that the DGAC would have their work to review.

The scientific basis for adults' physical activity guidelines is much stronger than that for children and youth. But Dr. Pate urged the DGAC to take advantage of all available resources to develop the 2005 *Dietary Guidelines*.

Other new areas in the past five years include the role of resistance exercise and its impact on resting metabolism and energy balance. Literature on the benefits of weight-bearing exercise on bone mass should also be carefully reviewed.

For the 2005 Dietary Guidelines, suggested Dr. Pate, the DGAC should consider making recommendations about dose (or a range of doses) for prevention of excessive weight gain, and perhaps for weight loss and maintenance.

The IOM Macronutrient Panel recommended 60 minutes or more of physical activity by adults per day. This was somewhat controversial, but the difference in the two recommendations are not that great. However he urged clarification so that the public is not confused about the appropriate dose of physical activity for maintenance of good health and prevention of weight gain.

Dr. Pate noted that people have asked whether physical activity would form part of the next Food Guide Pyramid. While he did not know, he said that the question highlighted the point that the public is looking at a way to integrate physical activity and diet.

The distinction should be drawn between the prevention of excessive weight gain and the treatment of obesity. Although important for both, physical activity has a more profound impact on the former goal than the latter. However, he also said that more is now known about the contribution of increased physical activity in maintenance of weight loss, which may warrant more emphasis in the 2005 Dietary Guidelines. The impact of television and other screen time on weight has also become better understood.

### *Discussion*

There is a limited science base about the advantage of one type of physical activity over another, with the exception of the role of weight-bearing exercise in building bone mass. In terms of getting one's physical activity in five-minute bouts, Dr. Pate noted that the 1995 Centers for Disease Control and Prevention-American College of Sports Medicine (CDC-ACSM) recommendations, ratified by NIH consensus conference and by other organizations, addressed the advantages of bouts as short as 8 to 10 minutes, but that the literature at the time did not address shorter bouts. Since then, there have been some studies that have said even these shorter bouts bring about benefits.

**Dr. Benjamin Caballero** presented on recent approaches for determination of dietary energy requirements, with the consideration of physical activity as a part of the diet. He explained that the IOM Macronutrient Panel came up with the 60 minutes daily recommendation through metabolic evidence. The Panel was not charged specifically to make a recommendation about exercise, but rather more broadly about energy intake. It became impossible not to consider energy output. While iron, calcium, and other minerals are an absolute value, energy is a relative one. A person's energy expenditure affects how many calories he or should consume.

For the past 60 years, since the first RDAs were defined, a factorial method was used. The energy that people expend while resting was measured, and then an allowance provided for physical activity. However, there are only imprecise methods of measurement of physical activity.

The Panel used a doubly labeled water database, which is more precise. It is a composite measurement over several days. Raw data were requested from investigators worldwide to make a database of healthy individuals, excluding those who are very physically active as well as those with a high BMI. It is not a nationally representative database, he stressed.

Total Energy Expenditure (TEE) goes up until age 30. A person's weight and height have an influence on TEE. A measurement for Physical Activity Level (PAL) was derived as a ratio of the TEE to the resting energy expenditure. Resting energy expenditure equals a PAL of 1; the more activity one does, the higher the PAL. Four ranges of PAL were determined:

- Sedentary (from 1 to 1.39)
- Low active (1.4 to 1.59)
- Active (1.6 to 1.89)
- Very active (1.9 to 2.5)

A majority of the healthy individuals in the database were in the active category, indicating that those who have stable weight tend to be active. A PAL of 1.71 was observed for individuals in the new dataset, which means that a higher level of physical activity was assumed than in the previous RDA recommendations published in 1989 (a PAL of 1.6). Caloric recommendations are different depending on one's PAL. The 60-minute recommendation came by compiling a large set of activities and calculating the impact of each on one's PAL. By walking, for example, one's PAL can be increased by 0.2. The Panel took the upper end of a sedentary PAL (1.39) and realized that by walking for an hour, he or she could raise the PAL to the lower range of active. A workbook was developed that listed activities and how they can help achieve a PAL of 1.6. This is a metabolic calculation.

Previously, the recommendation was "at least" 30 minutes of physical activity. The Macronutrient Panel is recommending 60 minutes daily for a 0.2 increase in PAL to prevent weight gain. The amount of activity needed to maintain energy balance may be higher than that for reduction of disease risk.

The 2000 Dietary Guidelines, with their emphasis on aiming for a healthy weight, are not working—100,000 people per day are passing the BMI mark of 25. For weight control, some of the recommendations are in conflict. A person with a BMI of 25 who is sedentary is at higher risk of disease than a person with a BMI of 27 who is active. An overweight person who loses weight but stays sedentary has only a limited reduction in risk. In contrast, in the Diabetes Prevention Program, physical activity had an effect on diabetes incidence, even in those with higher BMIs.

Physical activity decreases for children and youth are significant, especially for teenage girls beginning at age 15, as reported by Kinn et al in the New England Journal of Medicine.

To prioritize recommendations about energy in the *Dietary Guidelines*, Dr. Caballero recommended stating that people should be more active, even before a recommendation to check their weight. Physical activity is the most significant determinant of excess weight in

the population.

### *Discussion*

Dr. Pate considers being more active and checking one's weight equally significant. The amount of physical activity that is necessary to prevent weight gain is highly individual. Thus, a blanket recommendation about the amount needed to prevent weight gain is not supported in the literature and would not be helpful. Some people need less than 30 minutes to maintain weight; some need more. Monitoring one's weight lets a person know his or her needs. He applauded the IOM Panel's effort as a major step forward, as well as the effort to pull together the doubly labeled water data, even though they are cross-sectional data. Long-term prospective studies are needed.

The amount of caloric imbalance that starts to create weight gain is difficult to measure, but can be 100 to 200 calories a day. Most people gain weight slowly over time. Dr. Pate expressed more optimism about the chances of prevention of weight gain than the treatment of those already overweight or obese.

Most calculations are based on an average amount per day. However, as Dr. Caballero noted, if one goes to a party, for example, more calories might be consumed that particular day. The problem is an environment hostile to counterbalancing the calorie excesses of a given day. Another practical issue is that people have trouble distinguishing between, for example, a 400-calorie sandwich and an 800-calorie sandwich. A radical proposal would be that all packaged foods list their caloric content. Another would be to try to teach Americans how many calories they should consume daily at their current PAL level. Americans also need to know the caloric content of different types of physical activity. A walk around the block does not mean that one will then burn off a hot fudge sundae.

Dr. Pate cautioned about directly linking the caloric content of different foods with the calories expended in different exercise modes. It can sound too defeating—i.e., that the way to burn off 800 calories is to walk for eight miles. In dealing with weight prevention, it may not be the 800 calories that a person has to deal with, but perhaps 100 extra calories.

The discussion then turned to the macronutrient composition of the diet and physical activity on prevention of weight gain or on weight loss, and whether the DGAC should address various diet plans. Dr. Pi-Sunyer responded that the target of the DGAC should perhaps be to prevent weight gain, as opposed to weight loss strategies. He did discuss some of the popular diet plans. They recommend different percentage amounts of protein, fat, and carbohydrates. When tested in a metabolic ward, it is the total calories that have an impact, not their composition, on weight loss. The question then becomes whether certain diets will change the satiety ratio and inhibit further eating. Is one diet more effective than another over the long term? This is where macronutrient composition plays a role. This is an important issue, but complicated and a matter of individual preference. The message should probably be that a person could probably lose weight and maybe prevent weight gain with various macronutrient combinations. At this time, there are no long-term data on the effects of a high protein-high fat diet on cardiovascular disease.



The Dietary Guidelines should not be cast as a strategy to lose weight. Prevention of weight gain is the goal, especially in children. Even for those who are already overweight, the prevention of more weight gain is important. Weight cycling is not healthy. Across the board we should be saying—do not gain more weight. Along those lines, Dr. Kris-Etherton suggested looking at the evidence and stating the benefits of even losing 10 pounds. Also, she stressed the importance of the message that “a calorie is a calorie,” no matter whether from fat, carbohydrate, or protein.

Dr. Bronner stated that the fact that weight gain is slow and progressive should be underscored—a lot of people do not realize how much weight they have gained over time. There are studies that people are more aware when they weigh themselves regularly. The data about weight maintenance suggest that people should weigh themselves at least once a week. If people become aware of a weight gain, they can make immediate adjustments.

Dr. Caballero noted, although the dataset created for the IOM report only included healthy weight individuals, there was additional data from overweight individuals that was analyzed separately. It was found that the estimates of the energy needs of overweight versus normal weight people were almost the same. If we can help people avoid weight gain, we can stop this move from normal to overweight, and from overweight to obese. He reiterated the need to focus energies on those in the healthy BMI range in order to create simple, direct messages. In the 2000 Dietary Guidelines report, weight loss is dealt with in a vague way. It is not too useful for those embarking on a weight loss program.

In response to a question about how well BMI correlates with body fat, Dr. Caballero said that it varies from population to population. Generally, it is not a bad indication, but can be misleading. For this reason, many surveys now include body fat as a separate measure. It is unlikely that, through looking at one’s BMI, he or she would be misclassified as obese. There might be a few cases of someone who has a high BMI but is very athletic, such as a football player. However, it does not seem an issue with the general population.

Just saying eat less/exercise more is not sufficient. Dr. Camargo suggested that educating people about calories is important. In addition, perhaps more is needed—such as recommending that exercise facilities be made available and that physical education remains in the schools. Dr. Pate noted that the previous Dietary Guidelines couched the recommendations to individuals. Perhaps there need to be companion recommendations to institutions, policy makers, and others. In exercise science, people are exploring this and moving beyond public health education. This might apply to other recommendations. For example, Dr. Appel suggested that there might be a guideline for individuals about sodium, but also to governments and manufacturers. There may be ways to suggest incentives: for example, tax breaks to companies that give employees time to exercise. Some of the recommended solutions are system-wide. Until they are in place, the trajectory toward excess weight will continue.

Returning to the topic of body fat and BMI, women at every BMI level tend to have more body fat than men. BMI has an independent correlation for risk of disease and mortality.

Another possibility of self-assessment is through waist circumference, using cutoffs such as belt sizes of 35 inches for women and 40 inches for men.

Regarding the 2000 Dietary Guidelines' different recommendations for physical activity for adults and children, Dr. Pate reiterated that the scientific basis is firmer for adults. The consensus recommendation of 60 minutes daily for children was derived through a bit of a "back door approach." It seemed to be ahead of what most children do, but still attainable.

Weight loss in the elderly is somewhat controversial. Once people reach 65, some say not to intervene. However in the Diabetes Prevention Program (DPP), the elderly did well. In terms of morbidity, the DPP indicates that the elderly would benefit, although the mortality data are not as clear. The elderly do well when looking at blood pressure control. There is also an orthopedic issue—we want to prevent weight gain so that older people are able to get around.

### ***Decision about Whether to Proceed with Revised 2005 Dietary Guidelines***

In reflecting on the presentations over the past two days, Dr. King asked the DGAC whether members felt further evaluation of the science was necessary. In other words, are the 2000 Dietary Guidelines based on science that has not changed?

Dr. Camargo made a motion to continue to evaluate the data from the last five years and make new recommendations. Dr. Go seconded the motion. It was amended by Dr. Appel to include a focus on the last five years, but being able to go further back if necessary. The amendment was agreed to by consensus, and the motion passed unanimously.

(Break: 2:40 to 2:50)

### ***Systematic Approach to the Science Review Discussion Leaders: J. Lupton and L. Appel***

Dr. King introduced this session by noting that a systematic approach to science reduces bias, maintains objectivity, and improves reliability. It also makes the process more transparent. Finally, a systematic approach means that future Committees will have this work as a foundation.

**Dr. Joanne Lupton** first presented on "Evidence-based Systems Application to the Dietary Guidelines Process." She divided her presentation into four parts:

- Description of evidence-based rating systems
- Their importance and use
- How they work
- Adaptation of existing systems to the needs of the DGAC

An evidence-based rating system is a science-based systematic evaluation of the strength of the evidence behind a recommendation, such as how to treat a patient, what diet to recommend, or, in this case, how to modify or adopt a dietary guideline. They are used to

make important decisions based on a review of current science, but value judgments are also necessary. There will never be a perfect amount of information—recommendations must be made all the time with imperfect data. There are many evidence-based rating systems. The Agency for Healthcare Research and Quality (AHRQ) evaluated many of those currently in use in 2002.

An evidence-based rating system works through this process:

- Define the question/statement
- Collect all relevant studies
- Evaluate each study independently for its type and quality
- Rate the strength of the body of evidence
- Report the strength of the science and make a recommendation (which is what the DGAC must do).

For example, if it was proposed to add *trans* fat to the current Guideline that states that people should choose a diet low in saturated fat and cholesterol, then the Committee would have to choose a testable statement and review the data to see if the evidence were as strong for *trans* fat as for saturated fat and cholesterol.

Issues involved would be whether to revisit studies or rely on such authoritative statements as the IOM report at face value. The Committee would also have to decide whether to use only studies conducted since the last authoritative statement and whether to limit the types of studies used (e.g., exclude animal or in vitro studies, or studies not in English). Once the Committee makes these decisions, the staff could do a literature search.

Data are extracted from the studies and put in tabular form, after the Committee has decided which data should be extracted. Staff, if possible, would do the data extraction for the Committee's evaluation.

Studies would be rated based on their type, from a randomized controlled clinical trial (an "A") to a cross-sectional study (a "D"). The quality would be based on agreed-upon criteria, and each study's evidence assigned a +, -, neutral, or N/A. AHRQ has identified various generic systems to rate study quality. AHRQ has also identified seven systems that fully address quality, quantity, and consistency in rating the strength of the evidence. Grades could be assigned from Good (strong design, clinically important and consistent, adequate statistical power), to Fair, to Limited.

The end product would be a statement on diet and health with a rating of the scientific evidence behind the statement. It would be a clear and transparent demonstration of which research studies were evaluated to provide the rating, with evidence tables that show the rigor of the evaluation.

**Dr. Lawrence Appel** presented "A Systematic Approach to Scientific Review" and noted that there would be some overlap with Dr. Lupton's presentation.

Rating schemes, he said, work well with medical therapies but sometimes there is imperfect evidence associated with prevention. Although the “gold standard” of studies is experimental, the fact is that studies are often done for different reasons and, thus, are designed differently. For example, a randomized, controlled trial may not be the best way to estimate prevalence since there are very few randomized trials that actually sample a population. The U.S. Preventive Services Task Force presented a hierarchy of evidence, from expert opinion as the weakest to a randomized trial as the strongest (meta-analyses were not included). In the IOM Evolving Science Committee related to dietary supplements, a hierarchy of evidence was also created. The NIH Consensus Statements assign a “D” to consensus of opinion up to an “A” for substantial number of well-designed trials. However, in looking at the studies that exist for the Dietary Guidelines, there might not be a lot of A’s, or even B’s. Much of the literature will be trials with surrogate outcomes and observational studies.

Dr. Appel noted that the most acceptable outcome variable for decision making is total mortality. Everything below that would be considered a surrogate outcome; the Committee would have to decide which surrogate outcomes it will accept. It depends on how rigorous a basis is desired. There are relatively few trials with clinical outcomes as compared to observational studies and trials with surrogate outcomes. For example, we know that reduced weight leads to lowered blood pressure, and that lower blood pressure leads to fewer coronary heart disease events. However, there are not studies that link weight directly with CHD.

Other issues for the DGAC to consider:

- Should we do independent literature searches or augment the DRI reports?
- Should we compile evidence tables or just refer to selected tables in the DRI reports or other reviews?
- Should we conduct literature searches on topics not well covered in the DRI reports, such as dietary patterns?

### *Next Steps*

Dr. King thanked the presenters and referred DGAC members to Tab 7 of their notebooks, which contained a suggested approach to the review of evidence. She noted that an organized literature review would lead to more confidence in the recommendations, but that there are limited time and resources available. Thus, the question comes down to what would be the most meaningful activity.

Dr. Lupton suggested that the DGAC define the questions it wants answered very clearly. The subcommittees could make suggestions to take to the full committee. Philosophical decisions on how far back to go in a literature search are important, so that time is not wasted searching for studies that will not be used. Dr. Pi-Sunyer suggested looking up previous evidence-based reports, such as the DRI, and then bridging the gap between when those end and the present. Most topics have been addressed by some group (e.g., DRI, NIH, professional societies), noted Dr. Appel, and the DGAC’s role is to make sure that there is evidence to cite and that additional evidence is updated as needed. There will be more questions on some issues than

others. It was agreed that the DGAC could use the evidence tables of other groups without necessarily relying on their conclusions.

Dr. King summed up that the DGAC would divide into Subcommittees. Each Subcommittee would bring one or two clear proposed changes or questions to the next meeting for which they think the DGAC would need an evidence-based search. The challenge for each Subcommittee is to predict the most important issues. The search would start with already conducted systematic reviews, and then address the literature since that review was written (as opposed to published). The third step would be for staff to collect the literature and summarize it in a table.

Dr. King directed the DGAC members to Tab 7 for a potential template to summarize the literature and asked for comments. The template includes columns for—

- Reference
- Study design methods
- Independent variable
- Dependent variable
- Covariates
- Special populations
- Results
- Weakness or strength of evidence
- Sponsor of the work

It was suggested that columns for sample size and duration of the intervention be added, and that study method needs to be well defined. Dr. King asked Dr. Lupton and Dr. Appel to work with staff to modify the template. In terms of training to rate the evidence, Dr. Lupton said that extracting the information should not be that difficult.

The role of public comment to the DGAC was then addressed. Dr. Hentges felt it necessary to consult counsel to ensure that the correct procedures are followed for notifying the public of the opportunity. After some discussion it was agreed that, if feasible, public testimony would be scheduled for the next DGAC meeting. The January meeting would also provide time for discussion about how to evaluate the body of evidence as a group and each Subcommittee would present several questions. Staff in the meantime would begin to do literature and systematic reviews. Dr. Appel noted that the hierarchy of evidence relates to clinical models and that looking at prevention might mean having evidence ranked from a ‘B’ or ‘C’ study in terms of design (e.g., not a randomized trial).

It was discussed how to deal with each Subcommittee’s issues beyond the one or two major questions to present to the whole Committee. Some prioritization is necessary, with perhaps a look at previous research. If there seems to be information needed that is not in the literature that staff might be able to provide, this needs to be identified soon. If there are more issues than the staff can address, then other processes may need to be used, such as the DGAC members carrying out their own searches.

Dr. King proposed organizing the Subcommittees around the same topics as the presentations of the past two days. She divided the DGAC as follows:

- Nutrient Adequacy and Life Cycle Needs: C. Weaver, lead; Y. Bronner, V.L.W. Go, T. Nicklas
- Food Safety: F. Clydesdale, lead; C. Camargo, C. Weaver
- Fluid and Electrolytes: L. Appel, lead; B. Caballero, R. Pate, C. Weaver
- Ethanol: C. Camargo, lead; L. Appel, P. Kris-Etherton
- Carbohydrates: J. Lupton, lead; F. Clydesdale, R. Pate, X. Pi-Sunyer
- Fatty Acids: P. Kris-Etherton, lead; C. Camargo, V.L.W. Go, T. Nicklas
- Energy Balance and Weight Maintenance: X. Pi-Sunyer, lead; L. Appel, B. Caballero, R. Pate
- Dr. Bronner will also work on crosscutting issues specific to the life cycle.

### *Next Meeting*

Subcommittees should also identify individuals who might provide expert presentations at the January meeting, which might take two-thirds or up to a full day. Several hours would be set aside for public comment. There will be a discussion on how to review the bodies of evidence and each Subcommittee would report back to the entire DGAC on questions to be answered and their priority. The staff, in the meantime, would begin the literature searches.

After some discussion about the location of the next meeting, Washington, D.C. was decided upon to facilitate participation by the public and by government staff.

Dr. Hentges thanked the DGAC on behalf of Dr. Beato and Mr. Bost. The Co-Executive Secretaries expressed that they were looking forward to working with the DGAC on the Dietary Guidelines and invited the members to contact them for any background reports needed. In the meantime, they will forward relevant reports and public comment to all members.

Dr. King thanked the Committee members for their work and adjourned the meeting.

(Adjournment: 3:48)