Part C. Methodology

Committee Appointment

Beginning with the 1985 edition, the US Department of Agriculture (USDA) and US Department of Health and Human Services (HHS) have appointed a Dietary Guidelines Advisory Committee (DGAC) of prominent experts in nutrition and health to assist in preparing the Dietary Guidelines for Americans. This Committee has been an effective mechanism for obtaining a comprehensive review of the science, recommendations from experts, and broad public acceptance of the Dietary Guidelines. The 2010 DGAC was established for the single, time-limited task of reviewing the 2005 edition of *Nutrition and Your Health: Dietary Guidelines for Americans* and determining whether, on the basis of current scientific and medical knowledge, revision was warranted. The Committee determined that a revision was needed and developed nutrition and health recommendations in this Advisory Report to the Secretaries of USDA and HHS. The Committee was dissolved upon delivery of this report.

Nominations were sought from the public through a Federal Register notice published on April 10, 2008. Prospective members of the DGAC were expected to be knowledgeable about current scientific research in human nutrition and chronic disease, and be respected and published experts in their fields. They would be familiar with the purpose, communication, and application of the Dietary Guidelines and have demonstrated interest in the public's health and well-being through their research and educational endeavors. Expertise was sought in specific specialty areas, including, but not limited to, the prevention of chronic diseases (e.g., cancer, cardiovascular disease, type 2 diabetes, obesity, and osteoporosis), energy balance (including physical activity), epidemiology, food safety and technology, general medicine, gerontology, nutrient bioavailability, nutrition biochemistry and physiology, nutrition education, pediatrics, public health, and evidence review methodology.

The Secretaries of USDA and HHS jointly selected individuals for membership to the 2010 DGAC. The chosen individuals are highly respected by their peers for their depth and breadth of scientific knowledge of the relationship between dietary intake and health in all relevant areas of the current Dietary Guidelines.

To ensure that recommendations of the Committee took into account the needs of the diverse groups served by USDA and HHS, membership included, to the extent practicable, individuals with demonstrated ability to represent minorities, women, and persons with disabilities. Efforts were made to ensure equitable geographic distribution and racial, ethnic, and gender representation. Appointments were made without discrimination on the basis of age, race and ethnicity, gender, sexual orientation, disability, or cultural, religious, or socioeconomic status. Equal opportunity

practices, in line with USDA and HHS policies, were followed in all membership appointments to the Committee.

Charge to the 2010 Dietary Guidelines Advisory Committee

The Dietary Guidelines for Americans provide science-based advice for Americans, ages 2 years and older, in order to promote health and to reduce the risk of major chronic diseases through diet and physical activity.

The Dietary Guidelines form the basis of Federal nutrition policy, nutrition standards, nutrition programs, and nutrition education for the general public and are published jointly by USDA and HHS every 5 years.

The charge to the Dietary Guidelines Advisory Committee, whose duties were time-limited and solely advisory in nature, was as follows:

- Inform the Secretaries of both Departments if no changes to the *Dietary Guidelines for Americans*, 2005 are warranted. This action will disband the DGAC.
- Inform the Secretaries of both Departments if changes are warranted, based on the preponderance of the most current scientific and medical knowledge, and determine what issues for change need to be addressed.
- Place their primary focus on the review of scientific evidence published since the last DGAC deliberations.
- Place their primary emphasis on the development of food-based recommendations.
- Prepare and submit a report of technical recommendations with rationales to the Secretaries. DGAC responsibilities do not include translating the recommendations into a policy or communications document.
- Disband upon the submittal of the Committee's recommendations via the *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010*.

The Committee Process

The 13-member Committee served without pay and worked under the regulations of the Federal Advisory Committee Act (FACA). The Committee held six public meetings in Washington, DC over the course of 1½ years. Meetings were held in October 2008; January, April, and November 2009; and April and May 2010. Members of the general public were able to attend the Committee's first two meetings in person in Washington DC. For the remaining meetings, members

of the public were able to participate by webinar. All meetings were announced in the *Federal Register*. Meeting minutes and transcripts were posted for each meeting at www.dietaryguidelines.gov. Archived recordings of the third through sixth meetings were made available at www.dietaryguidelines.gov. All documents pertaining to Committee deliberations were made available for public viewing at the first two meetings, and thereafter, were made available through www.dietaryguidelines.gov and at the National Agricultural Library Reference Desk.

Written public comments were received throughout the Committee's deliberations through a newly developed electronic database designed for collecting public comments. This database allowed for the generation of public comment reports as a result of a query by key topic areas. Comments received on and before April 29, 2010, were compiled into these reports and shared with all Committee members. A general description of the types of comments received and the process used for collecting public comments is described in ***Appendix E-5. Public Comments***. Comments can be viewed by the public at www.dietaryguidelines.gov. In response to a solicitation for oral comments, 51 of the 58 organizations or individuals who registered presented oral testimony during the January 29-30, 2009, meeting of the Committee. These comments are summarized in the January Public Meeting Minutes at www.dietaryguidelines.gov.

The Committee used a newly developed, state-of-the-art, web-based electronic system and methodology to address the majority of the science-based research questions posed by the Committee. These reviews are publicly available in the Nutrition Evidence Library (NEL) at www.nutritionevidencelibrary.com. Remaining questions were answered by data analyses, modeling analyses, and consideration of other evidence-based reviews or existing reports, such as the 2008 edition of the *Physical Activity Guidelines for Americans*. Topic areas that were addressed for this report were similar to those for the 2005 Dietary Guidelines, but this new methodology and web-based system allowed the Committee to ask and process more questions in a systematic, transparent, evidence-based way. These research questions were developed and assessed by seven subcommittees: Energy Balance and Weight Management; Nutrient Adequacy; Fatty Acids and Cholesterol; Carbohydrates and Protein; Sodium, Potassium, and Water; Alcohol (initially called Ethanol); and Food Safety and Technology. One main difference from 2005 was that protein was added as a topic area, thus resulting in the Carbohydrates and Protein subcommittee. Food technology was also added as a topic area and was incorporated into the Food Safety and Technology subcommittee. Each subcommittee was made up of three to five Committee members, with one Committee member appointed as the lead. Although the lead member was responsible for communicating and coordinating all the work that needed to be accomplished within the subcommittees, draft conclusions reached on the scientific evidence reviewed, ultimately reflected the consensus of the entire Committee.

Subcommittees met regularly and communicated by conference calls, webinars, e-mail, and face-to-face meetings. Each subcommittee was responsible for presenting the basis for its draft conclusions and recommendations to the full Committee within a public forum, responding to questions, and making changes if indicated. To gain perspective for interpreting the science, some subcommittees invited experts to respond to specific questions during conference calls. The full Committee also heard presentations at the public meetings from five invited outside experts. These experts addressed questions posed by the Committee in advance and responded to additional questions during the meetings.

The Committee members were supported by USDA's Designated Federal Officer, who led the administrative effort for this revision process and served as one of four Co-executive Secretaries (two from USDA and two from HHS). Support staff for managing Committee operations consisted of 12 USDA and HHS Dietary Guidelines Management Team members and 10 NEL Team members, including a research librarian. Each subcommittee included a primary and secondary Dietary Guidelines Management Team member as well as a primary and secondary NEL Team member.

In addition to the seven topical subcommittees, the DGAC included a Science Review subcommittee, similar to that formed for the 2005 DGAC. The main focus of this four-member subcommittee was to provide oversight to the whole DGAC process, an especially important function given the shift to a systematic and transparent evidence-based review process using the newly developed NEL. Additional roles included providing guidance on overlapping and cross-cutting issues and determining the final report structure and format. As the review of the science progressed, the Science Review subcommittee meetings were opened to subcommittee Chairs and eventually to other Committee members during times when cross-cutting topics were placed on the agenda. In order to adhere to FACA guidelines, full Committee participation was not allowed, except in cases where the meeting was strictly administrative in nature and was held for purposes of information sharing only.

Reflecting the DGAC subcommittee structure, the bulk of the report consists of eight science-based chapters that review the evidence on these major topic areas. In addition, throughout their deliberations, the Committee considered issues related to overall dietary patterns and the need for synthesizing and integrating findings from individual diet and nutrition topic areas. As a result, the Committee included two additional chapters—***Part B. Section 2. The Total Diet: Combining Nutrients, Consuming Food*** and ***Part B. Section 3. Translating and Integrating the Evidence: A Call to Action***.

Systematic Review of the Scientific Evidence

In 2005, USDA and HHS committed to using an evidence-based, systematic review methodology to support development of the 2010 DGAC Report. This rigorous, transparent methodology, designed to minimize bias, enables the Departments to comply with the Data Quality Act, which mandates that the government ensure the quality, objectivity, utility, and integrity of information used to form Federal guidance.

Science leaders from the Agency for Healthcare Research Quality (AHRQ), the US Cochrane Collaboration, and the American Dietetic Association assisted in developing the NEL systematic review methodology. NEL nutritionists and systematic review methodologists helped Committee members execute the systematic review and synthesize the evidence in its DGAC Report.

DGAC members developed the NEL systematic review questions, created a literature search protocol (called the search and sort plan) for each question, and approved all completed search and sort lists. Trained Evidence Abstractors (National Service Volunteers) systematically abstracted published articles and evaluated the methodological rigor of each study. NEL staff conducted quality reviews of these materials and developed evidence portfolios with summary paragraphs and evidence tables to assist the committee in synthesizing the evidence. Based on the evidence portfolio, Committee members developed evidence summaries and conclusion statements, graded each conclusion, and described these findings in the DGAC report. The complete evidence portfolio for each NEL systematic review question is available in the USDA Nutrition Evidence Library, which can be accessed at www.nutritionevidencelibrary.com. These steps are described in greater detail in the following sections.

Question Development

Each DGAC subcommittee generated a list of topic areas to explore to update the 2005 Dietary Guidelines. These lists were based on the evolution of the science, public comment received, and whether controversy existed about a given topic or guideline. After developing an initial list of research questions, the subcommittees set priorities for questions to be answered using the NEL systematic review methodology. The wording and intent of specific questions evolved and additional questions were considered in an iterative process. Frequently, multiple questions were needed to fully address a topic of interest. This cluster of questions was referred to as a "family of questions." Limitations in time and resources prevented the review of all questions using the NEL systematic review methodology.

As needed, NEL staff conducted exploratory literature searches and developed analytical frameworks to assist Committee members in framing NEL systematic review questions. The scope

of topic areas addressed was very broad, so subcommittee members were required to make critical decisions related to the comprehensiveness of reviews, such as determining literature search date ranges. Any available systematic reviews (e.g. 2009 AHRQ report *Vitamin D and Calcium: A Systematic Review of Health Outcomes*) or reports based on systematic reviews (e.g. *Physical Activity Guidelines Advisory Committee Report, 2008*) that were deemed to be current and comprehensive representations of available literature were not duplicated by the NEL team. Results from the 2007 *World Cancer Research Fund/American Institute for Cancer Research; Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective* report were used to substantiate recommendations related to food, nutrient, and diet intake and cancer-related outcomes.

Literature Search and Sort Plans

A method, referred to as PICO, was used to identify the **P**opulation or Participants, **I**ntervention (or Exposure in observational studies), **C**omparator, and **O**utcomes of interest to be addressed by a specific question or family of questions. The PICO method aided the generation of a literature search and sort plan, which defined the eligibility criteria for studies selected for inclusion in each systematic review. All searches were limited to human studies, developed countries, English language, and peer-reviewed publications. Unpublished data, including abstracts and conference proceedings, were not included. A brief explanation of the rationale behind the chosen search strategy for specific topics and questions is presented in the Methodology section in each chapter in ***Part D. Science Base***. General eligibility criteria included factors, such as:

- Age
- Health status of subjects (inclusion of subjects with type 2 diabetes or other prevalent chronic diseases varied by topic)
- Study setting
- Number of subjects per study arm (typically a minimum of 10 subjects per study arm)
- Attrition rate (typically less than 20 percent; rate was modified for long-term studies)
- Characteristics of the intervention (e.g., dose or duration of intervention, food based nutrients)
- Outcome measures and timing of measures
- Study design

The subcommittees tailored inclusion and exclusion criteria by question or family of questions. Each subcommittee carefully considered the date range from which to extract the evidence, based

upon whether the systematic review was designed to update 2005 Dietary Guidelines, update a comprehensive systematic review, or examine an area not previously addressed by the Dietary Guidelines. Many searches initially included all study designs. However, for a number of questions, cross-sectional studies were eventually excluded from review when sufficient evidence from studies with a stronger design was available.

Existing systematic reviews were frequently incorporated into the portfolio of evidence used to answer a question. Comprehensive systematic reviews, with well-documented methodology and rigorous criteria for judging methodological quality of included studies and grading the body of evidence, were occasionally selected to serve as a baseline for a review in cases where the seminal research on a question was considered to be "settled science." Numerous published systematic reviews conducted by the American Dietetic Association were updated for this report, using DGAC criteria.

The committee used an iterative, step-wise process to determine which research designs were considered to examine a question. Study designs included intervention trials, observational studies, ecological studies, systematic reviews, and meta-analyses. If systematic reviews were used, primary studies included in these reviews were excluded. If multiple systematic reviews considered an overlapping body of primary studies, this was noted in the evidence summary.

Each search and sort plan specified the databases and search terms used to guide the search. PubMed/Medline and the Cochrane Database of Systematic Reviews were searched for all of the NEL systematic review questions, supplemented by BIOSIS, CAB Abstracts, Food Science & Technology Abstracts, Scopus, ScienceDirect, Embase, Aquatic Sciences and Fisheries Abstracts, Fish and Fisheries Worldwide, and AGRICOLA, as dictated by the question topics. A wide variety of search terms and key words were used, including subject headings such as MeSH and thesauri terms. Because some databases do not have full text search capabilities, key word/subject terms searches were limited to certain fields (e.g., titles and abstracts), which may have limited identification of potentially relevant articles.

Electronic searches were augmented by hand searches of references from primary and review articles, as well as articles identified for consideration by committee members. If new search terms were identified, the electronic searches were rerun to ensure completeness of the search. The Committee monitored the search process including review of the search terms and results. The search was expanded or modified based on their feedback and knowledge of the field.

Selecting the Evidence

The literature search plan was implemented collaboratively by the research librarian, the NEL nutrition scientist staff, and the DGAC members. The research librarian conducted a title screen and identified abstracts to be reviewed by the NEL staff. All abstracts identified by the research librarian were evaluated by the NEL staff, in accordance with criteria outlined in the search and sort plan. Articles that potentially met the eligibility criteria were reviewed in full-text version. Two lists were compiled for review by subcommittee members: a list of citations meeting the inclusion criteria and a list of citations recommended for exclusion (with the specific rationale for exclusion noted). When an article could not be clearly included or excluded based on the eligibility criteria, it was highlighted for subcommittee review.

Once the subcommittee reached agreement on the final list of articles to be included in the review, the NEL staff assigned each included manuscript to a National Service Volunteer to prepare an evidence worksheet. Information on the search terms used, search date, number of included and excluded citations identified by the search, final list of included citations, and a table with the excluded citations, including reason for exclusion, are provided in the NEL, at www.nutritionevidencelibrary.com.

Critical Review of Studies

National Service Volunteers, a cadre of highly qualified nutrition and health professionals, were trained and served as evidence abstractors to support the systematic review process. They: 1) classified the study by design type, 2) extracted key evidence from each individual study into a comprehensive, templated evidence worksheet (made available to committee members and posted on the NEL), and 3) applied predefined criteria from a Research Design and Implementation Checklists for each primary research study and review study to critically appraise the methodological quality of the study. Evidence abstractors received training on how to apply the criteria to studies differing in design.

Each study received a quality rating of positive, neutral, or negative, based upon a predefined scoring system (these quality grades are available for each article in the NEL). In the chapter text, for clarity these ratings are described as studies which are methodologically strong (positive), methodologically neutral (neutral), and methodologically weak (negative). The appraisal of study quality is a critical component of the systematic review methodology because in a highly transparent manner, it indicates the Committee's judgment regarding the relevance (external validity/generalizability) and validity of each study's results. This rating, referred to as the "quality rating" indicates the extent to which the design and conduct of a study is shown to be protected from systematic bias, nonsystematic bias, and inferential error (Lohr, 2004). Studies were not

excluded on the basis of quality rating. However, the quality rating was taken into consideration by the DGAC as they reviewed the literature and formed conclusions.

Summaries of the Evidence

NEL staff drafted evidence summary paragraphs and evidence tables for all included articles on a question or family of questions to aid analysis and synthesis of the complete body of evidence. These paragraphs and tables provided key information about the study design, quality rating, study subjects, the intervention or exposure, comparators, and key outcomes. Using this information, and going back to the original articles when necessary, Committee members then drafted an evidence overview summary, which included an overall summary statement, comparison of findings between studies, discussion of relevant issues related to methodologies used, and definitions.

Formulating and Grading the Conclusion Statement

The final step in the DGAC's systematic review process was writing and grading a Conclusion statement, based upon the body of scientific evidence evaluated. This step was characterized by careful consideration of the qualitative and quantitative findings. Each Conclusion statement briefly answered the research question, focusing on the general agreement among studies. When the evidence addressed only one sex, age group, ethnicity, or level of health risk, such as children or subjects without cardiovascular disease, this was reflected in the Conclusion statement. Conclusions also included a statement regarding distinct subgroups, if findings for that population were different than for the overall conclusion.

Developing and grading each Conclusion was a deliberative and time-consuming process that benefited from group interaction. The strength of the evidence supporting the conclusion statement was graded using the DGAC's predetermined criteria (outlined in Table C1), which assessed the quality (relevance and validity) and size of the studies, the quantity of studies, the consistency and agreement across studies, the generalizability to the population of interest, and the magnitude of the effect or public health impact. Each subcommittee deliberated on each Conclusion statement and grade, and proposed Conclusions and grades were then brought to the full Committee for consideration and discussion. Due to the challenge of grading such a broad range of conclusions within one report, the Committee decided to use the following qualitative word grades rather than numerical grades: Strong; Moderate; Limited; Expert Opinion; Grade Not Assignable.

For some research questions, the DGAC's systematic review generated recommendations for future research.

Table C1. 2010 DGAC Conclusion Grading Chart used to grade the strength of the body of evidence supporting conclusion statements

Elements	Strong	Moderate	Limited	Expert Opinion Only	Grade Not Assignable
Quality • Scientific rigor and validity • Study design and execution	Studies of strong design Free from design flaws, bias, and execution problems	Studies of strong design with minor methodological concerns OR only studies of weaker study design for question	Studies of weak design for answering the question OR inconclusive findings due to design flaws, bias, or execution problems	No studies available Conclusion based on usual practice, expert consensus, clinical experience, opinion, or extrapolation from basic research	No evidence that pertains to question being addressed
Consistency • Consistency of findings across studies	Findings generally consistent in direction and size of effect or degree of association, and statistical significance with minor very exceptions	Inconsistency among results of studies with strong design, OR consistency with minor exceptions across studies of weaker design	Unexplained inconsistency among results from different studies, OR single study unconfirmed by other studies	Conclusion supported solely by statements of informed nutrition or medical commentators	NA
Quantity • Number of studies • Number of study participants	One large study with a diverse population or several good quality studies Large number of subjects studied Studies with negative results have sufficiently large sample size for adequate statistical power	Several studies by independent investigators Doubts about adequacy of sample size to avoid Type I and Type II error	Limited number of studies Low number of subjects studied and/or inadequate sample size within studies	Unsubstantiated by published research studies	Relevant studies have not been done
Impact • Importance of studied outcomes • Magnitude of effect	Studied outcome relates directly to the question Size of effect is clinically meaningful Significant (statistical) difference is large	Some doubt about the statistical or clinical significance of the effect	Studied outcome is an intermediate outcome or surrogate for the true outcome of interest OR size of effect is small or lacks statistical and/or clinical significance	Objective data unavailable	Indicates area for future research
Generalizability • Generalizability to population of interest	Studied population, intervention and outcomes are free from serious doubts about generalizability	Minor doubts about generalizability	Serious doubts about generalizability due to narrow or different study population, intervention or outcomes studied	Generalizability limited to scope of experience	NA

Use of the USDA Food Patterns for Special Analyses

The 2010 DGAC identified specific questions that they felt could best be addressed through a food pattern modeling approach, using the USDA food patterns and the modeling process developed to address similar requests by the 2005 DGAC.

Briefly, the USDA food patterns describe types and amounts of food to consume that will provide a nutritionally satisfactory diet. They include recommended intakes for five major food groups and for subgroups within several of the groups. They also recommend an allowance for intake of oils and limits on intake of calories from solid fats and added sugars. The calories and nutrients that would be expected from consuming a specified amount from each component of the patterns are determined by calculating nutrient profiles. A nutrient profile is the consumption-weighted average nutrient content for nutrient-dense forms of foods within each group. These nutrient profiles can be modified based on the assumptions for each food pattern modeling analysis. Additional details on the USDA food patterns can be found in the report for the food pattern modeling analysis, *Adequacy of the USDA Food Patterns*, which is available at www.dietaryguidelines.gov.

The USDA food patterns were originally developed in the 1980s (Cronin, 1987; Welsh, 1993), and were substantially revised and updated in 2005, concurrent with the development of the 2005 Dietary Guidelines (Britten, 2006a). The 2005 updates included use of nutrient goals from the Institute of Medicine *Dietary Reference Intakes* reports that were released from 1997 to 2004 (IOM, 1997, 1998, 2000, 2001, 2002, 2004). The developmental process and the food patterns resulting from the 2005 update have been documented in detail (Britten, 2006a; Marcoe, 2006).

A food pattern modeling process was developed for and used by the 2005 DGAC to determine the hypothetical impact on nutrients in and adequacy of the food patterns when specific changes are made. The structure of the USDA food patterns allows for modifications that test the overall impact on diet quality of various dietary recommendation scenarios. Most analyses involved identifying the impact of specific changes in amounts or types of foods that might be recommended by the Committee or selected by consumers. For example, subcommittees requested analyses to obtain information on the potential impact of consumers selecting only lacto-ovo vegetarian choices, eliminating legumes, or choosing varying levels of fat as a percent of calories (DGAC, 2004). The use of food pattern modeling analyses for the 2005 DGAC has been documented (Britten, 2006b; Nicklas, 2005; Weaver, 2005).

Five 2010 DGAC subcommittees identified a total of 18 questions that they felt could be addressed through food pattern modeling. Several questions were merged or dropped, resulting in 12 modeling analyses that were completed and provided as reports to the relevant subcommittees. For each question, a specific approach was drafted by USDA staff and provided to the

subcommittee for comment. After the approach was discussed and accepted, USDA staff completed the analytical work and drafted a full report for the subcommittee's consideration. Each report was discussed by the relevant subcommittee, and the analysis and report were revised as needed. The food pattern modeling analyses conducted for the DGAC are listed in Table C2. Full reports for each analysis are available online at www.dietaryguidelines.gov; summary discussions are provided in relevant chapters of the DGAC report, as shown in the Table.

Table C2. Food pattern modeling analyses conducted for the 2010 DGAC

Topic and Question	Addressed in
E3.1 Adequacy of the USDA Food Patterns How well do the USDA food patterns, using updated food intake and nutrient data, meet IOM and potential DG 2010 nutrient recommendations?	Part B.2: The Total Diet: Combining Nutrients, Consuming Foods
E3.2 Realigning Vegetable Subgroups What revisions to the vegetable subgroups may help to highlight vegetables of importance and allow recommendations for intake levels that are achievable, without compromising the nutrient adequacy of the patterns?	Part B.2: The Total Diet: Combining Nutrients, Consuming Foods
E3.3 Vegetarian Food Patterns How well do plant-based or vegetarian food patterns, adapted from the USDA food patterns, meet IOM and potential DG 2010 nutrient recommendations?	Part B.2: The Total Diet: Combining Nutrients, Consuming Foods
E3.4 Starchy Vegetables How do the nutrients provided by the starchy vegetable subgroup compare with those provided by grains and those provided by other vegetable subgroups? How would nutrient adequacy of the patterns be affected by considering starchy vegetables as a replacement for some grains rather than as a vegetable subgroup?	Part D.2: Nutrient Adequacy
E3.5 "Typical Choices" Food Patterns What is the impact on caloric and nutrient intake if the USDA food patterns are followed but typical rather than nutrient-dense food choices are made?	Part B.2: The Total Diet: Combining Nutrients, Consuming Foods
E3.6 Milk Group and Alternatives What is the impact on nutrient adequacy (1) if no milk or milk products were consumed, (2) if calcium was obtained from nondairy sources or fortified foods, and (3) if more fluid milk and less cheese were consumed?	Part D.2: Nutrient Adequacy
E.3.7 Replacing all Non-Whole Grains with Whole Grains What is the impact on intake of folate and other nutrients if all recommended grain amounts are selected as whole grains rather than half whole and half nonwhole grains?	Part D.2: Nutrient Adequacy
E3.8 Cholesterol What is the impact on food choices and overall nutrient adequacy of limiting cholesterol to less than 200 mg per day?	Part D.3: Fatty Acids and Cholesterol

Table C2 (continued). Food pattern modeling analyses conducted for the 2010 DGAC

Topic and Question	Addressed in
E3.9 Reducing Cholesterol-Raising Fatty Acids What is the impact on food choices and overall nutrient adequacy of limiting cholesterol-raising (CR) fatty acids to less than 7% of total calories and to less than 5% of total calories, with CR fatty acids operationalized as total saturated fatty acids minus stearic acid?	Part D.3: Fatty Acids and Cholesterol
E3.10 Seafood What is the impact on nutrient adequacy of increasing seafood in the USDA food patterns to (1) 4 ounces per week of seafood high in n-3 fatty acids, (2) 8 ounces per week of seafood in proportions currently consumed, and (3) 12 ounces per week of seafood low in n-3 fatty acids?	Part D.3: Fatty Acids and Cholesterol
E3.11 Sodium What would the sodium levels of the USDA food patterns be (1) using current patterns, (2) using "typical choices" patterns, and (3) using only low sodium and no-salt-added foods?	Part D.6: Sodium, Potassium, and Water
E3.12 Potassium What are the potassium levels in the USDA food patterns, in comparison to current consumptions and DASH diet levels, in absolute amounts, adjusted for energy intake, and as a ratio of sodium to potassium? How would potassium levels of the USDA food pattern change if current levels of coffee and tea intake were included?	Part D.6: Sodium, Potassium, and Water

Chapter Summary

The Committee used conclusions from the NEL systematic review as the primary means to answer their research questions. These Conclusion statements were integrated with results from food modeling analyses, reviews of reports from expert groups, dietary intake analyses, presentations by expert consultants, established nutrition science knowledge, and/or expert opinion of the DGAC and the broader scientific community to inform the development of the Committee's Implications statements. The Implications statements are an extension of the NEL Conclusion statements that lay out the overarching conclusion that the Committee has drawn about the question.

References

American Dietetic Association, Scientific Affairs and Research. ADA Evidence Analysis Manual Adapted for the USDA Evidence Analysis Library. American Dietetic Association: Chicago, IL, 2008.

Britten P, Lyon J, Weaver C, Nicklas T, Kris-Etherton P, Weber J, Marcoe K, Davis C. MyPyramid food intake pattern modeling for the Dietary Guidelines Advisory Committee. *J Nutr Ed Behav.* 2006b;38(6 Supple):S143-S52.

Britten P, Marcoe K, Yamini S, Davis C. Development of food intake patterns for the MyPyramid Food Guidance System. *J Nutr Ed Behav.* 2006a;38(6 Suppl):S78-S92.

Cronin F, Shaw A, Krebs-Smith S, Marsland P, Light L. Developing a food guidance system to implement the Dietary Guidelines. *J Nut Educ.* 1987;19:281-302.

Dietary Guidelines Advisory Committee. *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2005*. Washington DC: US Department of Agriculture, Agricultural Research Service, August 2004.

Institute of Medicine. *Dietary reference intakes for calcium, phosphorus, mangesium, vitamin d, and fluoride.* Washington DC: National Academies Press, 1997.

Institute of Medicine. *Dietary reference intakes for thiamin, riboflavin, niacin, vitamin b6, folate, vitamin b12, pantothenic acid, biotin, and choline.* Washington DC: National Academies Press, 1998.

Institute of Medicine. *Dietary reference intakes for vitamin c, vitamin e, selenium, and carotenoids.*Washington DC: National Academies Press, 2000.

Institute of Medicine. *Dietary reference intakes for vitamin a, vitamin k, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc.* Washington DC: National Academies Press, 2001.

Institute of Medicine. *Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids.*Washington DC: National Academies Press, 2002.

Lohr, K. Rating the strength of scientific evidence: relevance for quality improvement programs. *Int J Qual Health Care.* 2004;16:9-18.

Institute of Medicine. *Dietary reference intakes for water, potassium, sodium, chloride, and sulfate.*Washington DC: National Academies Press, 2004.

Marcoe K, Juan WY, Yamini E, Carlson A, Britten P. Development of food group composites and nutrient profiles for MyPyramid Food Guidance System. *J Nutr Ed Behav.* 2006;38(6 Suppl):S93-S107.

Nicklas TA, Weaver C, Britten P, Stitzel KF. The 2005 Dietary Guidelines Advisory Committee: Developing a key message. *J Am Diet Assoc.* 2005;105(9):1418-24.

Weaver C, Nicklas T, Britten P. The 2005 Dietary Guidelines Advisory Committee Report: Achieving nutritional recommendations through food-based guidance. *Nutr Today.* 2005; 40(3):102-7.

Welsh S, Davis C, Shaw A. *USDA's Food Guide: Background and Development.* Washington DC: US Department of Agriculture, Human Nutrition Information Service Misc. Publication 1514, 1993.