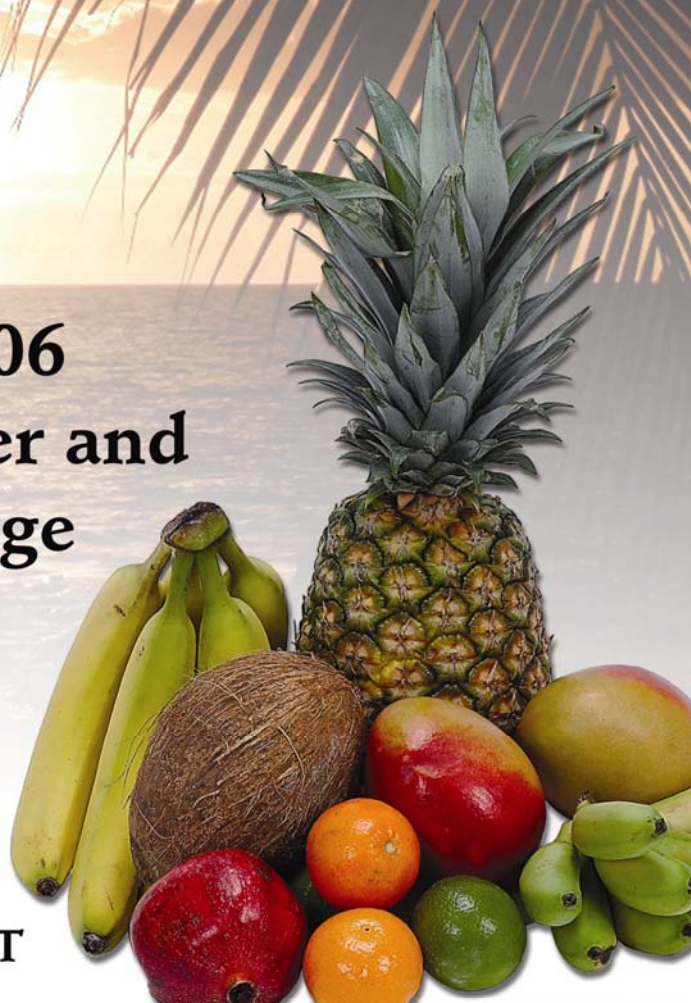# 30th NATIONAL NUTRIENT DATABANK CONFERENCE

THE ROLE OF FOOD COMPOSITION IN IMPROVING DIETETIC PRACTICE

September 18-20, 2006
Hawaii Convention Center and
Hilton Hawaiian Village
Honolulu, Hawaii

PROGRAM AND ABSTRACTS BOOKLET

30th NATIONAL NUTRIENT DATABANK CONFERENCE (NNDC)
THE ROLE OF FOOD COMPOSITION IN IMPROVING DIETETIC PRACTICE

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PROGRAM AND ABSTRACTS BOOKLET

Edited by Jean Pennington
(with assistance from Donna Au, Phyllis Stumbo, and Thea Zimmerman)

Cover art by Kevin Blitz, Honolulu HI

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        The NDP Group, Port Washington NY
        Unilever Foods North America, Englewood Cliffs NJ
        Westat, Rockville MD

MESSAGE FROM THE CONFERENCE CHAIR:

Aloha! Welcome to the beautiful state of Hawaii. This is the 30th time the National Nutrient Databank Conference (NNDC) has been held, but only the first time it has been held in Hawaii. It is also the first time that the NNDC has been held in combination with the American Dietetic Association's (ADA) Food and Nutrition Conference and Exhibition (FNCE), and we look forward to including more members of the dietetics profession in this and future meetings of the NNDC. We appreciate the time and effort by the ADA staff in making this joint meeting a success, particularly Karen Lechowich, Diane Barrera, Carla Lambert, and Esther Meyers. It is fitting that an important milestone has been reached this year, because the first conference, which was held in 1976, in Seattle, Washington, was jointly sponsored by the American Dietetic Association. Thanks also go to the members of the Local Arrangements Committee for their hard work: Donna Au, Rachel Novotny, Caryn Oshira, and Joannie Dobbs. I also appreciate the many talents of the Program Co-Chairs, Jean Pennington and Phyllis Stumbo, who have worked tirelessly to put together such an outstanding program for this year's conference.

<div align="right">Suzanne Murphy, NNDC Conference Chair</div>

MESSAGE FROM THE PROGRAM CO-CHAIRS:

The theme for the 30th NNDC, "The Role of food Composition in Improving Dietetic Practice" developed out of the collaboration between ADA and NNDC and the desire of both groups to provide conference content that would be especially meaningful to Registered Dietitians. The first two NNDC Sessions are open to both FNCE and NNDC attendees and are part of the ADA research track. Sessions I and II cover the importance of food composition data for dietary intake assessment, provide a primer on food sampling and analytical methods, and address how food composition databases must keep pace with the changing food supply and meet the diverse needs of dietitians. Session III offers five presentations on the timely topic of databases for dietary supplements. Session IV addresses new data for foods and food components, and Session V keeps us up to date with advances in database technology. The five presenters in Session VI bring us information on some unique foods of the Pacific. Sessions VII and VIII bring us presentations on data for special population groups and advances in using food composition data for dietary assessment. The last Session covers issues related to analytical methods, data quality, and data variability. The NNDC poster presentations are provided in conjunction with a FNCE poster session and cover topics in four ADA CDR Learning Need Codes.

We offer our thanks to the 45 oral presenters and 17 poster presenters for contributing the results of their research and programs to this Conference. The presenters come from the US, Fiji, Micronesia, Guam, Korea, Italy, Germany, Canada, Australia, and Nigeria. We very much appreciate the time and expertise that they devote to research in food composition and to their willingness to share their information through the NNDC. We thank the Session Co-Chairs and members of the Program Planning Committee for their contribution to the program, and we are especially thankful to Mary Balch, Susie Day, Suzanne McNutt, and Thea Zimmerman, for their reviews of the NNDC abstracts.

<div align="center">Jean Pennington and Phyllis Stumbo, NNDC Program Co-Chairs</div>

30th NATIONAL NUTRIENT DATABANK CONFERENCE
THE ROLE OF FOOD COMPOSITION IN IMPROVING DIETETIC PRACTICE

CONFERENCE PROGRAM

Monday, September 18, 2006
Opening Reception (6:00-9:00 PM), [Hilton Hawaiian Village]

Tuesday, September 19, 2006 [Hawaii Convention Center]
The first day of the 30th NNDC coincides with the last day of FNCE, and NNDC Sessions I and II are organized in line with FNCE research tracks and have been approved by ADA.

SESSION I (7:00-8:30 AM) – FOOD COMPOSITION DATA: THE FOUNDATION OF DIETARY ASSESSMENT
Session CoChairs: Suzanne Murphy, PhD, RD and Phyllis Stumbo, PhD, RD

Welcome (5 min)
>   Suzanne Murphy, PhD, RD, Cancer Research Center of Hawaii (CRCH),
>   University of Hawaii, Honolulu HI
>   Esther Myers, PhD, RD, American Dietetic Association, Chicago IL

Brief History of the NNDC (5 min)
>   Phyllis Stumbo, PhD, RD, University of Iowa General Clinical Research Center,
>   Iowa City IA

The Synergy Between Dietary Assessment and Food Composition Data. Suzanne Murphy, PhD, RD, CRCH, University of Hawaii, Honolulu HI (17 min+3 min Q&A)

Sources of Food Composition Data and Considerations for Use. Jean Pennington, PhD, RD, National Institutes of Health, Bethesda MD (17 min+3min Q&A)

Considerations for Selecting a Dietary Assessment System. Phyllis Stumbo, PhD, RD, University of Iowa General Clinical Research Center, Iowa City IA (17 min+3 min Q&A)

Incorporation of Data into Dietary Assessment Systems. Suzanne McNutt, MS, RD, Westat, Rockville MD (17 min+3 min Q&A)

BREAK (8:30-9:00 AM)

SESSION II (9:00-10:00 AM) – MEETING DIETETIC NEEDS FOR FOOD COMPOSITION DATA
Session CoChairs: Ana Chavez, MS, RD and Thea Zimmerman, MS, RD

What's Behind the Numbers? Statistical Sampling, Joanne Holden, MS, ARS, USDA, Beltsville MD (17 min+3 min Q&A)

What's Behind the Numbers? Analytical Methods, James Harnly, PhD, ARS, USDA, Beltsville MD [unable to attend]

Maintaining Accurate and Current Databases with the Changing Marketplace. Alison Eldridge, PhD, RD, General Mills, Minneapolis MN (17 min+3 min Q&A)

Are Dietitians' Needs for Data Being Met? Beverly McCabe-Sellers, PhD, RD, ARS, USDA, Little Rock AR (17 min+3 min Q&A)

POSTER/EXHIBIT VIEWING (10:10 AM-1:00 PM) [Hawaii Convention Center Exhibit Hall] - Note that exhibits close at 1:00 PM.

SESSION III (1:00-2:30 PM) – DATABASES FOR DIETARY SUPPLEMENTS
Session CoChairs: Donna Au, MPH, RD and Johanna Dwyer, DSc, RD

Development of a Dietary Supplement Database for WINS. Julia Peterson, MS, PhD, Tufts University, Boston MA (18 min)

USDA Dietary Supplement Ingredient Database (DSID): Adult Multivitamin/ Mineral Study. Janet Roseland, MS, RD, LD, Nutrient Data Laboratory, ARS, USDA, Beltsville MD (18 min)

An Approach to Assessing Dietary Supplement Intake for Use in Conjunction with the Collection of 24-Hour Dietary Recalls. Lisa Harnack, DrPH, Nutrition Coordinating Center, University of Minnesota, Minneapolis MN (18 min)

Research Topics for NHANES Dietary Supplement Data. Ana Chavez, MS, RD, National Center for Health Statistics, Centers for Disease Control and Prevention, Hyattsville MD (18 min)

Progress in Developing Dietary Supplement Databases at NIH's Office of Dietary Supplements. Johanna Dwyer, DSc., RD, Office of Dietary Supplements, National Institute of Health, Bethesda MD (18 min)

BREAK (2:30-3:00 PM)

SESSION IV (3:00-4:00 PM) – NEW DATA FOR FOODS AND FOOD COMPONENTS
Session CoChairs: Catherine Champagne, PhD and Susan Gebhardt, MS

Impact of Data from the National Food and Nutrient Analysis Program on the Composition of Highly Consumed Foods. David B Haytowitz, MS, Nutrient Data Laboratory, ARS, USDA, Beltsville MD (15 min)

Dietary Fiber Database Development for the National Health and Nutrition Survey in Korea. Yoonna Lee, PhD, Korea Health Industry Development Institute, Seoul, Korea (15 min)

Analysis of Selected Chemopreventive Agents in Foods Commonly Consumed in Hawaii. Adrian Franke, PhD, Cancer Research Center of Hawaii, Honolulu HI (15 min)

Vitamin and Mineral Content of Tropical Fruit Cultivars Grown in Hawaii. Marisa M Wall, PhD, US Pacific Basin Agricultural Research Service, USDA, Hilo HI (15 min)

BREAK (4:00-4:15 PM)

SESSION V (4:15-5:30 PM) – ADVANCES IN DATABASE TECHNOLOGY AND INFORMATION DISSEMINATION
Session CoChairs: David Haytowitz, MS and Lisa Jahns, PhD, RD

Development of a Self-Administered Automated 24-Hour Dietary Recall (24 hr) for Use in Large-Scale Nutrition Research. Amy Subar, PhD, MPH, RD, National Cancer Institute, NIH, Bethesda MD (15 min)

Development of NOADS: The <u>N</u>HANES (National Health and Nutrition Examination Survey) <u>O</u>nline <u>A</u>nalyst for <u>D</u>ietary <u>S</u>upplements; A Web-Based Tool for Analysis of Total Nutrient Intakes and Their Relation to Biomarkers of Nutritional Status. Mary Frances Picciano, PhD, Office of Dietary Supplements, NIH, Bethesda MD (15 min)

Development and Pilot Testing of an Omega-3 Fatty Acid Food Frequency Questionnaire. Nancy M Lewis, PhD, RD, FADA, University of Nebraska, Lincoln NB (15 min)

Developing an International Nutrient Databank Directory. Elizabeth Braithwaite, MPH, RD, ESHA Research, Salem OR (15 min)

International Activities in Food Composition. Barbara Burlingame, PhD, FAO, Rome, Italy (15 min)

ANNOUNCEMENTS AND ADJOURNMENT (5:30- 5:40 PM)

BANQUET (ticket required; 6:30-9:00 PM)

Wednesday, September 20, 2006 [Hilton Hawaiian Village]
Continental Breakfast (8:00-9:00 AM)

SESSION VI (9:00-10:30 AM) – UNIQUE FOODS OF THE PACIFIC
Session CoChairs: Jean Hankin, PhD, RD and Donna Au, MPH, RD

The Importance of Composition Data for Pacific Foods. Barbara Burlingame, PhD, FAO, Rome, Italy (15 min)

Nutrient Profiles of Unique Hawaiian Foods. Alvin Huang, PhD, College of Tropical Agriculture and Human Resources, University of Hawaii, Honolulu HI (15 min)

Pro-vitamin A Carotenoids in Bananas? The Surprisingly High Level of Micronutrients in Several Staple Foods from Micronesia. Lois Englberger, PhD, Island Food Community of Pohnpei, Federated States of Micronesia (15 min)

Fijian Wild Foods and Lovo Cooking. Bill Aalbersberg, PhD, University of the South Pacific, Suva, Fiji (15 minutes)

The Pacific Tracker (PacTrac): Development of a Dietary Assessment Instrument for the Pacific. Carrie Blitz, RD, CRCH, University of Hawaii, Honolulu HI (15 minutes)

Panel Discussion/Questions. All presenters (15 minutes)

BREAK (10:30-11:00 AM)

SESSION VII (11:00 AM -12:30 PM) – DATA FOR SPECIAL POPULATION GROUPS
Session CoChairs: Rachel Novotny, PhD, RD and Lisa Jahns, PhD, RD

Nutritional Quality of Korean Children's Diet with Lunch at Home and School: Analysis of Data from the 2001 National Health and Nutrition Survey. Jihyun Yoon, PhD, Seoul National University, Seoul, Korea (15 min)

Food Composition Information for Ethnic Populations in the US. Pamela Pehrsson, PhD, Nutrient Data Laboratory, ARS, USDA, Beltsville MD (15 min)

Development of a Food and Nutrient Coding Database for the Nigerian Food Consumption and Nutrition Survey. R Sue Day, PhD, University of Texas School of Public Health, Houston TX (15 min)

Nutrient Database of Competitive School Foods: Assessing the School Food Environment and Evaluating Adherence to School Nutrition Policies. Sarah Stone-Francisco, MPH, Samuels & Associates, Oakland CA (15 min)

Relative Risk(s) of Dietary/Lifestyle Factors and Risk Index for Selected Chronic Diseases Among Older Adults in Korea. Cho-il Kim, PhD, Korea Health Industry Development Institute, Seoul, Korea (15 min)

Nutrient and Food Intakes of Americans: NHANES 2001-2002 Data. Catherine Champagne, PhD, RD, Pennington Biomedical Research Center, Baton Rouge LA (15 min)

LUNCH (12:30-2:00 PM)
Meeting of the NNDC Steering Committee [Sea Pearl IV]

SESSION VIII (2:00-3:30 PM) – ADVANCES IN USING FOOD COMPOSITION DATA FOR DIETARY ASSESSMENT
Session CoChairs: Thea Zimmerman, MS, RD and Elizabeth Braithwaite, MPH, RD

Food and Nutrient Components, Standards, and Scoring in the Revised Healthy Eating Index. Patricia Guenther, PhD, RD, Center for Nutrition Policy and Promotion USDA, Alexandria VA (15 min)

Development of a Glycemic Index Database for Dietary Assessment. Sally Schakel, Nutrition Coordinating Center, Minneapolis MN (15 min)

The German Nutrient Database as the Basis for the Calculation of Nutritional Status of the German Population. Ana Lucia Vasquez-Caicedo, Federal Research Centre for Nutrition and Food, Karlsruhe, Germany (15 min)

Relationships Between Patient Variables and Computerised Dietary Assessment in a Primary Healthcare Setting. Yasmine Probst, MSc, University of Wollongong, Wollongong, NSW Australia (15 min)

Development of the Iowa Bone Nutrient FFQ from CSFII Data. Julie Gilmore, PhD, RD, College of Dentistry, University of Iowa Clinical Research Center, Iowa City IA (15 min)

Utilizing Nutrient Data to Determine Proper Portion Sizes in Fast Food Restaurants. James Painter, PhD, RD, Eastern Illinois University, Charleston IL (15 min)

BREAK (3:30-3:45 PM)

SESSION IX (3:45-4:45 PM) – ANALYTICAL METHODS, DATA QUALITY, AND DATA VARIABILITY
Session CoChairs: Mary Balch, MS, RD and Susie Day, PhD

Quality Control Procedures for Nutrient Databases. Jaspreet KC Ahuja, Beltsville Human Nutrition Research Center, ARS, USDA, Beltsville MD (15 min)

Variability of the Nutrient Composition of Multivitamin Supplements. Song-Yi Park, PhD, Cancer Research Center of Hawaii, University of Hawaii, Honolulu HI (15 min)

Multi-Component Methods for Analysis of Vitamin and Mineral Dietary Supplements. James Harnly, Food Composition laboratory, BHNRC, ARS, USDA, Beltsville MD [unable to attend]

The Importance of Sample Source in Making Nutrient Comparisons of Foods. Charlene Rainey, Food Research, Inc., Costa Mesa CA (15 min)

Understanding Nutrient Variability: Impact on Public Health. Joanne Holden, MS, Nutrient Data Laboratory, ARS, USDA, Beltsville MD (15 min)

ANNOUNCEMENTS AND CONCLUDING WORDS (4:45-5:00 PM)
Suzanne Murphy, PhD, RD
- NNDC Steering Committee
- 31st NNDC and 32nd NNDC
- Acknowledgement of Local Arrangements Committee
- Concluding Words

LISTING OF POSTER PRESENTATIONS (with name of presenting author)
(Organized by ADA Learning Need Codes and available for viewing on September 19, 2005 from 10:10 AM to 1:00 PM.)

COMPOSITION OF FOODS, NUTRIENT ANALYSIS (2020)
Interactive Access for the Canadian Nutrient File, 2005. Josephine Deeks, Banting Research Centre, Ottawa, Ontario, Canada

Effects of Changing the Grain Designation for Corn Tortilla Snack Products. Kristin Marcoe, MBA, RD, Center for Nutrition Policy and Promotion, USDA, Alexandria VA

Synchronization and Standardization of Food Codes in Databases. Haeng-Shin Lee, PhD, Korea Health Industry Development Institute, Seoul, Korea

Variations in the Nutrient Profile of Rice Across Three Pacific Islands. Rachael T Leon Guerrero, PhD, RD, University of Guam, Mangilao, Guam

Tea Consumption is a Determinant of Flavonoid Intake Among US Adults. Won Song, PhD, MPH, RD, Michigan State University, East Lansing MI

Updating Weights and Percent Refuse for Raw Fruit in the USDA National Nutrient Database for Standard Reference. Susan Gebhardt, MS, Nutrient Data Laboratory, BHNRC, ARS, USDA, Beltsville MD

Nutrient Databases: When the End-User is Not a Scientist. Priscilla Connors, PhD, RD, University of North Texas, Denton TX

ASSESSMENT METHODOLOGY (3010)
Keeping a Database Up-to-Date for a Continuous Survey. Betty Perloff, Beltsville Human Nutrition Research Center, ARS, USDA

Web-Based Resources for Enhancing Dietary Data Analysis: What We Eat in America, NHANES. Jaspreet Ahuja, MS, Food Survey Research Group, ARS, USDA, Beltsville MD

Using a Modified Version of the USDA's AMPM Software: The Canadian Experience. Josephine Deeks, Health Canada Food Directorate, Ottowa, Canada

Developing a Database and a Focused food Frequency Questionnaire for Assessing Dietary Arsenic Intake for a Bi-National Arsenic Exposure Study. Ellen J Graver, MS, Arizona Cancer Center, Tucson AZ

Updating Nutrient Intake Estimates from the Arizona FFQ: The "Metabolize" Nutrient Database. Robin Whitacre, Arizona Cancer Center, Tucson AZ

Developing a Food List for Use in a Self-Administered 24-Hour Recall. Thea Palmer Zimmerman, MS, RD, Westat, University Heights OH

ASSESSMENT OF TARGET GROUPS, POPULATIONS (3020)
The Development of the Thrifty Food Plan's Prices Database. Kristin Marcoe, MBA, RD, Center for Nutrition Policy and Promotion, USDA, Alexandria VA

Assessment of the Food and Nutrient Intake of People Living with HIV/AIDS in Northern Nigeria. Victor Ohuruogu, MSc, University of Ibadan, Nigeria [unable to attend]

Dietary Exposure Assessment of Selenium for Koreans and Comparison of Intake Levels by Groups with KDRIs. Younju Choi, PhD, Korea Food and Drug Administration, Seoul, Korea

SUPPLEMENTAL NUTRIENTS, BOTANICALS (3100)
NHANES 2001-2002 Dietary Supplement Database Use for Describing the Reported Dietary Supplement Use in the New England Bladder Cancer Study. Anna G McIntosh, MS, RD, Westat, Rockville MD

ABSTRACTS FOR ORAL PRESENTATIONS

SESSION I. FOOD COMPOSITION DATA: THE FOUNDATION OF DIETARY ASSESSMENT

THE SYNERGY BETWEEN DIETARY ASSESSMENT AND FOOD COMPOSITION DATA. Suzanne Murphy, PhD, RD, Cancer Research Center of Hawaii, University of Hawaii, Honolulu HI

Keywords: dietary assessment, food composition data
Objective: To review the ways in which accurate dietary assessment depends on accurate and complete food composition data.
Discussion: There are several evolving features of food composition tables (FCTs) that are important in improving dietary assessment. These include: (1) rapidly expanding information on nutrient and non-nutrient components of foods; (2) wider choices of units in which to express the levels of these components; (3) more options for calculating intakes of food types (e.g., servings of fruits, vegetables, grains); (4) better information on nutrients in foods from specific regions and countries; and (5) the increasing availability of data on the composition of dietary supplements. These advances in FCTs enhance many ongoing advances in software for dietary data collection and evaluation. Furthermore, as computers become smaller and less expensive, and access to the Internet expands, dietary assessment will become more available to the lay public. Dietitians can play an important role in ensuring that FCTs meet the highest standards, and that they are used appropriately, both by the public seeking better nutrition information, and by health professionals in their own research and practice.
Significance: The capacity of FCTs has expanded dramatically in recent years. The new features of FCTs can work synergistically with improved dietary assessment software to provide better dietary assessment at both the individual and group levels.
Funding Disclosure: None

SESSION I. FOOD COMPOSITION DATA: THE FOUNDATION OF DIETARY ASSESSMENT

SOURCES OF FOOD COMPOSITION DATA AND CONSIDERATION FOR USE. Jean Pennington, PhD, RD, National Institutes of Health, Bethesda MD

Keywords: food composition, food data
Objective: To direct dietitians and other nutrition professionals to locations for food composition data and to identify issues that may affect the appropriateness of data use for various situations.
Discussion: Sources of food composition data for dietitians and other nutrition professionals include US government electronic databases, national and international database directories, the food industry, and the scientific literature. When data are not available from these sources, it may be necessary to impute or calculate values for a food, documenting the procedures used. Considerations for selecting data from various sources for a particular food include the food name and description, reliability of the source, data quality, and data variability. Food composition data are used for many purposes - dietary intakes surveys/studies, reference work, patient care, student education, product development, website dietary assessment, and clinical research. Some understanding of the limitations of the data should be considered before using them for these various purposes. For example, it may not be appropriate to use data from a reference database for clinical studies where food component intakes are related to physiological measurements. More precise data, i.e., direct analysis of the food(s) under study may be required. Another example is using food composition data from other countries for foods obtained and consumed in the US. This use may be appropriate, but might require modification for local ingredients or preparation methods.
Significance: The many and varied sources of food composition data should be used with consideration for their appropriateness in national surveys, patient care, education, clinical practice, clinical research, and product development.
Funding Disclosure: None
Websites:
Nutrient Database for Standard Ref, 18; http://www.nal.usda.gov/fnic/foodcomp/search/
Special Interest Databases; http://www.ars.usda.gov/Services/docs.htm?docid=5121
Food and Nutrient Database for Dietary Studies;
http://www.ars.usda.gov/Services/docs.htm?docid=7673
Vitamin A and Vitamin E; http://www.ars.usda.gov/Services/docs.htm?docid=12088
What's In the Foods You Eat; http://www.ars.usda.gov/Services/docs.htm?docid=7783
Dietary Supplement Databases; http://dietary-supplements.info.nih.gov/Health_Information/Dietary_supplement_Ingredient_and_Labeling_Databases.aspx
FDA Total Diet Study; http://www.cfsan.fda.gov/~comm/tds-toc.html
NNDC Directory; http://www.nal.usda.gov/fnic/foodcomp/conf/
INFOODS Directory; http://www.fao.org/infoods/directory_en.stm
Food Industry; http://lancaster.unl.edu/food/ciq-contacts.htm

**SESSION I. FOOD COMPOSITION DATA: THE FOUNDATION OF
DIETARY ASSESSMENT**

CONSIDERATIONS FOR SELECTING A DIETARY ASSESSMENT SYSTEM.
Phyllis Stumbo, PhD, RD, LD, University of Iowa General Clinical Research Center,
Iowa City IA

Keywords: diet, nutrition, software, computer applications
Objective: The purpose of this presentation is to describe criteria used to select dietary
calculation software for a variety of purposes. Dietary assessment software may be
designed for the researcher, food manufacturer, clinician, and/or consumer. Members of
these four user groups differ in their need to demonstrate the "big picture" or explicate
the fine details of food composition.
Discussion: Nutrient data and variety of foods, their naming convention and portion size
descriptors are the key components for any dietary assessment system (DAS). Criteria
for quality beyond the food description and nutrient data are operational efficiency and
effective output. The eight basic questions to ask when selecting a DAS for educational
and clinical applications are: does it 1) have representative foods, 2) a tested database, 3)
feature appropriate nutrients, 4) offer a search strategy that works, 5) provide a concise
report targeted to your audience, 6) assess nutritional adequacy of people or products, 7)
picture (graph) the data, and 8) offer sound nutritional advice.
Significance: These considerations will be illustrated using currently available software.
The participant will lean how software can enhance their educational and clinical
activities.
Funding Disclosure: None

SESSION I. FOOD COMPOSITION DATA: THE FOUNDATION OF DIETARY ASSESSMENT

INCORPORATION OF NUTRIENT DATA INTO ASSESSMENT SYSTEMS.

Suzanne McNutt, MS, RD; Thea Palmer Zimmerman, MS, RD, Stephen Hull, MS, Westat, Rockville MD

Keywords: dietary database, food frequency questionnaires, FFQ, dietary assessment, food composition

Objective: To describe the link between dietary assessment and food composition databases used in nutrition research.

Discussion: The accuracy of a dietary assessment method is dependent on the food composition database used to apply nutrients and calculate servings. This presentation will provide background information on the importance of dietary assessment and the types of research studies that include dietary assessment methodologies. The presentation will summarize the databases used in research and discuss issues related to updating and data imputation. It will also discuss the complex process required to develop specialized databases for food frequency questionnaires (FFQ), which includes defining the purpose of the FFQ, identifying the population data source, creating food line items, assigning nutrients to the responses, and determining the best method to assess portion size. Finally, it will describe the major FFQs used in research.

Significance: Dietary assessment is a primary source of data in nutrition research. The link between a dietary assessment method and its food composition database is critical to the accuracy of assessment.

Funding disclosure: None

SESSION II. MEETING DIETETIC NEEDS FOR FOOD COMPOSITION DATA

WHAT'S BEHIND THE NUMBERS? STATISTICAL SAMPLING. Joanne M Holden, MS, Pamela R Pehrsson, PhD, Charles R Perry, PhD, David B Haytowitz, MS, Nutrient Data Laboratory, ARS, USDA, Beltsville MD and National Agricultural Statistics Service, USDA, Washington DC

Keywords: sampling, sample design, NFNAP
Objective: The Nutrient Data Laboratory (NDL), USDA implemented the National Food and Nutrient Analysis Program (NFNAP) to obtain nationally representative estimates of the critical nutrients in highly consumed US foods. The NFNAP is based on a statistically based sample design to identify locations and brands for product collection and analysis. Other sources of high quality data (food industry, scientific literature, other Government agencies, and standard recipes and algorithms) not based in this rigorous sampling approach complement NFNAP data in the USDA National Nutrient Databank System.
Materials and Methods: The sampling design employed a three-stage sample selection process based on demographics and food products 1) selection of counties, 2) grocery stores selected within those counties, and 3) specific food products purchased for nutrient analyses. Current Census regions, divisions and states in the Stage 2 allow a self-weighting sample of food products from each region that is also geographically dispersed across US. The number of food brands or types collected is based on its contribution of critical nutrients to intake and known or expected variability of those nutrients. Selection of brands of products is based on market share data, in weight consumed.
Results: The general approach ensures that the resulting nutrient estimates for foods are representative of the average nutrient content of foods consumed by the US population. Over 1000 foods have been analyzed for over 100 nutrients since NFNAP's inception.
Significance: These nationally representative data provide a foundation for nutrition research, food policy development, and nutrition education strategies and are critical in monitoring the public health status.
Funding: USDA and NIH Agreement No. Y1CN5010.

**SESSION II. MEETING DIETETIC NEEDS FOR FOOD COMPOSITION
DATA**

**WHAT'S BEHIND THE NUMBERS? ANALYTICAL METHODS. James M
Harnly, PhD**, Food Composition Laboratory, Beltsville Human Nutrition Research
Center, ARS, USDA, Beltsville MD

Keywords: food analysis, analytical methods, food composition
Objective: To describe the current state of analytical methods for food components.
Description: A method exists for every known food component - somewhere, sometime,
a researcher has developed a method to analyze a specific component in a food or
biological material. These methods, however, are not suitable for obtaining data for a
nutrient database. Suitable methods must be qualitative, quantitative, and economic.
Qualitative methods separate targeted food components, detect a measurable signal for
each, and allow their identification. Quantitative methods go a step further and provide
concentration values that have good precision, exceed the limits of detection, and have
been validated for accuracy. Economical methods provide rapid determinations at a low
cost. Usually, highly definitive methods, based on extended chromatographic and mass
spectrometry, are developed to attain a thorough understanding of the sample and analyte
chemistry. This knowledge serves as the basis for more robust and less expensive
methods. Validation of accuracy is based on internal standards, recovery of added
materials, and, ideally, a certified reference material. New methods are constantly being
developed to incorporate new technology and to analyze the latest food components of
interest. There is considerable interest in faster methods that will allow the analytical
process to keep up with the constantly changing food supply. Simultaneously, the field
of metabolomics is advancing a philosophy that all the small molecules in a tissue can be
identified. Because the metabolome of a food equates to an inventory of its nutrients, this
area of research will have a significant impact on nutrient databases.
Significance: Based on the factors listed above, it is easy to understand why analytical
methodology for food composition is a very dynamic field.

SESSION II. MEETING DIETETIC NEEDS FOR FOOD COMPOSITION DATA

MAINTAINING ACCURATE AND CURRENT DATABASES WITH THE CHANGING MARKETPLACE. Alison Eldridge, PhD, RD, General Mills, Bell Institute of Health and Nutrition, Minneapolis MN

Keywords: food composition, industry foods, marketplace

Objective: To discuss how the food industry maintains accurate and current food composition databases.

Description: Modern consumers take for granted easy access to a broad variety of foods in our grocery stores, markets, and restaurants. These foods may be locally grown, regionally produced, or imported from almost anywhere in the world. Seasonality is no longer the issue it once was due to globalization of the food supply. Novel fruits and vegetables are widely available because of increased importation and because of the introduction of new varieties. In addition, manufactured foods continue to evolve in response to consumer demands, dietary recommendations, and legislative input. These factors result in a constantly changing food marketplace. Changes in the food supply are surprisingly rapid. For example, there was a proliferation of foods low in carbohydrate in response to the popularity of the Atkins' Diet in 2004. We are currently experiencing a dramatic increase in whole grain foods in response to the call to increase whole grain servings in the *2005 Dietary Guidelines for Americans*. The food supply is adapting also in response to new legislation to label *trans* fats on the Nutrition Facts panel on packaged foods. Updating nutrient databases in response to the ever-changing food supply is extremely challenging. Accurate dietary intake estimates require both that the nutrient content databases accurately reflect the foods in the marketplace, but also that the foods can be recorded with the specificity needed to distinguish nutrient differences.

Significance: Maintaining accurate nutrient content and dietary intake databases requires increased collaboration between academia, government and the food industry.

Funding disclosure: Author employed by General Mills, Inc.

SESSION II. MEETING DIETETIC NEEDS FOR FOOD COMPOSITION DATA

ARE DIETITIANS' NEEDS FOR DATA BEING MET? Beverly McCabe-Sellers, PhD, RD, LD, ARS, USDA, Little Rock AR

Keywords: food composition, food databases, dietetic needs
Objective: To assess if dietitians have the food composition data that they need to carry out their duties and responsibilities.
Description: The client pool that dietitians work with is varied including individuals from all sectors of the life cycle and from around the globe. Desired patient outcomes range from maintenance of optimal health to treatment of chronic disease and disabilities. Acquiring appropriate data about the food components that clients consume is becoming increasingly complex, and these food components present complex challenges related to dietary assessment, analysis of food records or recalls, and monitoring of client progress. Dietitians who are building evidence-based practices and individual nutrition counseling strategies need greater access to a broader database of food composition beyond simple nutrients and beyond the traditional American foodways. Rapid access to global food composition data is needed if ethnic foods are to be incorporated into medical nutritional therapy. As more food constituents are studied for their potential in preventing chronic disease and promoting optimal diets, dietitians need research data on good sources of new constituents and of appropriate levels to achieve good client outcomes. Identifying foods as a good or excellent source requires knowledge of effective levels of intakes and what effects, if any, that food preparation has on the food constituents of interest. Questions arise if computerized databases contain the needed food information and if the data can be accessed rapidly for dietetic practice. Are new dietitians being trained with a sufficient background in using and skills in applying current databases?
Significance: Dietitians must make client needs known if databases are to meet future needs.

SESSION III. DATABASES FOR DIETARY SUPPLEMENTS

DEVELOPMENT OF A DIETARY SUPPLEMENT DATABASE FOR WINS.

Julia Peterson, PhD[1], Johanna Dwyer, DSc[1,2], Barbara Winters, PhD[3], Diane C Mitchell, MS[4], Karen Atkinson, PhD[5], [1]Friedman School of Nutrition Science & Policy, Tufts University, Boston MA; [2]Jean Mayer Human Nutrition Research Center on Aging at Tufts University and Frances Stern Nutrition Center, Tufts-New England Medical Center, Boston MA; [3]Campbell Soup Company, Camden NJ; [4]Pennsylvania State University, University Park PA; [5]Bunker Hill Community College, Boston MA

Keywords: application, database, dietary assessment, flavonoid, supplement

Objective: The Women's Intervention Nutrition Study (WINS) studied postmenopausal women who were undergoing conventional therapy for breast cancer and who were randomized to consume either their usual diet or a very low fat (approximately 15% of calories from fat) diet as adjuvant therapy. We examined differences in flavonoid intakes among them using both food and supplement databases.

Method: Dietary supplements containing flavonoids were identified from label declarations of ingredients. Ingredients were classified taxonomically using botanical classifications. The amounts of each flavonoid compound in these ingredients were estimated using available published analytical values. When published analyses were not available, amounts were estimated using explicit assumptions applied in a uniform manner. The supplement database and a flavonoid food composition database were used to analyze the dietary records of a sample of 195 randomly selected women in the WINS intensive intervention group (IIG, <15% of calories from fat) and 316 women in the non-intervention group (NIG, approximately 34% calories from fat) group at baseline and again at one-year post intervention.

Results: At baseline, the IIG and NIG groups were similar in their intakes of all flavonoid classes except for flavanones, which were significantly lower in the IIG group. From baseline to 12 months, in the IIG group, only flavanones were increased.

Significance: Generally, flavonoid intake from food and supplements did not differ between IIG and NIG groups; therefore, it is unlikely that differences in flavonoid intake confound findings about breast cancer risk in this cohort.

SESSION III. DATABASES FOR DIETARY SUPPLEMENTS

USDA DIETARY SUPPLEMENT INGREDIENT DATABASE (DSID): ADULT MULTIVITAMIN/MINERAL STUDY. Joanne Holden, MS, **Janet Roseland, MS, RD**, Karen Andrews, BS, Cuiwei Zhao, MS, Amy Schweitzer, MS, RD, Nutrient Data Laboratory, ARS, USDA, Beltsville MD; James Harnly, PhD, Wayne Wolf, PhD, Food Composition Laboratory, ARS, USDA, Beltsville MD; Charles R Perry, PhD, National Agricultural Statistics Service, USDA, Fairfax VA; Johanna T Dwyer, DSc, RD, Mary Frances Picciano, PhD, Joseph M Betz, PhD, Leila G Saldanha, PhD, RD, Elizabeth Yetley, PhD, Kenneth Fisher, PhD, Office of Dietary Supplements, NIH, Bethesda MD; Katherine Sharpless, PhD, National Institute of Standards and Technology, Gaithersburg MD; Kathy Radimer, PhD, Jaime Wilger, MS, National Center for Health Statistics, CDC, Hyattsville MD

Keywords: dietary supplements, analytical database, DSID, multivitamin
Objective: The Nutrient Data Laboratory, USDA, is collaborating with the Office of Dietary Supplements (ODS), the National Center for Health Statistics, and other government organizations to design and populate a Dietary Supplement Ingredient Database (DSID). This analytically-based, publicly-available database will estimate actual ingredient levels for vitamins and minerals in dietary supplement products.
Methods and Materials: The database will initially be populated with adult multivitamin/mineral (MVM) products as they are most commonly consumed. Next on the priority list are children's MVM products, calcium supplements, and vitamin D supplements.
Results: A pilot study designed to identify appropriate analytical methods and experienced laboratories for the analysis of 12 vitamins and 11 minerals in adult MVM supplement products has been completed. Another pilot study, which analyzed representative MVM products based on specific ingredient levels, provided preliminary estimates of the range of analytical values compared to labeled levels. The representative MVM products were identified by ingredient, based on common % Daily Value (DV) levels reported in the National Health and Nutrition Examination Survey (NHANES) 2001-2002. These DV levels ranged from 2% (potassium) to 6666% (thiamin), with 16 nutrients having 100% DV as the most common level. An adult MVM product study is now underway.
Significance: Combined intake data from foods and supplements is used to evaluate the total impact of dietary components on the nation's health.   The DSID will provide better estimates of actual nutrient intake from supplements than databases that rely on label values alone.
Funding Disclosure: Interagency agreement ODS/NIH Y4-HV-0051.

SESSION III. DATABASES FOR DIETARY SUPPLEMENTS

AN APPROACH TO ASSESSING DIETARY SUPPLEMENT INTAKE FOR USE IN CONJUNCTION WITH THE COLLECTION OF 24-HOUR DIETARY RECALLS. Lisa Harnack DrPH, Mary Stevens, Nancy Van Heel, MS, Sally Schakel, John Himes, PhD, Nutrition Coordinating Center, University of Minnesota, Minneapolis MN

Keywords: dietary supplement assessment

Objective: With the rising use of dietary supplements, it has become imperative that tools for assessing nutrient intake include assessment of their use. Presently, nutritional analysis software programs for use in the collection and analysis of 24-hour dietary recalls are not designed for their assessment. The addition of this capability has been impeded, in part, by the lack of a standardized methodology for assessment of use. Thus, we have developed an assessment approach for use in combination with the collection of dietary recalls.

Methods and Materials: The development process involved conducting a literature review to identify existing assessment approaches. For each approach found, we reviewed validity and reliability studies conducted to evaluate the methodology, and considered how well it could be adapted for use with the collection of dietary recalls.

Results: After considering the merits of available approaches, a new approach termed the Tiered 24-hour Dietary Supplement Recall was developed. With this approach, following completion of a dietary recall a series of structured questions is used to collect detailed information about use of dietary supplements on the recall day. The first set of questions (Tier 1) is designed to screen for use of dietary supplements (e.g., were one or more supplements used on the recall day?). Tier 2 collects the detail (e.g., full name of product, number of times taken on the recall day, dosage taken each time used).

Significance: The approach has the potential to work well in conjunction with the collection of dietary recalls. Testing will be required to evaluate its reliability and validity.

SESSION III. DATABASES FOR DIETARY SUPPLEMENTS

RESEARCH TOPICS FOR NHANES DIETARY SUPPLEMENT DATA. Ana Chavez, MS, RD, Jaime Wilger, MPH, Kathy Radimer, PhD, National Center for Health Statistics, CDC, Hyattsville MD; Johanna Dwyer, DSc, RD, Office of Dietary Supplements, NIH, Bethesda MD

Keywords: dietary supplements, NHANES
Objective: To describe the various uses of National Health and Nutrition Examination Survey (NHANES) dietary supplement database combined with other NHANES data.
Methods and Materials: The NHANES is a continuous survey conducted to monitor the health and nutritional status of the US population. The survey consists of a personal interview followed by a physical examination including a blood draw. Supplement use in relationship to major public health issues such as problems of the aging population can be studied by combining questionnaire, physical exam, and laboratory data. For example, total intake of calcium from supplements and diet can be compared to bone density, history of fractures, age, race, sex, physical activity level, parity, cigarette use, and other risk factors for osteoporosis. Other uses of supplement data will be presented.
Results: In 1999-2002, 21,004 individuals were interviewed and 19,759 examined. Of adults (18 years and older), 51% interviewed reported taking dietary supplements.
Significance: Because half of adult Americans take dietary supplements and nutrient intake is associated with health and disease, it is of interest to examine demographic characteristics and the health and nutritional status of individuals. Thus, the NHANES dietary supplement database combined with other NHANES topics provide a valuable and unique resource enabling researchers to study nutrient intake as it relates to health.

SESSION III. DATABASES FOR DIETARY SUPPLEMENTS

PROGRESS IN DEVELOPING DIETARY SUPPLEMENT DATABASES AT THE NIH'S OFFICE OF DIETARY SUPPLEMENTS.

Johanna T. Dwyer, DSc, RD, Mary Frances Picciano, PhD, Joseph M Betz, PhD, Leila G Saldanha, PhD, RD, Elizabeth Yetley, PhD, Kenneth Fisher, PhD, Paul R Thomas, EdD, RD, Office of Dietary Supplements (ODS), NIH, Bethesda MD; John Milner, PhD, National Cancer Institute, NIH, Bethesda MD; Joanne Holden MS, Janet Roseland MS, RD, Karen Andrews, BS, Cuiwei Zhao, MS, Amy Schweitzer, MS, RD, Nutrient Data Laboratory, ARS, USDA, Beltsville MD; James Harnly, PhD, Wayne Wolf, PhD, Food Composition Laboratory, ARS,USDA, Beltsville MD; Charles R Perry, PhD, National Agricultural Statistics Service, USDA, Fairfax,VA; Kathy Radimer, PhD, Jaime Wilger, MS, National Center for Health Statistics (NCHS), CDC, Hyattsville MD; Katherine E Sharpless, PhD, National Institute of Standards and Technology (NIST), US Department of Commerce, Gaithersburg, MD

Keywords: dietary supplement databases, DSID, DSLD, label database, nutrients, analytical substantiation, standard reference materials, and dietary supplement ingredients

Objective: Dietary supplement databases are generally not based on analytical data, but ingredients and their amounts are simply copied from product labels. Progress in developing substantiated dietary supplement databases is described.

Methods and Materials: The Dietary Supplement Ingredient Database (DSID) working group is a trans-agency, collaborative effort between ODS/NIH, ARS/USDA, NCHS/CDC, and NIST to develop and stimulate the use of both analytically substantiated and label-based databases for dietary supplements.

Results: ARS/USDA is developing an analytically substantiated database for several dietary supplement ingredients including adult and children's multivitamin-multiminerals, calcium (including antacids), and vitamin D. Vitamins E, C, B complex; single minerals (Fe, Se, Cr, Mg, K, and Zn); fish oil products; and glucosamine/chondroitin will be subsequently evaluated. A sampling plan for obtaining representative multivitamin-mineral products is being implemented. Priority components for analyses have been selected on the basis of exposure (NHANES data), public health and research significance, availability of reference materials, and analytical methods. To aid in these studies, NIST has developed and distributed a vitamin-mineral supplement standard reference material for analytic comparison. The analyses will permit dietary supplement label declarations to be linked with data on composition from validated chemical analyses for high priority ingredients. Collaboration continues with NCHS on the National Health and Nutrition Examination Survey (NHANES) dietary supplement label database. Its contents are available in SAS in the NHANES 1999-2000 and 2001-2002 data releases. ODS also supports the development of a dietary supplement assessment module (DSAM) suitable for use on laptop computers through a cooperative agreement with the University of Minnesota (complete version will be released in May 2007). The University of Hawaii Cancer Center studies of validity and reliability of information on dietary supplement use are funded by ODS. ODS collaborates with NCHS and the National Center for Complementary and Alternative Medicine (NCCAM), NIH on studies of motivations for dietary supplement use in NHANES and in the National Health Interview Survey (NHIS). ODS is also exploring the development of a publicly-available dietary supplement label database (DSLD) of all dietary supplements sold in the US.

Significance: These projects will enhance the ability of federal partners, the research community, industry, and consumers to accurately measure total dietary intakes as well as to study and recognize the effects of dietary supplements upon on the health of the public.

SESSION IV. NEW DATA FOR FOODS AND FOOD COMPONENTS

IMPACT OF DATA FROM THE NATIONAL FOOD AND NUTRIENT ANALYSIS PROGRAM ON THE REPORTED COMPOSITION OF HIGHLY CONSUMED FOODS. David B Haytowitz, MS, Pamela R Pehrsson, PhD, Joanne M Holden, MS, Nutrient Data Laboratory, ARS, USDA, Beltsville MD; Charles R Perry, PhD, National Agricultural Statistics Service, USDA, Washington DC

Keywords: food composition, nutrient analysis

Objective: The National Food and Nutrient Analysis Program (NFNAP) improves the quantity and quality of data in USDA food composition databases through the analysis of nationally representative samples of foods and beverages.

Methods and Materials: USDA food consumption and composition data were used to target those foods that contribute nutrients of public health significance to the US diet (Key Foods). The NFNAP employs statistically valid sampling plans, comprehensive quality control, and USDA analytical oversight to ensure the quality of the data. Foods were ranked using a scoring system, divided into quartiles, and examined to determine the impact of any changes in their composition. Foods were collected from retail locations in US Census statistical areas, then composited and sent to commercial labs and cooperators for analysis along with quality control materials. One-way T-tests and multivariate tests were used to assess if current NFNAP means generated from original analytical data are different from historical means.

Results: Newly obtained results for nationally representative samples show significant changes compared to database values for selected nutrients of unknown or non-representative sampling. For example, an increase in the folate value of 14% (from 95 to 111 mcg/100g) and a 35% decrease in the selenium value (from 26.5 to 19.5 mcg/100 g) for hamburger rolls was found. There was s significant change in the vitamin A value for cooked carrots from 1225 to 760 RAE/100 g; the iron value for fast food French fried potatoes increased by 43% (from 0.78 to 1.37 mcg/100g).

Significance: These changes reflect enhancements in sampling and methodology, which result in the greatly improved accuracy of nutrient estimates for Key Foods and subsequent assessments of dietary intake.

SESSION IV. NEW DATA FOR FOODS AND FOOD COMPONENTS

DIETARY FIBER DATABASE DEVELOPMENT FOR THE NATIONAL HEALTH AND NUTRITION SURVEY IN KOREA. Yoonna Lee, PhD, Hae-Jeung Lee, PhD, Haeng-Shin Lee, PhD, Young-Ai Jang, PhD, Cho-il Kim, PhD, Nutrition Research Team, Korea Health Industry Development Institute, Seoul, Korea

Keywords: dietary fiber, nutrient database, Health Plan 2010

Objectives: As people become more health-conscious, the necessity of nutrient databases for Korean foods has been emphasized continuously. To provide useful information about diets for consumers' health and to cope with the objectives in the Health Plan 2010, a dietary fiber (DF) database was developed.

Methods and Materials: A food list representing the usual diet of Koreans was developed based on the results of the 2001 National Health and Nutrition Survey and the 2002 Seasonal Nutrition Survey. With the food intake data from over 18,000 subjects, 150 foods were selected for the analysis of total dietary fiber (TDF) considering the amount and frequency of consumption, and probable high content of DF. Among those, 50 foods were analyzed for soluble and insoluble dietary fiber (SDF, IDF) separately. Foods were purchased in triplicate considering the area of production or the best-selling brands. TDF and IDF content were measured using the AOAC 991.43 method, and SDF by the HPLC method.

Results: A DF database for 150 common foods for Koreans was developed. On average, dried seaweeds showed the highest TDF content (27.30g/100g), and legumes, the second (10.32g/100g). Polished rice, the main staple food of Koreans, contained 1.5g TDF/100g compared to brown rice with 3.3g TDF/100g. Other than the beverages with added fiber, the proportion of SDF was highest in garlic (72.9%).

Significance: This database will enable the assessment of DF intake of Koreans and allow for linking DF to health outcomes. It will also contribute toward achieving health goals stated in the Health Plan 2010 by allowing informed-consumers to make healthy food choices.

SESSION IV. NEW DATA FOR FOODS AND FOOD COMPONENTS

ANALYSIS OF SELECTED CHEMOPREVENTIVE AGENTS IN FOODS COMMONLY CONSUMED IN HAWAII. Adrian A Franke, PhD, Laurie J Custer, BSc, Rochelle Lacey, RD, Suzanne P Murphy, PhD, RD, Cancer Research Center of Hawaii, University of Hawaii, Honolulu HI

Keywords: flavonoids, vitamin E, phytochemicals
Objective: The food composition database of the Cancer Research Center of Hawaii (CRCH) is an essential tool for investigating the relationship between diet and chronic diseases. The Analytical Laboratory of the CRCH has developed reliable and affordable techniques for the measurement of isoflavones, flavonoids, ascorbic acid, carotenoids, tocopherols, tocotrienols, and other phytochemicals in foods.
Methods and Materials: Vitamin C, the major dietary flavones (apigenin, luteolin), flavonols (kämpferol, quercetin, myricetin), flavanones (hesperetin, naringenin, and their glycosides), and anthocyanidins (pelargonidin, cyanidin, delphinidin) were quantified from 130 commonly consumed foods in Hawaii. After optimization of extraction procedures to avoid loss of these sensitive analytes, high pressure liquid chromatography (HPLC) with electrochemical, diode-array, and/or mass spectrometric detection was performed. In addition, vitamin E (α-, β-, γ-, δ-tocopherol and -tocotrienol) was analyzed in 79 food items (50 in duplicate) from local markets. Normal-phase HPLC analysis with fluorescence detection resulted in baseline separation of all 8 analytes and the internal standard tocol.
Results: Concentrations in foods as eaten ranged from 4-801 mg/kg for ascorbic acid and 172-905 mg/kg for citrus flavanones to as high as 259 mg/kg for flavones/flavonols and 1168 mg/kg for anthocyanidins. Storage and processing, especially when heat was applied, led to significant losses of all analytes. As expected, E vitamer levels correlated with fat content, and varied greatly between foods; fruits, vegetables, and fat-free items contained the lowest concentrations.
Significance: The high variability in the levels of these antioxidants, in part caused by culturally diverse food preparation techniques, indicates that food level determinations are a prerequisite for accurate human diet studies.

SESSION IV. NEW DATA FOR FOODS AND FOOD COMPONENTS

VITAMIN AND MINERAL CONTENT OF TROPICAL FRUIT CULTIVARS GROWN IN HAWAII. Marisa M Wall, PhD, US Pacific Basin Agricultural Research Service, USDA, Hilo HI

Keywords: banana, papaya, longan, lychee, rambutan, vitamin C, provitamin A, minerals
Objective: To determine levels of vitamin C, provitamin A, and minerals in different cultivars of several tropical fruits (banana, papaya, longan, lychee, and rambutan) grown in Hawaii.
Methods and Materials: Banana (*Musa* sp.), papaya (*Carica papaya*), longan (*Dimocarpus longan*), lychee (*Litchi chinensis*), and rambutan (*Nephelium lappaceum*) cultivars were harvested from different locations throughout Hawaii and analyzed for vitamin C (ascorbic acid) and mineral content. Bananas and papayas also were analyzed for provitamin A (β-carotene, α-carotene, β-cryptoxanthin) content.
Results: Dwarf Brazilian ("apple") bananas had almost three times more vitamin C (12.70 mg/100 g fresh weight) and 1.5 times more provitamin A (12.44 μg RAE/100 g) than Williams fruit bananas (4.45 mg/100 g and 8.15 μg RAE/100 g, respectively). Dwarf Brazilian bananas had higher P, Ca, Mg, Mn, and Zn contents than Williams fruit. The average K content for Hawaii's bananas was 330.6 mg/100 g. Papaya vitamin C content was 51.2 mg/100g, with no differences among cultivars. Provitamin A content for papayas averaged 44.1 μg RAE/100 g, and ranged from 18.7 to 74.0 μg RAE/100 g. Lycopene was not detected in the yellow-fleshed cultivars, Kapoho, Laie Gold, and Rainbow, but the red-fleshed Sunrise and SunUp contained 1350 to 3674 μg lycopene per 100 g. Papayas (100 g) contained 9% of the DRI for Cu, 6-8% of the DRI for Mg, but less than 3% of the DRI for other minerals. Longan fruit had the highest vitamin C content (60.1 mg/100 g) among the specialty fruit tested. Average ascorbic acid content was 27.6 mg/100 g for lychees and 36.4 mg/100 g for rambutans. Vitamin C content was 63.3 mg/100g and 55.3 mg/100 g for the longan cultivars, Biew Kiew and Sri Chompoo, respectively. The early maturing lychee cultivar, Kaimana, had an average ascorbic acid content of 33.2 mg/100 g, and the later maturing, Groff and Bosworth-3, cultivars had 21.2 and 22.5 mg/100 g, respectively. For rambutans, vitamin C content ranged from 22.0 to 47.8 mg/100 g for the six cultivars tested. Longans were a good source of K (324.9 mg/100 g) and Cu (0.26 mg/100 g). Consumption of lychee fruit (100 g) would meet 2-4% of the DRI for six minerals (P, K, Mg, Fe, Zn, Mn), and 22% of the DRI for Cu. Rambutan fruit had 20% of the DRI for Cu and 8-10% of the DRI for Mn.

SESSION V. ADVANCES IN DATABASE TECHNOLOGY AND INFORMATION DISSEMINATION

DEVELOPMENT OF A SELF-ADMINISTERED AUTOMATED 24-HOUR DIETARY RECALL (24HR) FOR USE IN LARGE-SCALE NUTRITION RESEARCH.

Amy F Subar, PhD, MPH, RD[1], Richard Buday, FAIA[2], Frances E Thompson, PhD, MPH[1], Nancy Potischman, PhD[1], Gordon Willis, PhD[1], Patricia M Guenther, PhD, RD[3], Suzanne McNutt, MS, RD[4], Barbara Forsyth, PhD[4], Stephen G Hull, MS, RD[4], Jennifer Crafts, PhD[4], Debbie Richards, MS[5], Arthur Schatzkin, MD, DrPH[1], Tom Baranowski, PhD[6]; [1]National Cancer Institute, [2]Archimage, [3]Center for Nutrition Policy and Promotion, USDA, [4]Westat, [5]Animatrix, [6]Baylor College of Medicine

Keywords: 24-hour dietary recall, web-based dietary assessment, software

Objective: To develop a self-administered computer-based 24HR instrument for use by adults that is easy-to-use, low-cost, publicly-available, and Web-enabled.

Methods: We are adapting elements of the USDA Automated Multiple Pass Method (AMPM) in the design of the instrument and using the Food and Nutrient Database for Dietary Studies (FNDDS) and Pyramid Servings Database (PSD) for calculating nutrient/food group intakes. Software development tools include Adobe Flash™, Microsoft .NET, and Media Semantics Character Builder™. Several rounds of cognitive/usability testing were conducted in the development of the instrument. Using a cross-over design, we conducted initial formative pilot testing among 18 adults in a self-administered computer environment. We tested two versions of a "quick list" (the first AMPM pass) for remembering foods consumed the previous day, "unstructured" and "meal-based."

Results: For the quick list test, 13 of 18 respondents showed a preference for the meal-based version, although positive features of both were identified. Chronological reporting was most common, though many foods were sporadically reported out of order. Versions did not appreciably differ in number of foods reported, moved, or deleted. Further cognitive testing results as well as screen shots of the software and reports will be presented.

Significance: 24HRs are used to collect high quality dietary data. Because they require highly-trained interviewers, recalls are expensive and impractical for large-scale research. If these efforts prove successful, the use of affordable, automated recalls could be valuable in clarifying diet-disease associations in observational epidemiologic studies and measuring dietary compliance in clinical trials.

SESSION V. ADVANCES IN DATABASE TECHNOLOGY AND INFORMATION DISSEMINATION

DEVELOPMENT OF NOADS: THE <u>N</u>HANES (NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY) <u>O</u>NLINE <u>A</u>NALYST FOR <u>D</u>IETARY <u>S</u>UPPLEMENTS; A WEB-BASED TOOL FOR ANALYSIS OF TOAL NUTRIENT INTAKES AND THEIR RELATION TO BIOMARKERS OF NUTRITIONAL STATUS.

Mary Frances Picciano, PhD, Johanna T Dwyer, DSc, RD, Kenneth D Fisher, PhD, Christopher J Hinkle, BSE, Paul R Thomas, EdD, RD, Anne Thurn, PhD, Elizabeth A Yetley, PhD, Office of Dietary Supplements, National Institutes of Health, Bethesda, MD

Keywords: total nutrient intakes, foods and dietary supplements, Web-based analytical tool, nutritional biomarkers, NHANES, NOADS

Objective: NHANES generates extensive public access data files that are available through the Internet. Its survey samples are based on the US Census and the data are representative of the non-institutionalized US population, making it an important source of national information to drive research and policy. Unfortunately, the scientific community finds it difficult to use, analyze, and interpret NHANES data for assessing relationships of total nutrient intakes to nutritional biomarkers because of 1) the survey's design complexity, 2) its use of two different methods to gather intake data with different time frames, and 3) the fact that biomarkers of nutrient status are obtained in a segment of NHANES that requires cross matching of samples. The complexity of the data files and the multiple analytical steps required to obtain total nutrient intakes underscore the need for a user-friendly analysis tool to help nutritionists and other health professionals make better use of the NHANES data.

Methods and Materials: This pilot project, which focused on intakes of folate and Vitamin B-12 and related biomarkers, was developed as an accurate, easy-to-use, web-based analysis tool that enables end-users (individuals working in nutrition and public health) to quickly obtain information on intakes of nutrients from food and supplements and their related health biomarkers using the NHANES public use data files. NOADS is a prototype designed by Research Triangle International (Research Triangle Park, NC) for the ODS. The current implementation of NOADS uses public access data derived from NHANES completed in 1999-2000 and 2001-2002. NOADS users may generate analytic and dynamically driven results in real time, as opposed to simply accessing pre-existing reports. Users make a number of interactive selections from demographic and behavioral data and determine the analysis period. Depending upon selection, appropriate weights are applied and descriptive statistical analysis is performed. Reports can be defined during the selection process to include specific variables and statistics in the output and exclude others.

Results: Analyses can be viewed in a tabular format through a web browser and can be saved to a Microsoft Excel document, which allows the user to manipulate the final report. The current implementation of NOADS is a prototype built to ODS specifications for folate and vitamin B-12. The tool is both scalable and extensible -- the number of data sets can be expanded, and more variables and additional statistics and report types can be added to the existing application. A step-wise analytical run will be demonstrated.

Significance: NOADS is designed to facilitate research on relationships among diet, dietary supplements, and health outcomes and to expand the ability of researchers to examine emerging public health issues.

Funding Disclosure: Office of Dietary Supplements, NIH

SESSION V. ADVANCES IN DATABASE TECHNOLOGY AND INFORMATION DISSEMINATION

DEVELOPMENT AND PILOT TESTING OF AN OMEGA-3 FATTY ACID FOOD FREQUENCY QUESTIONNAIRE. Nancy M Lewis PhD, RD, FADA, Paula Ritter-Gooder MS, RD, Kimberly B Heidel PhD, MHS, RD, Megan Waltz-Hill MS, RD, Department of Nutrition and Health Sciences, University of Nebraska, Lincoln NE

Keywords: omega-3 fatty acids, FFQ, food frequency questionnaire

Objective: Omega-3 fatty acids are essential to health and provide cardio-protective benefits. To estimate omega-3 fatty acid dietary intake, we developed and tested the reliability of a semi-quantitative food frequency questionnaire (FFQ) and pilot tested its validity in a convenience sample of cardiac patients in the Midwest.

Design and Subjects: The FFQ was developed using USDA Nutrient Database and Food Processor (ESHA) with emphasis on foods containing ≥10 mg omega-3 fatty acid/medium serving. Small, medium, and large portion sizes were defined for each food using the USDA MyPyramid portion guidelines. Frequency of consumption was categorized as none, once/month, <once/week, 1-2 times/week, 3-4 times/week, 5-6 times/week, daily, and >once/ day. The draft instrument was administered to 25 college students in an introductory nutrition class for testing reliability with test-retest four weeks apart. A reliability of <.50 meant that <50% of the total variability in responses was due to variation among participants, and therefore the majority of total variability was within participants. Foods that had a reliability of <.50 were removed, except common food items (including chicken and pork) found in food baskets and government programs. The FFQ was modified for use with cardiac patients and listed foods with ≥10 mg omega-3 fatty acid/medium serving. A focus group of nutrition professionals reviewed the tool and modifications were made. The instrument was tested for validity and reliability in a convenience group of cardiac patients (17 women and 11 men). Three 24-hour recalls, collected using the multiple pass method and two administrations of the FFQ two weeks apart were obtained by a dietitian by phone and home visit. Food Processor was used to analyze the food recalls. On the FFQ, estimated intake of omega-3 fatty acids was calculated by multiplying the amount of omega-3 fatty acids for each food by the frequency selected (as described above) by selected serving size (small, medium, or large). Omega-3 fatty acid intakes and estimates of omega-3 fatty acids by food group were calculated using Microsoft® Excel (2002, Microsoft, Corporation). Pearson correlation was used to assess the association between food recalls and FFQ. Alpha coefficient was used to assess reliability of the FFQ.

Results: The correlation of omega-3 fatty acid intakes using the food recalls and FFQ was 0.42 (p<0.05). Reliability of the FFQ was 0.83 with the food groupings ranging from 0.93 for grains to 0.57 for vegetables. Ninety percent of omega-3 fatty acid intake was provided by 28 foods, with the top two food sources from plant origin. A total of 73 out of 152 foods contributed 98% of the omega-3 fatty acid intake. Overall 113 out of 152 items on the FFQ were consumed. Average time to complete the FFQ was 20 min.

Conclusions: The FFQ yielded excellent reliability and acceptable validity in the population tested and can be used to estimate omega-3 fatty acid intakes in cardiac patients. It requires further testing before use in research due to the small number of subjects studied.

SESSION V. ADVANCES IN DATABASE TECHNOLOGY AND INFORMATION DISSEMINATION

DEVELOPING AN INTERNATIONAL NUTRIENT DATABANK DIRECTORY.

Elizabeth Braithwaite, MPH, RD, ESHA Research, Salem OR; Barbara Burlingame, PhD, FAO, Rome, Italy; Catherine Chenard, MS, RD, General Clinical Research Center (GCRC), University of Iowa, Iowa City IA; Barbara Selley, RD, Food Intelligence, Toronto, Canada; and Phyllis Stumbo, PhD, RD, GCRC, University of Iowa, Iowa City IA

Keywords: food composition, database directory, dietary assessment

Discussion: The US National Nutrient Databank Conference (NNDC) has developed several Nutrient Databank Directories. The first two editions were compiled by a pioneer in computer applications, Loretta Hoover, University of Missouri, in the 1980s, and the third edition was published by Jack Smith, University of Delaware, in the 1990s. At the close of the 2003 NNDC, which was held in conjunction with the International Food Data Conference in Washington, DC, a committee was formed to update the Nutrient Databank Directory and to include databases from all participants in the conference. As food has become more global, rather than local, the committee felt that food information should reflect a global perspective. The resulting 2004 International Nutrient Databank Directory includes databases from the US, Canada, China, and The Netherlands and is available at http://www.nal.usda.gov/fnic/foodcomp/conf/index.html. The 2006 edition will soon be available and will offer a clearer distinction between reference databases (national or specialty databases) and user databases (generally associated with software). As with the previous edition, detailed nutrient availability will be tracked, as well as nutrient completeness, data sources, and associated software products.

Significance: The availability of the International Nutrient Databank Directory on the Internet allows users easy and free access to the information and simplifies the task of capturing this valuable information for database managers around the globe.

SESSION V. ADVANCES IN DATABASE TECHNOLOGY AND INFORMATION DISSEMINATION

INTERNATIONAL ACTIVITIES IN FOOD COMPOSITION. Barbara Burlingame, PhD, Food and Agriculture Organization (FAO) of the United Nations (UN), Rome, Italy

Keywords: INFOODS, food composition, food analysis
Objective: To provide an overview of international activities in food composition.
Discussion: FAO operates the Secretariat for the International Network of Food Data Systems (INFOODS) in collaboration with UN University. Its purpose is to establish and work with a network of Regional Data Centres to develop standards and promote harmonization in data generation, compilation, and interchange. Additionally, it assists developing countries in strengthening their analytical capabilities to provide the health, agriculture, food trade and industry, and environment sectors with useful compositional data. The INFOODS website (http://www.fao.org/infoods) provides information and links related to food composition, including the list of regional data centres and their coordinators, the *Journal of Food Composition and Analysis* (JFCA) (http://www.elsevier.com/wps/find/journaldescription.cws_home/622878/description#description), technical standards and publications, an international directory and bibliography of food composition tables and databases, training courses, and conferences. The 18 Regional and Sub-Regional Data Centres have varying levels of activity. They hold conferences, training courses, and meetings; implement standardized data systems; and prepare and update national and regional food composition databases and tables. Centre coordinators report biennially on activities and achievements. International postgraduate training courses on food composition are held annually in collaboration with Wageningen University, USDA, and other organizations. Recently, and in the next few months, the venues for the courses include South Africa, the Netherlands, India, and Nigeria. Each year, at least 8 issues of JFCA, the international, peer-reviewed, official INFOODS journal, are published, including special themed issues and supplements. In 2006, there was the *28th National Nutrient Databank Conference* supplement and two special themed issues: *After processing: the fate of food components*, dealing with the effects of cooking, fermenting, extruding, and other household and industrial processing and preparation applications on nutrients; and *Nutrition and biodiversity, a common path*, dealing with the nutrient content and sustainable use of wild, uncultivated, underutilized species and subspecies. INFOODS operates the biennial Task Force for the International Food Data Conference (IFDC). Every second IFDC is an official satellite to the International Congress of Nutrition, while the intervening IFDC is chosen through proposals received. In 2007, the IFDC with the theme of "Biodiversity and Food Composition," will take place in Sao Paulo, Brazil. Ongoing INFOODS work includes developing an international data system that will interrogate and retrieve data from a distributed network of databases; scanning and publishing on the web relevant historic documents and publications, such as old and out-of-print food composition tables; developing of standards for component identification, food identification, and data interchange; and creating a cultivar-specific database to capture "orphan" compositional data on underutilized species and varieties.

SESSION VI. UNIQUE FOODS OF THE PACIFIC

THE IMPORTANCE OF COMPOSITION DATA FOR PACIFIC FOODS.
Barbara Burlingame, PhD, FAO, Rome, Italy

Keywords: food composition, Pacific, OCEANIAFOODS, INFOODS, FAO
Objective: Many factors influence the composition of foods, suggesting that analysis of nutrients and other bioactive components should be specific to the unique foods and the unique conditions under which the foods are produced. These data can be useful in the various sectors of health, agriculture, trade, environment, education, food industry, and development.
Methods and Materials: Current food and nutrition information from the Food and Agriculture Organization of the United Nations' (FAO) office in Apia, Samoa, complemented with data from FAO's agricultural statistical databases, Nutrition Country Profiles, the *Journal of Food Composition and Analysis*, and FAO/WHO Expert Consultations, will be used to show the unique foods and agro-ecological zones, and the nutrition situations in Pacific Island countries.
Results: Pacific Island countries are heterogeneous in their people, foods, and food traditions, although some commonalities can be determined. Data show that most Pacific Island countries are not respecting their traditional food systems, and are not using and developing their unique food biodiversity in a sustainable manner. Recent compositional data for wild and under-utilized species, cultivars, and breeds, will be compared with data on their counterparts/related foods in other countries, illustrating in many cases the superiority of the local foods. Conditions of over- and under-nutrition, micronutrient deficiencies, and risk assessments related to contaminants, additives, and other constituents in local food supplies, will be used to illustrate the benefits of local foods compared to imported foods.
Significance: More and better data on the composition of Pacific Island foods should lead to greater respect and importance given to local food resources. This will improve nutrition interventions, lead to better agriculture and nutrition policies, provide justification for trade-related policies, enhance marketing and export opportunities for unique foods, and lead to sustainable development and use of Pacific Island biodiversity.
Funding Disclosure: not applicable

SESSION VI. UNIQUE FOODS OF THE PACIFIC

NUTRIENT PROFILES OF UNIQUE FOODS IN HAWAII. Alvin Huang, PhD, College of Tropical Agriculture and Human Resources, University of Hawaii, Honolulu HI

Keywords: fat content, vitamins, sodium, nutrient composition

Objective: To establish the missing nutrient database for unique foods in Hawaii. There are a number of traditional Polynesia foods as well as Asian foods common in Hawaii, but their nutrient profiles are not available in most databases, due to a lack of familiarity to the food by nutrition researchers. A grant obtained by the Center of Family at the University of Hawaii has enabled the author to start addressing this issue.

Materials and Methods: A list of approximately 120 foods have been identified and deemed to lack nutrient information by a panel of four nutrition educators. A total of twenty foods on this list have been sourced from major venders in Hawaii and analyzed for nutrients with methods in accordance with FDA's guidelines for nutrition labeling. Most food items were procured from three or more sources in replicates. Results were evaluated for significance based on sample numbers and pooled standard errors.

Results and Significance: The foods analyzed include fruits, vegetables, and ethnic food items. Japanese cucumber and Chinese eggplants, for instance, have shown significantly different nutrient profiles from the cucumber and eggplants listed in the USDA database. Ethnic foods such as *taegu* (Korean dry fish), *longa* (Filipino pork sausage), *manapua* and *laulau* are popular in the Hawaiian diet, but their nutrient compositions are not available to dietitians and nutrition educators. Most these items are high in fat and sodium, and sometimes, heavy metals. Although transplanted from other parts of the Pacific, many food items have been evolved in Hawaii to suit the climate and people's palates. Consequently, their nutrient profiles may be quite different from the perspective ethnic origins. A comparison to illustrate this point will be attempted for items including *lumpia* and chicken *katsu*.

SESSION VI. UNIQUE FOODS OF THE PACIFIC

PRO-VITAMIN A CAROTENOIDS IN BANANAS? THE SURPRISINGLY HIGH LEVEL OF MICRONUTRIENTS IN SEVERAL STAPLE FOODS FROM MICRONESIA. Lois Englberger, PhD[1], Adelino Lorens, DTA[1,2], Julia Alfred, MCN[3], Tinai Iuta, MCN[4], Bill Aalbersberg, PhD[5], Joseph Schierle, PhD[6], Peter Hoffman, PhD[6], Julie Humphries, PhD[7], Alvin Huang, PhD[8]; [1]Island Food Community of Pohnpei, [2]Pohnpei Office of Economic Affairs, [3]Marshall Islands Ministry of Health, [4]Kiribati Ministry of Health and Medical Services, [5]University of the South Pacific, [6]DSM Nutritional Products, [7]The University of Adelaide, [8]University of Hawaii

Keywords: provitamin A carotenoids, micronutrients, indigenous foods, Micronesia
Objective: To identify micronutrient-rich indigenous Micronesian foods/varieties.
Methods: A participatory, ethnographic approach was used to identify indigenous, culturally-acceptable, Micronesian foods/varieties likely to have high contents of carotenoids (based on flesh coloration) and other micronutrients, focusing on staple foods of the Federated States of Micronesia, Marshall Islands, and Kiribati. Over 100 samples of bananas, giant swamp taros, pandanus varieties, and other foods were analyzed for provitamin A carotenoids, vitamins, and minerals.
Results: Many bananas, giant swamp taros, and pandanus varieties were found with significant levels of beta- and alpha-carotene, with beta-carotene levels (on a fresh weight basis) ranging from 30 to 8508 micrograms/100 g (banana); 56 to 4486 micrograms/100 g (giant swamp taro) and 19 to 19,086 micrograms/100 g (pandanus). Yellow and orange coloration was a good indicator for carotenoids in bananas. Giant swamp taro varieties were rich in minerals; one banana variety (*Karat*) was rich in riboflavin.
Significance: These foods/varieties can be promoted to alleviate micronutrient deficiencies and other nutrition-related health problems in Micronesia.
Funding: CDC/UNICEF, Sight and Life, FAO, Secretariat of the Pacific Community

SESSION VI. UNIQUE FOODS OF THE PACIFIC

FIJIAN WILD FOODS AND LOVO COOKING. Bill Aalbersberg, PhD, Shailesh Kumar, MSc, University of the South Pacific, Suva, Fiji

Keywords: Fijian foods, earth-oven cooking, nutrients

Objective: To evaluate the nutrient composition of unique Fiji foods and determine the effect of earth-oven cooking on them.

Methods and Materials: Traditional foods were collected from four sources and a composite analyzed by standard AOAC (Association of Official Analytical Chemists) techniques for a variety of nutrients. Foods were also cooked in a traditional earth-oven and the nutrient changes determined and compared with other types of cooking.

Results: A number of traditional Fijian green leaves, nuts, and fruits have significantly higher nutrient content compared to the Western counterpart foods that are increasingly replacing them. For example, raw taro leaves (*Colocasia esculenta)* and edible hibiscus *(Abelmoschus manihot)* have protein contents of 3.6 and 3.8 g/100g, respectively, compared to around 2g for most cabbages. Retinol equivalents for these traditional green leaves are also quite high at 715 and 508 µg/100g. The taro leaves are traditionally cooked in an earth oven with coconut milk to make "palusami." Root crops and fish/meat are also placed in the oven. Such cooking had expected retention of macronutrients (some water, ash, and fat loss; little protein loss; but the loss of vitamins was quite high in general). Unexpected findings of nutrient retention of much greater than 100% occurred for fat in the case of lean meat, dietary fibre, and β-carotene content. These have been previously noted due to fat migration, development of resistant starch, and increased extractability of β-carotene, respectively.

Significance: Traditional foods have many health advantages and their continued consumption should be encouraged. At the same time, awareness of the effects of different cooking methods and times is needed.

SESSION VI. UNIQUE FOODS OF THE PACIFIC

THE PACIFIC TRACKER (PACTRAC): DEVELOPMENT OF A DIETARY ASSESSMENT INSTRUMENT FOR THE PACIFIC. Carrie L Blitz, RD[1]; Suzanne P Murphy, PhD, RD[1]; Rachel Novotny, PhD, RD[2]; Yun Oh Jung, BS [1]; Donna Lyn M Au, MPH, RD[1]; Nicola Davison, MSc[2], Cancer Research Center of Hawaii, University of Hawaii[1]; Department of Human Nutrition, Food and Animal Sciences, University of Hawaii[2]

Keywords: dietary assessment, food composition, database, Pacific
Objective: We created a computer-based dietary assessment instrument incorporating foods specific to the diet of the Pacific Island population.
Methods and Materials: The PacTrac database is a modification of the Interactive Healthy Eating Index (IHEI) developed by the USDA Center for Nutrition Policy and Promotion as an online interactive dietary assessment tool for use by the public. Creation of PacTrac required two additions to IHEI: (1) a function to save data to allow for later access, (2) Pacific Island foods. Sources for Pacific Island foods included the Cancer Research Center of Hawaii (CRCH) Food Composition Table (FCT) and recipes from Guam and the Commonwealth of the Northern Mariana Islands (CNMI).
Results: 344 foods in the CRCH FCT were added to the IHEI to create PacTrac-1. Feedback from pilot sessions indicated it was too large and therefore difficult to navigate. For PacTrac-2, we removed the original IHEI database (over 7000 foods) and replaced it with the CRCH FCT (2737 foods). Subsequent versions of PacTrac incorporated 85 Guam recipes and 40 CNMI recipes. The current version, PacTrac-4 contains 2903 foods and is being used to analyze dietary data in Hawaii, Guam, and CNMI. Pactrac-4 can be accessed via the CRCH website.
Significance: PacTrac is an alternate method of collecting dietary data for nutrition studies in the Pacific Islands.
Funding Disclosure: Funded by USDA grant #35215-1452 and National Cancer Institute, NIH grant #CA096254.

SESSION VII. DATA FOR SPECIAL POPULATION GROUPS

NUTRITIONAL QUALITY OF KOREAN CHILDREN'S DIET WITH LUNCH AT HOME AND SCHOOL: ANALYSIS OF DATA FROM THE 2001 NATIONAL HEALTH AND NUTRITION SURVEY. Ji Hye Kim, MHE, HeeYoung Paik, ScD, **Jihyun Yoon, PhD,** Department of Food and Nutrition, Seoul National University, Seoul, Korea

Keywords: nutritional quality, Korean children, school lunch, home lunch, 2001 National Health and Nutrition Survey

Objective: This study was conducted to compare the nutritional quality of Korean children's diet with lunch at home and school.

Methods and Materials: The food intake data collected by the 24-hour recall method in the 2001 National Health and Nutrition Survey were analyzed for 7-18 year-old children attending elementary, middle, or high schools. The Home Lunch Group (HG, n=327) was defined as a group of students having eaten a home-prepared lunch at home and the School Lunch Group(SG, n=939) as a group of students having eaten a school-prepared lunch at school.

Results: The SG surpassed HG in the nutritional quality of lunch in terms of average nutrient intakes, comparison with 1/3 of Recommended Daily Allowance(RDA), nutrient density, Index of Nutritional Quality(INQ), Nutrient Adequacy Ratio(NAR), and Mean Nutrient Adequacy Ratio(MAR). The Dietary Variety Score (DVS) for the SG was 18.2, more than double that of the HG (8.6), which supports that a variety of foods were being served in school lunches. The ratio of lunch to one-day energy intake was higher in the SG than that in the HG. Regarding the Nutritional quality of the one-day meal, the SG was superior to the HG in average nutrient intakes and in comparisons with RDA, NAR, MAR, and DVS. Both the SG and HG were low in calcium and iron and high in sodium.

Significance: The results confirm that school-aged children eat more nutritionally-balanced lunches at schools than home, and that nutrient intakes at schools contribute to increasing the nutritional quality of a whole day's intake.

Funding disclosure: This study was partially supported by the Research Fund from the Research Institute of Human Ecology of Seoul National University.

SESSION VII. DATA FOR SPECIAL POPULATION GROUPS

FOOD COMPOSITION INFORMATION FOR ETHNIC POPULATIONS IN THE US. Pamela R Pehrsson, PhD, David B Haytowitz, MS, Joanne M Holden, MS, Nutrient Data Laboratory, ARS, USDA, Beltsville MD

Keywords: diverse populations, food composition, traditional foods
Objective: Ethnic populations in the US (e.g., American Indians/Alaska Natives (AIAN), Latinos, African-Americans, Asian Americans, and Pacific Islanders) have diverse diets that relate to their unique cultures and include indigenous plants and animals and foods imported from their native countries. For most, traditional cultural foods are being replaced with less healthy, mainstream foods, and more sedentary lifestyles contribute to poorer nutritional status and growing health problems, including obesity, diabetes, and cancer. The research objective is to provide traditional food composition data critical to monitoring of public health status among different ethnic populations.
Materials and Methods: Sampling from all tribes or ethnic population subgroups is cost-prohibitive so they are being selected on a probability-proportional-to-size (population) across the 50 states or Indian reservations using 2000 Census or reported tribal enrollment data. Lists of the most highly consumed foods (harvested, hunted, imported, or traditional recipes) are developed from published research, formal and informal health clinic surveys, government surveys, and interviews. Foods are assayed for approximately 100 nutrients using validated analytical methodology and rigorous quality control procedures under the National Food and Nutrient Analysis Program.
Results: Over 100 AIAN and 30 Latino foods have been analyzed to date. Preliminary results show tribal foods are often lower in sodium than mainstream foods and rich in healthful nutrients such as omega-3 fatty acids (i.e., wild fish) and phytonutrients (e.g., wild berries).
Significance: Nutrient data for traditional foods, crucial to monitoring the public health status of ethnic groups, are available in the USDA National Nutrient Database for Standard Reference (SR), NDL Web site, http://www.ars.usda.gov/nutrientdata. **Funding:** USDA and NIH Agreement No. Y1CN5010.

SESSION VII. DATA FOR SPECIAL POPULATION GROUPS

DEVELOPMENT OF A FOOD AND NUTRIENT CODING DATABASE FOR THE NIGERIAN DIETARY INTAKE SURVEY. R Sue Day, PhD, RD, Deirdre Douglass, MS, RD, LD, Human Nutrition Center, University of Texas School of Public Health; Bussie Maziya-Dixon, PhD, International Institute of Tropical Agriculture, Ibadan, Nigeria

Keywords: food coding database, measures, recipes, FNDDS, Nigeria
Objective: To describe the development of the Nigerian-specific food and nutrient coding database by adding Nigerian specific foods, recipes, measure descriptions, and gram weights to information from the USDA Food and Nutrient Database for Dietary Studies (FNDDS).
Methods and Materials: After food intake data were collected in the 2001 Nigerian Food Consumption and Nutrition Survey, a food and nutrient coding database was needed to complete the nutrient analysis. The FNDDS and the Food Intake Analysis System (FIAS) were used to aid creation of foods and recipes specific to Nigeria.
Results: The FNDDS database had only 214 of the basic foods reported to be consumed by Nigerians. Researchers developed food descriptions and nutrient profiles for another 117 foods specific to Nigerian intake. An additional 14 foods were created from ingredients in the FNDDS database. Complete profiles of 14 nutrients were included for every new food from composition books and/or laboratory analyses. Next, 422 recipes were created using the FNDDS and Nigerian foods using the nutrient retention factor recipe methodology. Recipes were kitchen tested to obtain a weight before and after cooking and the weight of typical serving sizes. It was necessary to add 359 measure descriptions to FNDDS foods and 164 for Nigerian foods. Details of the development and examples of recipes will be shown.
Significance: This unique database of foods and recipes for this region of Africa constitutes an important milestone for future diet and nutrition studies. The methodology provides the opportunity to learn how population specific nutrient databases are created.
Funding Disclosure: International Institute of Tropical Agriculture based in Ibadan, Nigeria and USAID

SESSION VII. DATA FOR SPEICAL POPULATION GROUPS

NUTRIENT DATABASE OF COMPETITIVE SCHOOL FOODS: ASSESSING THE SCHOOL FOOD ENVIRONMENT AND EVALUATING ADHERENCE TO SCHOOL NUTRITION POLICIES. Sarah Stone-Francisco, MPH, Lisa Craypo, MPH, RD, Maria Boyle, MS, RD, Liz Schwarte, MPH, Sarah E Samuels, DrPH, Samuels & Associates, Oakland CA

Keywords: school food, policy, evaluation

Objective: To develop a nutrient database of competitive school foods to facilitate evaluating the school food environment and nutrition policy adherence.

Methods and Materials: In several independent evaluations of district-level nutrition policies in more than 50 schools in California districts from Fall 2003 to Spring 2005, an extensive database was developed to catalog the nutrient profiles of >1,000 a la carte foods sold in elementary through high schools. The database contains information relevant to local and state nutrition standards: serving size, package size, calories, fat, saturated fat, and sugar. Nutrient information was obtained from packages, USDA nutrient databases, and calls to food and beverage manufacturers.

Results: More than half of all foods being sold did not adhere to nutrition standards. The majority of trail mix, frozen desserts, cookies, chips, cakes and pastries, fried vegetables, and candy, did not adhere, while all baked chips, seeds and nuts, and most fruit, vegetables, and side salads did. The inconsistent availability of nutrient information and snack manufacturers' responses to researchers' requests has implications for schools' ability to monitor compliance with policies.

Significance: When applied to the foods found on an individual campus, and compared with nutrient standards specified in school, district, or state policies, this database enables food service directors and nutritionists, school personnel, parents, and other stakeholders to assess adherence to the local or regional policy, and to know which foods need to be changed to increase adherence to the policy, thereby improving the school nutrition environment for students and adults, alike.

SESSION VII. DATA FOR SPECIAL POPULATION GROUPS

RELATIVE RISK(S) OF DIETARY/LIFESTYLE FACTORS AND RISK INDEX FOR SELECTED CHRONIC DISEASES AMONG OLDER ADULTS IN KOREA.

Cho-il Kim, PhD, Haeng-Shin Lee, PhD, Yoonna Lee, PhD, Young-Ai Jang, PhD, Hae-Jeung Lee, PhD, Nutrition Research Team, Korea Health Industry Development Institute, Seoul, Korea

Keywords: relative risk, risk index, nutrient intake, chronic disease, prevention

Objectives: Increasing prevalence of chronic diseases (CDs) made the early detection or recognition of the proneness to CDs important in their prevention and/or management. In the process of developing a Risk Index for Chronic Diseases (RICD), we looked into the nutrient/food intake and lifestyle factors of older adults.

Methods and Materials: Starting with data from the 1998 and 2001 National Health and Nutrition Surveys, nutrient intakes of 6,112 adults 40-64 years of age were calculated using a food composition database and matched with health examination records by individual ID. To avoid any bias due to diet/lifestyle changes following recognition of CDs, those diagnosed with a CD before the health exam were excluded, and relative risk (RR) of dietary and/or lifestyle factors was calculated.

Results: Inadequate nutrient intake defined as undernutrition (i.e., intakes for calcium, iron, vitamin A, and riboflavin<EAR and energy intake<75% EER) showed significant RR greater than 1.0 for hypertension and hyperlipidemia compared to fair-to-adequate nutrient intake ($p < 0.05$). While abdominal obesity and lower variety of diet were clear risk factors for hypertension, diabetes, and hyperlipidemia, abdominal obesity was a protective factor (RR=0.329) for anemia. Interestingly, urban residency was protective over rural residency for hypertension, diabetes, and hyperlipidemia. Provisional calculation of RICD with factors of significant RR resulted in a clear difference between patients and non-patients for each CD ($p < 0.001$).

Significance: Further refinement in selecting nutritional/dietary factors to set a cutoff point of RICD with reasonable sensitivity and predictability for each CD incidence would make the risk index useful in preventing CDs under surveillance.

SESSION VII. DATA FOR SPECIAL POPULATION GROUPS

NUTRIENT AND FOOD INTAKES OF AMERICANS: NHANES 2001-2002 DATA

Catherine Champagne, PhD, RD, H Raymond Allen, PhD, Pennington Biomedical Research Center, Baton Rouge, LA

Keywords: dietary intake, achieving diet recommendations

Objective: The objective of this research was to determine how well Americans achieved recommended nutrient intakes.

Methods and Materials: The National Health and Nutrition Examination Survey (NHANES) 2001-2002 data were used to determine the percentages of individuals in various age groupings who met recommended dietary intakes. Fruit juice consumption was of interest since it has been implicated in contributing to the obesity epidemic. A total of 9598 subjects completed the 1-day intake used for this analysis.

Results: Those meeting specific health recommendations varied. Only 38% achieved a total dietary fat intake of <30% of kcals (range 34-47%). Forty-five percent achieved saturated fat recommendations (range 30-58%); however, 72% met cholesterol recommendations (range 49-83%). Depending on the age group, those meeting sodium (22-66%) and fiber (5-24%) recommendations varied the most. Approximately 35% met the calcium recommendation, and 37% met the magnesium recommendation. Vitamin E intakes ranged from 39% to 72% for individuals above one year old. Other vitamins and minerals were generally not of concern. Fruit juices contributed about 2-3% of calories, but remained a significant source of vitamin C, meeting about 1/3 of the daily requirement.

Significance: These results suggest continued counseling to achieve health recommendations. It can be seen from these data that 100% fruit juice consumption did not impact weight status in terms of caloric contribution. With the continued focus on the global obesity epidemic and the implications of beverage consumption in that complex scenario, more research is needed on various other types of beverages, e.g. soft drinks and fruit drinks, which Americans choose.

Funding Disclosure: This research was not supported by any additional funding source outside of the Pennington Center.

SESSION VIII. ADVANCES IN USING FOOD COMPOSITION DATA FOR DIETARY ASSESSMENT

FOOD AND NUTRIENT COMPONENTS, STANDARDS AND SCORING IN THE REVISED HEALTHY EATING INDEX. **Patricia M Guenther, PhD, RD**[1], Jill Reedy, PhD, RD[2], Susan M Krebs-Smith, PhD, RD[2], P Peter Basiotis, PhD[1], [1]Center for Nutrition Policy and Promotion, USDA; [2]National Cancer Institute, NIH

Keywords: dietary assessment; food patterns; dietary standards.
Objective: The Healthy Eating Index (HEI) is a measure of diet quality, used to monitor change in diet quality of the US population and to measure conformance to dietary guidance at both the individual and population level. The release of 2005 *Dietary Guidelines for Americans* motivated an update of components, standards, and scoring of the HEI.
Methods: The HEI is based on the new USDA food guide, MyPyramid, which has 12 patterns representing recommended amounts of food groups to consume at various calorie levels. The Pyramid Servings Database (PSD), version 3, conforms to the new food guide by separating solid fat from oils (formerly grouped together as "discretionary fat"). This database and the Food and Nutrient Database for Dietary Studies (FNDDS) were used to create the components of the revised HEI. Distributions of population 1-day intakes were considered when setting scoring criteria**.**
Results: Key aspects of diet quality selected as components for the revised index are measures of total and non-juice fruit; total, dark-green, and orange vegetables and legumes; total and whole grains; milk; meat and beans; oils; sodium; calories from saturated fat; and calories from solid fats, added sugars, beer, wine, and distilled spirits. Standards for scoring all the components are expressed per 1,000 calories of energy intake.
Significance: The revised HEI is an important application of the FNDDS and the PSD. These two databases were used to create a tool for assessing total diet quality in terms of key recommendations found in the *Dietary Guidelines for Americans, 2005*.

SESSION VIII. ADVANCES IN USING FOOD COMPOSITION DATA FOR DIETARY ASSESSMENT

DEVELOPMENT OF A GLYCEMIC INDEX DATABASE FOR DIETARY ASSESSMENT. Sally F Schakel, RD, LD, Rebecca Schauer, RD, LD, Nutrition Coordinating Center, University of Minnesota; John H. Himes, PhD, MPH, University of Minnesota

Keywords: glycemic index; database
Objective: To address a growing research interest and need, a glycemic index (GI) database was developed for the more than 18,000 foods in the University of Minnesota's dietary data collection software, the Nutrition Data System for Research (NDSR).
Methods: The primary source of data was current scientific literature with GI selected whenever possible from studies that used the following methodology: North American foods, healthy subjects, and a 2-hour glucose response. Two GI numbers were included for all foods, one based on glucose as a reference, and the other, a white bread reference. Assigning indices within a large database also required imputation, as there are comparatively limited data available from the literature. For database foods that were not a match to foods in the literature, GI was either estimated from similar foods or calculated from available carbohydrate amounts and the GI of ingredients within the food. To evaluate the calculation procedure, GIs were calculated and then compared to known literature values for 102 multi-ingredient foods.
Results: A wide range of ready-to-eat cereals, baked goods, and candy had comparable GIs, while dairy products, such as ice cream, showed larger GI differences. For 71% of the comparisons, both methods classified a food similarly as low-, medium-, or high-glycemic, or GI differences were less than 10%.
Significance: The GI database provides researchers with a tool to identify low- and high-GI foods and test whether substitution of one for another within a diet will influence disease risk factors.

SESSION VIII. ADVANCES IN USING FOOD COMPOSITION DATA FOR DIETARY ASSESSMENT

THE GERMAN NUTRIENT DATABASE AS A THE BASIS FOR THE CALCULATION OF NUTRITIONAL STATUS OF THE GERMAN POPULATION.   Ana Lucía Vásquez-Caicedo, Bernd M Hartmann, Simone Bell, Christine Brombach, PhD, National Nutrition Survey, Federal Research Centre for Nutrition and Food, Karlsruhe, Germany

Keywords: Nutrition Survey, Nutrient Database

Objective: To explain how the German nutrient database serves as the basis for determining the nutritional status of the German population.

Description: The second German National Nutrition Survey (NVS II) is currently being conducted at the Federal Research Centre for Nutrition and Food (BfEL) in Karlsruhe. 20,000 participants between 14 and 80 years of age are being interviewed nationwide. Statements about energy and nutrient intake are expected to be obtained from this study using the German Nutrient Database (BLS). The BLS is the basis for the data collection software DISHES used to obtain data on the habitual dietary intake, and for the final analysis of the data generated by interviews with the software EPIC-Soft for 24-hour recalls. In addition, the BLS is the source for nutrient calculation from dietary weighing records, obtained from a sub-sample of the interviewees. Through this collaboration, the BLS receives direct feedback on food consumption, and is able to rapidly react by adding information on new food items and recipes. Furthermore, the harmonization of this database with other European food composition databases, on the frame of the European Food Information Resources Network (EuroFIR), will optimise the quality of the data on nutrients, providing results comparable to other European studies. Accordingly, actualization regarding documentation, food indexing, analytical methods, recipe calculation, yields and retention factors are being undertaken. Furthermore, the BLS is going through several technical innovations, including its online availability and a new nutrient computing program for data generation. This program represents an online cooperation platform, which is modular, scalable, and administered through a browser.

Significance: This work describes the development of the German Nutrient Database through knowledge exchange at different levels.

SESSION VIII. ADVANCES IN USING FOOD COMPOSITION DATA FOR DIETARY ASSESSMENT

RELATIONSHIPS BETWEEN PATIENT VARIABLES AND COMPUTERISED DIETARY ASSESSMENT IN A PRIMARY HEALTHCARE SETTING. Yasmine Probst, MSc, GradCertBus, PhD Candidate, Linda Tapsell, DipEdNutr, PhD, FDAA, Marijka Batterham, MSc, MStat, PhD, AdvAPD, University of Wollongong, Wollongong, NSW, Australia

Keywords: Internet, dietary assessment, primary healthcare
Objectives: To determine relationships between patient variables and use of a self-administered dietary assessment website in the primary healthcare setting.
Methods and Materials: Relationships between age, BMI, and computer experience/ ownership and usage were assessed. Chi square and ordinal regression models were developed using data from 188 patients using the website over 12 months. Under-reporting was related to a factor of basal metabolic rate.
Results: 125 (66.5%) female and 63 (33.5%) male patients used the website. 72.9% were overweight (BMI >25kg/m²). Advanced/intermediate computer users were 17.1 times more likely to own a computer than beginners or patients who had never used a computer. Patients with a higher BMI were 1.9 times (p=0.04) more likely to use the computer at home than in the GP practice, and patients aged <35 years and using the computer at home were 16.8 times more likely to be advanced computer users than patients aged >56 years using the computer in the GP practice. Nutrient intake data was more likely to be over-reported or on target than under-reported by patients.
Significance: Finding innovative ways for overweight patients to report intakes in the primary healthcare setting may include the use of computers. Overweight patients may feel greater comfort having their diet assessed in their own home, and any social desirability bias may be decreased due to the limited face-to-face contact required.
Funding Disclosure: ARC linkage grant between the University of Wollongong, Illawarra Division of General Practice and Xyris Software Australia.

SESSION VIII. ADVANCES IN USING FOOD COMPOSITION DATA FOR DIETARY ASSESSMENT

DEVELOPMENT OF THE IOWA BONE NUTRIENT FFQ FROM CSFII DATA.
Julie M Eichenberger Gilmore, PhD, RD, LD, College of Dentistry, University of Iowa; Phyllis J Stumbo, PhD, RD, LD, General Clinical Research Center, University of Iowa and Teresa A Marshall, PhD, RD, LD, College of Dentistry, University of Iowa, Iowa City IA

Keywords: FFQ, calcium assessment, serving sizes, CSFII
Objectives: To develop an easily administered FFQ/dietary screener for current (adult) and retrospective (adolescent) intakes of nutrients important for bone development and maintenance; and to quantify serving sizes and nutrients from foods using gender and age specific techniques.
Methods and Materials: Nutrients of interest were calcium, vitamin D, caffeine, and alcohol. Fifteen categories of foods were selected for inclusion in a FFQ/dietary screener based on frequency of intake and nutrient density. Calcium contributing foods were selected from published dietary intake assessment tools. Food items contributing vitamin D, caffeine, and alcohol were selected based on nutrient density and Midwest consumption practices. Serving sizes were quantified in standard serving units or as small, medium, and large servings. Food items selected for the FFQ/dietary screener were matched to CSFII foods. Calcium, caffeine, and alcohol nutrient values were assigned using CSFII data files at median values per 100 g intake. CSFII midpoint tertile frequency of intake values for males and females 14 - 18 and 25 - 45 years old were used to establish serving weights for small, medium and large servings.
Results: CSFII data files provide an efficient way for estimating typical intakes, serving sizes, and nutrient values for target groups.
Significance: Age and gender derived data provide realistic estimates of nutrient intakes when utilizing FFQ/dietary screener assessment methods.

SESSION VIII. ADVANCES IN USING FOOD COMPOSITION DATA FOR DIETARY ASSESSMENT

UTILIZING NUTRIENT DATA TO DETERMINE PROPER PORTION SIZES IN FAST FOOD RESTAURANTS. James E Painter PhD, RD, Eastern Illinois University, Charleston IL

Keywords: nutrient data, food portion, weight control

Objective: To document that the consumer can use nutrient data provided by fast food restaurants to maintain weight and health while consuming exclusively fast food for 30 days.

Methods and Materials: One 250 lb male and one 110 lb female consumed exclusively fast food for 30 days. Subjects used nutrient data to consume their assigned portions, 4,500 calories/1500 calories per day for the male and female subjects, respectively. Intake was monitored to assure compliance. Body weight, percent body fat, blood lipids, and liver function were monitored by a medical doctor prior to the study, at two weeks, and at 4 weeks. The subjects were told to make healthy food choices and consume proper portions.

Results: Subjects were able to find healthy food options at fast food restaurants. They lost 2–4 lbs, total cholesterol dropped by 5%, pre-study body fat percentage was maintained, liver enzymes improved or remained normal, and blood triglycerides remained in the normal range.

Significance: People can consume fast food and maintain weight and health if nutrient data are used to make healthy choices and consume proper portions.

SESSION IX. ANALYTICAL METHODS, DATA QUALITY, AND DATA VARIABILITY

QUALITY CONTROL PROCEDURES FOR NUTRIENT DATABASES. Jaspreet KC Ahuja, MS, Betty P Perloff, BS, Beltsville Human Nutrition Research Center, ARS, USDA, Beltsville MD

Keywords: Database quality, quality control checks, nutrient database

Objective: To describe the quality control (QC) procedures for the Food and Nutrient Database for Dietary Studies (FNDDS) nutrient values file and to provide a guide and protocol for application of FNDDS QC checks to other nutrient databases.

Methods: A detailed QC plan has been developed for the FNDDS nutrient values file over the years. Multiple, automated checks are performed for all new and revised data at different stages of the update process – pre-update, during update, and post-update. Based on the purpose of the checks, they can be grouped into three main categories – nutrient integrity checks, database integrity checks, and database validation checks.

Results: Details of QC checks used for the FNDDS nutrient values file will be given. The procedures used and our experiences with them will be discussed with examples.

Significance: Accurate dietary assessment is dependant on a high-quality food and nutrient database. While much progress has been made in analytical data quality control, the area of database quality control remains largely uncovered. Increased automation of database maintenance and update processes necessitate stringent quality control procedures. The QC checks used for the FNDDS nutrient values file can serve as a guide for developing and maintaining other nutrient databases.

SESSION IX. ANALYTICAL METHODS, DATA QUALITY, AND DATA VARIABILITY

VARIABILITY OF THE NUTRIENT COMPOSITION OF MULTIVITAMIN SUPPLEMENTS. Song-Yi Park, PhD, Suzanne P Murphy, PhD, RD, Donna Au, MPH, RD, Laurence N Kolonel, MD, PhD, Cancer Research Center of Hawaii, University of Hawaii, Honolulu HI

Keywords: Multivitamin supplements, supplement composition, nutrient intakes

Objective: To examine the variability in nutrient composition among dietary supplements reported by a large sample of older adults.

Methods and Materials: Multivitamin users in the Multiethnic Cohort in Hawaii (n=29567) provided detailed information on product name(s) and frequency of use on a mailed questionnaire in 2000-2003. The nutrient profile of each supplement, based on the supplement's label, was entered into the Cancer Research Center of Hawaii's Supplement Composition Table.

Results: A total of 1654 multivitamin products with (n=1411) or without (n=243) minerals were reported. The vitamin composition of the products tended to be highly variable. For example, more than half of the products contained no β-carotene. The interquartile range was 5 times higher than the median for thiamin, riboflavin, pantothenic acid, vitamin B-6, and vitamin E. However, the median and 75th percentile were the same for folate, indicating that many products contained the same amount. The mineral composition of the products with minerals was also variable, particularly for iron. Median vitamin intakes from multivitamin supplements were well above the recommended daily value (RDA or AI) except for vitamin C and vitamin D. Intakes of nutrients from supplements were highly variable for most nutrients.

Significance: We found that the composition of multivitamin supplements was highly variable and that supplements contributed substantially to the intakes of nutrients. To accurately estimate nutrient intakes from multivitamins, brand and product information should be collected so as to identify the exact supplement composition, instead of assuming a uniform nutrient profile.

SESSION IX. ANALYTICAL METHODS, DATA QUALITY, AND DATA VARIABILITY

MULTI-COMPONENT METHODS FOR ANALYSIS OF VITAMIN AND MINERAL DIETARY SUPPLEMENTS. James M Harnly, PhD, Pei Chen, PhD, Wayne R Wolf, PhD, Food Composition Laboratory, BHNRC, ARS, USDA, Beltsville MD

Keywords: multi-component methods, dietary supplements, vitamin supplements, mineral supplements, analytical methodology

Objective: As part of the effort to establish a USDA Dietary Supplement Ingredient Database (DSID), methodology for the analysis of vitamins and mineral supplements was evaluated and a new multi-component method for eight water-soluble vitamins was developed. In the last 6 months, we have developed a multi-component method for the determination of eight water soluble vitamins (B_1 - thiamine, B_2 – riboflavin, niacin, B_6 - pyridoxine, folic acid, pantothenic acid, biotin and C - ascorbic acid,) in vitamin supplements. This method is based on LC separation with UV/Vis absorbance, molecular fluorescence, MS/MS, and/or stable isotope dilution-MS detection. Stable isotope labeled vitamins were obtained either commercially or by custom synthesis in collaboration with the Office of Dietary Supplements, NIH and the NIST. Metal concentrations were determined simultaneously by inductively coupled plasma-atomic emission spectrometry (ICP-AES), a common multi-element technique.

Results: Analytical methods for vitamins and minerals are plentiful but have not been incorporated into multi-component methods (vitamins) or have not been applied to analysis of supplements (minerals). Methods for vitamins are common but are historically based on microbiological or radio-immunological assays. Only in the last 10 years have serious attempts been made to use liquid chromatography with mass spectrometry (LC-MS) to quantify specific vitamin compounds. Multi-component (LC-MS) methods have not been considered. For the multi-component method developed here, method of additions and recovery studies showed completeness of extraction and absence of significant matrix effects, and spike recoveries demonstrated no significant matrix interferences for the supplement binders tested. Multi-component results for an in-house vitamin and mineral supplement quality control material will be discussed.

Significance: A successful multi-component method for the determination of eight water soluble vitamins was developed that will be applicable to vitamin supplements.

SESSION IX. ANALYTICAL METHODS, DATA QUALITY, AND DATA VARIABILITY

THE IMPORTANCE OF SAMPLE SOURCE IN MAKING NUTRIENT COMPARISONS OF FOODS. Charlene Rainey, Food Research, Inc.; Leslie Nyquist, Food Research, Inc., Costa Mesa CA

Keywords: sampling design, comparative claims, regulatory compliance

Objective: Comparative nutrient claims are often based on nutrient composition databases. The objective of this paper is to demonstrate the role sampling plays in the development of food composition studies and the resulting nutrient databases which are the basis for comparative claims.

Methods: Every food composition study has three distinct phases: sampling, analysis and the math used to summarize the data. Of the three, sampling plays a critical role in creating a valid food composition study that ensures regulatory compliance, yet it is often the least documented and most problematic. Sampling design and documentation are critical to improving the quality of food composition databases. This presentation will discuss various aspects of designing and implementing the collection of representative samples for food composition studies. Topics will include: consideration of variables (regions, seasons, varieties, brands, market share), point of sampling (market-basket, production line, warehouse), pre-sampling surveys, coordination of samplers and laboratories, sample documentation and chain-of-custody, sample handling, and composites for analysis.

Results: Examples of sampling design and documentation will be reviewed, as well as examples of claims that compare foods based upon different databases and sampling designs.

Significance: Sampling procedures are critical for regulatory compliance in nutrition labeling. Differences in sampling design for nutrient databases can lead to misinterpretation of results and misleading comparative claims.

SESSION IX. ANALYTICAL METHODS, DATA QUALITY, AND DATA VARIABILITY

UNDERSTANDING NUTRIENT VARIABILITY: IMPACT ON PUBLIC HEALTH. Joanne M Holden, MS, Pamela R. Pehrsson, PhD, Charles R Perry, PhD, Kristine Y Patterson, PhD, David B Haytowitz, MS, ARS, USDA, Beltsville MD

Keywords: data quality, nutrient variability

Objective: Information on the sources and magnitude of nutrient variability in US foods is often lacking and may include differences due to cultivars, brands, growing or processing conditions, cooking practices, fortification, nutrient stability, and analytical methods. Accurate analytical determination of variability (with minimal errors in measurement) is especially important for critical nutrients and application of food composition data in dietary guidance programs.

Methods: The National Food and Nutrient Analysis Program (NFNAP) generates high quality estimates of food components, expanding and improving the quality of data in USDA food composition databases. Nationally representative sampling plans, adequate sample size, and rigorous sample handling and analytical protocols ensure quality data for estimating nutrient variability. Variability is examined among 1) brand-specific composites; 2) individual samples; 3) production/growing locations (e.g., agricultural commodities); 4) harvest seasons/locations (e.g., fresh produce); and 5) analytical methods and laboratories.

Results: An ANOVA in select foods showed wide variability for nutrients due to brand and location (e.g., 46-89% of the variability in proximates in frozen cheese pizza). Fluoride in drinking water ranged from <20 mcg (wells) to 100-110 mcg (municipal) per 100 g across 144 national locations. A region effect was detected for over 10 nutrients in fast food hamburgers across chains. Vitamin D variability data in milk will also be presented.

Conclusion: These techniques for assessing nutrient variability allow improved monitoring of estimates of the composition of foods, including fortified foods, and nutrient intakes, product development, and information for planning future studies and assessing adequacy of analytical programs.

ABSTRACTS FOR POSTER PRESENTATIONS (Organized by ADA Learning Need Codes)

COMPOSITION OF FOODS, NUTRIENT ANALYSIS (2020)

INTERACTIVE ACCESS FOR THE CANADIAN NUTRIENT FILE, 2005.

Josephine Deeks, Marie-France Verreault, Margaret Munro, Maya Villeneuve, Banting Research Centre, Ottawa, Ontario, Canada

Keywords: access, interactive, online, national reference, database

Objective: The Canadian Nutrient File is Canada's national standard reference food composition database. In 2003 consultations with stakeholders revealed that a vital requirement was to have a more user-friendly program with which to access the nutrient data, because only a small number of clients were able to use the electronic relational files available for download,.

Methods and Materials: A program had previously been developed to edit and maintain data updates. A component of this software served as the JAVA template in which users are able to search either in English or French, by partial food names or food codes. Once one has located the food of interest, the next screen presents choices among reasonable serving sizes including one which corresponds to the Canada's Food Guide for Health Eating (CFGHE). Upon choosing a serving size, a report is generated profiling the available nutrient data in the chosen portion of the food.

Results: Consumer feedback for the new service is very positive. We are planning to conduct a consumer satisfaction survey in 2007. In addition, the number of queries to CNF staff is much reduced as clients can locate the data independently.

Significance: The CNF continues to fill the need for reference nutrient data for use on population nutrition studies that investigate diet and disease/risk assessment. The new interactive web program makes accessing the database more user-friendly allowing greater dissemination to a greater number of users who can now use the nutrient data to positively influence healthy eating and better food choices.

COMPOSITION OF FOODS, NUTRIENT ANALYSIS (2020)

EFFECTS OF CHANGING THE GRAIN DESIGNATION FOR CORN TORTILLA SNACK PRODUCTS. Kristin Marcoe, MBA, RD, Center for Nutrition Policy and Promotion, USDA, Alexandria VA

Keywords: MyPyramid, whole grains, refined grains

Objective: Because new proposed definitions for whole grain foods may no longer include corn tortilla snack products, this analysis was conducted to determine the effects on MyPyramid composites and nutrient profiles of changing the designation of corn snack products from whole grain (WG) to refined grain (RG).

Methods: Composites for WG and RG subgroups in MyPyramid were developed using 1-day food consumption data from the National Health and Nutrition Examination Survey 1999-2000 for 8,070 individuals ages 2 and over. The Pyramid Servings Database (PSD) was used to calculate amounts consumed from WG and RG subgroups. The USDA National Nutrient Database for Standard Reference, Release 17 (2004) was used to calculate nutrient profiles of each composite. Various corn snack products (e.g., tortilla chips) included WG equivalents in the PSD; these made up 22.9% of the WG composite. The WG components of these foods were regrouped with RG.

Results: Corn snack products comprised 3.2% of the revised RG composite. WG cereal and bread contributions to the WG composite increased by 10.7% and 7.0%, respectively. Magnesium (27.2 to 30.0 mg per ounce equivalent), iron (1.8 to 2.2 mg), zinc (0.9 to 1.1 mg), and fiber (2.4 to 2.6 g) increased in the revised WG nutrient profile. Folate dropped (59.1 to 57.2 mcg DFE) and magnesium rose (7.0 to 7.4 mg) in the revised RG profile. Estimates of WG consumption decreased by 0.19 ounce equivalents per day.

Significance: Changing corn snack products' grain components impacts MyPyramid composites, nutrient profiles, and estimates of WG consumption.

COMPOSITION OF FOODS, NUTRIENT ANALYSIS (2020)

SYNCHRONIZATION AND STANDARDIZATION OF FOOD CODES IN DATABASES. Haeng-Shin Lee, PhD[1], Young-Ai Jang, PhD[1], Yoonna Lee, PhD[1], Hae-Jeung Lee, PhD[1], Bok-Hee Kim, PhD[2], Cho-il Kim, PhD[1], [1]Nutrition Research Team, Korea Health Industry Development Institute; [2]Department of Food Science and Nutrition, Chosun University

Keywords: food coding system, database, classification, description
Objectives: With many different databases on food composition and nutrients in Korea, interrelating or connecting data among databases has not been possible. Acknowledging such problems and limitations, we attempted to devise a food coding system to enable interrelating, interchanging and sharing of informations obtainable through aforementioned databases.
Methods and Materials: Information on preexisting food databases in Korea and any ongoing international activities to standardiz/harmonize food coding systems in relavant databases were collected and evaluated. Then, we conducted a survey to determine the demands of the possible user groups of food databases. With this information, issues to be considered in devising a standardized food coding system were identified; enough comprehensiveness, more flexibility, broader expandability, and higher compatability were the four most important points.
Results: Development of the Korea Food and Nutrient Data System (KFNDS), which accommodates our draft food coding system, was proposed. Suggested basic component data files of KFNDS are: Base file (Food description file, Nutrient composition file, Recipe file, Weight file), Support file (Food group description file, Nutrient description file, Nutrient data sources file, Nutrient Retention file, Sample and analysis file), and Connection files (HS code file, Agriculture and Fisheries code file, INFOOD file, Import food code file, Country code file, Area code file, Company code file). The coding schemes in each data files are under development.
Significance: Food databases could become more accessible for stakeholders to use for their own purposes and for government to develop food- and health-related policies.

COMPOSITION OF FOODS, NUTRIENT ANALYSIS (2020)

VARIATIONS IN THE NUTRIENT PROFILE OF RICE ACROSS THREE PACIFIC ISLANDS.

Rachael T Leon Guerrero, PhD, RD, University of Guam; Suzanne Murphy, PhD, RD, University of Hawaii; Karen Todd, MS, RD, University of California, San Francisco; Mary Kretsch, PhD, RD, Joanne Holden, MS, Agriculture Research Service, USDA.

Keywords: nutrient variation, nutrient enrichment, rice

Objective: To determine the nutrient profile of white rice, a staple foods in Pacific Island populations.

Methods and Materials: Information on the enrichment levels of thiamin, niacin, iron, and folate was collected from the Nutrition Facts panel on food labels for samples of white rice in Oahu, Hawaii; Guam; and Saipan in the Commonwealth of the Northern Marianas Islands. Initially, samples from one package from Guam were analyzed after being prepared in three ways: (1) according to the label directions (unwashed); (2) washed twice in local water; and (3) superwashed by scrubbing the rice in local water, as is the local custom. A more comprehensive sampling of 17 rice brands was then collected and analyzed.

Results: The initial samples from Guam were taken from a single rice package that was labeled "enriched." However, the analyses indicated the levels of the four enrichment nutrients were similar to those of unenriched rice. There was little variation in the nutrient values of the unwashed and washed samples. For example, iron levels were 0.30, 0.08, and 0.15 mg/100g in the three samples, compared to 1.49 mg/100g that would be expected in enriched rice. Results from analyses of 17 additional brands will be presented at the time of the meeting.

Significance: The information on enrichment levels will be used to determine nutrient values used for the Pacific Tracker, a food composition database being developed by the Cancer Research Center of Hawaii, and will enhance the accuracy of nutrient intake estimates for island populations.

COMPOSITION OF FOODS, NUTRIENT ANALYSIS (2020)

TEA CONSUMPTION IS A DETERMINANT OF FLAVONOID INTAKE AMONG US ADULTS. Ock Kyoung Chun, PhD, MPH, Sangjin Chung, PhD, RD, **Won O Song, PhD, MPH, RD**, Food Science and Human Nutrition, Michigan State University, East Lansing MI

Keywords: flavonoid, tea consumption, USDA Flavonoid databases, National Health and Nutrition Examination Survey

Background: Intake of flavonoids, through antioxidant properties, has been inversely associated with the incidence of chronic diseases. Determinants of flavonoid intake have not yet been identified in free-living adults in the US.

Objectives: We tested the hypotheses that tea is the major dietary source of flavonoids in adults 19 years and over and that tea consumers differ from tea non-consumers in sociodemographics, health-related behaviors, dietary and beverage intake, and the sum and type of flavonoid intake.

Methods and Materials: We matched the recently released flavonoid contents of the USDA Flavonoid Databases with dietary intake data from the most recent consumption figures representative of the total US population from NHANES of 1999-2002. Participants (8,809 adults, aged $\geq$ 19 years) were divided into two groups according to tea consumption based on 24-hr dietary recalls as tea consumers vs. tea non-consumers.

Results: Tea was consumed in a day by 21.3% of US adults. Daily total flavonoid intake of tea consumers was far higher than that of tea non-consumers (697.9 vs. 32.6 mg/d) and per capita flavonoid intake from tea averaged 157 mg/d. The tea consumers tend to be older, female, Caucasian, and higher income than tea non-consumers ($p< 0.001$); have lower non-leisure time physical activity level ($p < 0.01$) and take dietary supplements ($p < 0.001$) than tea non-consumers. Intake of flavonols and flavan-3-ols, the major tea flavonoids, differed between the two groups ($p < 0.001$). Major dietary flavonoids sources without tea were citrus fruit juice, wine, and citrus fruits for both tea consumers and non-consumer groups. For tea non-consumers, flavonoids from wine, fruitades, and fruit drinks were higher than those from tea consumers.

Significance: Flavonoid intake among subgroups differs mainly due to the percent of tea consumers and prevalence of tea consumption within each subgroup.

COMPOSITION OF FOODS, NUTRIENT ANALYSIS (2020)

UPDATING WEIGHTS AND PERCENT REFUSE FOR RAW FRUIT IN THE USDA NATIONAL NUTRIENT DATABASE FOR STANDARD REFERENCE.

Susan Gebhardt, MS, Robin Thomas, MS, RD, Nutrient Data Laboratory, BHNRC, ARS, USDA, Beltsville MD

Keywords: fruit, weights, measures, refuse

Objective: To update the common household measures, gram weights and percent refuse for raw fruit in the USDA National Nutrient Database for Standard Reference (SR).

Methods and Materials: For the National Food and Nutrient Analysis Program (NFNAP), selected raw fruits were picked up in 12 locations across the US at two different times of the year. In addition to analyzing these samples for nutrient content, individual pieces of fruit were weighed and measured before and after the removal of refuse, such as skin, seeds, and/or stems. These data, in addition to information from the Agricultural Marketing Service, Food and Drug Administration, food industry organizations, and Price Look-Up (PLU) sizes, were used to reassess the weights and % refuse for selected raw fruit in SR.

Results: Discrepancies arose among the various sources and methods for determining the weights and sizes for many fruits and had to be resolved. Reassessment of weights for a few fruits, including apples and peaches resulted in significant changes in gram weights. For example, the weight of small and medium peaches increased by more than 50%.

Significance: Weights and measures and refuse are important for dietitians, researchers, educators and consumers to help estimate the nutrient content in a specified portion of food. For foods that are frequently consumed a modest change in the gram weight for one serving of fruit can have significant impact on food consumption surveys and other research studies.

COMPOSITION OF FOODS, NUTRIENT ANALYSIS (2020)

NUTRIENT DATABASES: WHEN THE END-USER IS NOT A SCIENTIST.
Priscilla Connors, PhD, RD, University of North Texas, Denton TX

Keywords: consumers, nutrient databases, nutrition software
Objective: To discuss consumer use of nutrient analysis tools designed for scientists.
Description: Reasonably prices CDs and unfettered access to the Internet have allowed consumers to acquire nutritional information once deemed unobtainable by the lay public. As populous use of food composition tables and nutrient analysis software becomes the norm, questions arise as to the reliability of these scientific tools once they are placed in the hands of consumers. For example, the ability of consumers to correctly use data entry screens and reliably interpret results is questionable. In addition, eccentricities accepted by trained professionals as typical of nutrient analysis software now emerge as factors that impact usability and accuracy when used by untrained consumers. The purpose of this poster presentation is to discuss the world of nutrient analysis from the end-user perspective, notably, when that end-user is not a scientist. Common stumbling blocks, such as food item descriptions that are not in the vernacular and serving sizes that fail to reflect the world as experienced by the consumer are outlined. Subtle issues, such as measurement choices that place the most familiar units last, or food item lists that place food combinations before the most basic form are reviewed.
Significance: Recommendations are made for improvement in both interface presentation and education of the end-user that offer to increase satisfaction with the experience of using nutrient databases and analysis software.

ASSESSMENT METHODOLOGY (3010)

KEEPING A DATABASE UP-TO-DATE FOR A CONTINUOUS SURVEY. Betty Perloff, Janice Bodner Montville, Jaspreet KC Ahuja, Grace Omolewa-Tomobi, Kaushalya Y Heendeniya, Food Surveys Research Group, Beltsville Human Nutrition Research Center, ARS, USDA, Beltsville MD

Keywords: dietary assessment, nutrient database

Objective: To provide current, reliable data (food descriptions, portion weights, nutrient values) in the Food and Nutrient Database for Dietary Studies (FNDDS) for processing What We Eat in America, the dietary interview component of the National Health and Nutrition Examination Survey (NHANES).

Methods: The FNDDS was updated for use with NHANES 2003-2004. Protocols were established and followed for adding, deleting, and changing food items and portion weights. Nutrient values were calculated based on USDA National Nutrient Database for Standard Reference (SR), Release 18, the most current at updating time. New SR items were incorporated where appropriate, e.g., items representing new commercial fats and oils replaced items for fats no longer used. Data for two additional nutrients (added vitamin B-12 and added vitamin E) were included, bringing the total number in the FNDDS to 63.

Results: FNDDS-2.0 is available for research using NHANES 2003-2004, for other dietary studies, or in dietetic practice.

Significance: Current food composition data, in an easy-to-use format and providing comparability with the latest NHANES dietary data, can be downloaded from http://www.ars.usda.gov/ba/bhnrc/fsrg.

ASSESSMENT METHODOLOGY (3010)

WEB-BASED RESOURCES FOR ENHANCING DIETARY DATA ANALYSIS: WHAT WE EAT IN AMERICA, NHANES. Nancy Raper, MS, Cecilia Wilkinson Enns, MS, Randy LaComb, MS, **Jaspreet Ahuja,** Food Survey Research Group, ARS, USDA, Beltsville MD

Keywords: What We Eat In America, NHANES, dietary data, FNDDS, What's In The Foods You Eat, time trends.
Objective: To enhance researchers' ability to analyze dietary intake data, resources available on USDA's Food Surveys Research Group website will be highlighted.
Methods: The USDA Food and Nutrient Database for Dietary Studies (FNDDS), version 2.0, used to process the 2003-04 What We Eat In America (WWEIA), NHANES dietary intake data, was released in 2006. This updated version provides food composition values for food energy and 62 nutrients including two new additions for the "added" forms of vitamin B12 and vitamin E. These two new added nutrients will allow researchers the ability to compare dietary intakes to Dietary Reference Intakes for the vitamin B12 requirement for individuals over 50 years of age that is to be met mainly from fortified foods, and for the Upper Tolerable Level for vitamin E that applies to synthetic forms obtained from supplements and fortified foods. What's In The Foods You Eat Search Tool provides a searchable version of selected FNDDS components.
Results: Researchers may access FNDDS 2.0 and the search tool on the FSRG website at http://www.ars.usda.gov/ba/bhnrc/fsrg.
Significance: These tools may be used in research projects using the 2003-04 WWEIA food intake data and in other food intake studies.

ASSESSMENT METHODOLOGY (3010)

USING A MODIFIED VERSION OF THE USDA'S AMPM SOFTWARE: THE CANADIAN EXPERIENCE. Maya Villeneuve, Isabelle Massarelli, Paula Roach, Isabelle Rondeau, **Josephine Deeks,** Health Canada, Food Directorate, Ottowa, Ontario, Canada

Keywords: AMPM, survey, nutrition
Objective: To customize the USDA Automated Multiple-Pass Method (AMPM) for 24-hour recall data collection in the Canadian Community Health Survey – Nutrition (CCHS 2.2).
Methods and Materials: This software was chosen for many reasons: manual data collection was not possible due to the large sample size; the high cost of developing a new data collection tool; type of interviewers utilized; and compatibility between the US and Canadian food composition databases. Modifications included: addition of Canadian brands and foods, metric measures, and French translation.
Results: Too many choices in the look-up tables (LUT) led to wrong food selections. The advantages of the Trigram search were lost when both languages appeared jointly in the main food list (MFL) and LUT. Interviewers had difficulties navigating through some challenging situations and the tool was used, for the first time, weeks after training.
Significance: The USDA AMPM is an excellent tool for 24-hour recall data collection. The process has been initiated by Health Canada to maintain and update the tool for future nutrition surveillance and research activities. Modifications will be implemented to resolve the challenges encountered during the CCHS 2.2. Separating the French from English in the MFL and LUT, restoring the Trigram search, adapting questions in problematic categories, and narrowing possibilities of answers in LUT would reduce errors and improve accuracy of this valuable tool.

ASSESSMENT METHODOLOGY (3010)

DEVELOPING A DATABASE AND A FOCUSED FOOD FREQUENCY QUESTIONNAIRE FOR ASSESSING DIETARY ARSENIC INTAKE FOR A BI-NATIONAL ARSENIC EXPOSURE STUDY. Ellen J Graver, MS, Robin Harris, PhD, MPH, Vern Hartz, MS, Robin Whitacre, BS, Cynthia A Thomson, PhD, RD, Jason Roberge, MPH, Katie Holton, MPH, Graciela Caire, Arizona Cancer Center, Tucson AZ

Keywords: Arsenic FFQ, Arsenic Database
Objective: Arizona and Sonora, Mexico investigators are evaluating associations between elevated arsenic (As) exposure and selected genetic polymorphisms.
Description: An inorganic As database was developed to be used in conjunction with a focused As Food Frequency Questionnaire (FFQ). It was derived from the 1999 Market Basket Survey (MBS) of Inorganic As in Food. Forty MBS commodities were matched with 40 lines on the focused As FFQ. The mean concentration of As in each of the 40 foods on the As FFQ represent the average concentration of As that a person would be exposed to after repeated consumption of that food over a one year period. An analysis program to connect As dietary data from the As FFQ and the As database was developed. Total daily average As exposures from food (g/day) for individuals were computed as the sum of the product of the mean residue amount per serving size (g/day) of each food reported by each individual. This interviewer-administered, English and Spanish, 40-line item, 2-page scannable instrument assesses dietary inorganic As intake over a previous 12-month period. Respondents answer questions related to number of servings consumed and whether their serving size was small, medium, or large. A reference portion size is provided for the medium portion.
Significance: This instrument and database may be useful in epidemiological studies of the associations between potential environmental As exposures and cancer.

ASSESSMENT METHODOLOGY (3010)

UPDATING NUTRIENT INTAKE ESTIMATES FROM THE ARIZONA FFQ: THE "METABOLIZE" NUTRIENT DATABASE. Ellen J Graver, MS, Vern Hartz, MS, **Robin Whitacre, BS,** Stephen Joel Coons, PhD, RPH, Cynthia A Thomson, PhD, RD, Arizona Cancer Center, Tucson AZ

Keywords: nutrient database, food frequency questionnaire
Objective: The Food and Nutrient Database for Dietary Studies (FNDDS) 1.0 system, the National Health and Nutrition Examination Survey (NHANES) national consumption data, and the National Nutrient Database for Standard Reference (NDBSR) are the primary sources for the Nutrient Database used by a proprietary system ("Metabolize") developed by the Arizona Cancer Center (University of Arizona) to map information from the Arizona Food Frequency Questionnaire (AFFQ) to nutrients per day. This poster describes the development process.
Description: The FNDDS system only reports the 61 nutrients for which there are values for all foods. The NDBSR reports values for 128 nutrients; however, not all foods have values for all nutrients. The FNDDS system was built so that it is possible to derive nutrient values using any version of the NDBSR. FNDDS 1.0 was based on NDBSR Version 16-1. Using Version 17, a new nutrient database was created.
Significance: Using this approach, we have been able to expand the available nutrient output (from 61 to 136 nutrients), phytochemicals, and food groups. Of course, caution must be used for nutrients for which there are missing data. In a comparison of AFFQ data run against the old and new "Metabolize" Nutrient Databases, only minor changes were observed in the macronutrients (-4.8% to +1.8%), and larger changes were observed in the carotenoids (-25.6% to + 19.6%). Values were also derived for Isoflavones, Cruciferous grams, and Red Meat grams.

ASSESSMENT METHODOLOGY (3010)

DEVELOPING A FOOD LIST FOR USE IN A SELF-ADMINISTERED 24-HOUR RECALL. Thea Palmer Zimmerman, MS, RD, Suzanne W McNutt, MS, RD, Stephen G Hull, MS, Anna McIntosh, MS, RD, Westat; Amy F Subar, PhD, MPH, RD, Frances E Thompson, PhD, MPH, Nancy A Potischman, PhD, National Cancer Institute, NIH; Patricia M Guenther, PhD, RD, Center for Nutrition Policy and Promotion, USDA

Keywords: 24HR, dietary recall
Objective: To develop a user-friendly food list that will enable users of an automated, self-administered 24-hour recall instrument to quickly find the foods they consumed and to reduce burden by reducing the number of follow-up probing questions asked.
Description: The National Cancer Institute (NCI), in collaboration with Westat and Archimage, is developing an automated, self-administered 24-hour dietary recall (ASA-24) instrument. The instrument is modeled after the USDA Automated Multiple Pass Method (AMPM) used in the NHANES, but adapted for self-administration. The first pass in the AMPM, the "quick list," asks respondents to report foods consumed on the previous day freely, in any order, and without detail. The NHANES interviewers, who are highly trained, create the quick list by matching the respondent's reported foods as closely as possible to a list of approximately 2600 food terms. In a subsequent pass, called the "detail pass," the interviewers use the AMPM probes to obtain additional descriptive information so that a food code can either be automatically linked by the AMPM or assigned by a food coder. Because the ASA-24 is self-administered and all reported foods must automatically link to a food code, criteria were established to create food list terms that are very recognizable, standardized, and predictable and contain detailed information so that the number of probes needed during the detail pass can be reduced.
Significance: This food list will be a key component of the NCI automated, self-administered 24-hour recall.
Funding: The project is funded by the National Cancer Institute, NIH.

ASSESSMENT OF TARGET GROUPS, POPULATIONS (3020)

THE DEVELOPMENT OF THE THRIFTY FOOD PLAN'S PRICES DATABASE.

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Keywords: food plans; food prices

Objective: To develop a database of average prices paid for representative foods consumed by low-income people in the United States for use in updating the Thrifty Food Plan.

Methods: Each food code for foods reported as having been consumed in the National Health and Nutrition Examination Survey conducted in 2001-2002 was classified as either a convenience or home-prepared food. Home-prepared foods were broken down into ingredients using the Food and Nutrient Database for Dietary Studies (FNDDS). The AC Nielsen Homescan data contain annual product and price information, including fresh produce, for approximately 15,000 households a year, including 700 households per year whose income is less than 131% of the federal Poverty Threshold. Convenience foods reported and the ingredients for the home-prepared foods were linked to all reasonable Universal Product Codes in the 2001, 2002 AC Nielsen data. The consumption-weighted average ingredient prices were summed to calculate the prices of home-prepared foods after yield factors for refuse, moisture, and fat loss and gain from FNDDS and the National Nutrient Database for Standard Reference, Release 18, were applied.

Results: The United States Department of Agriculture (USDA) prices database has the effective average price for items reported to have been consumed by low-income people in the United States during 2001-2002.

Significance: The Thrifty Food Plan is a market basket of nutritious foods that can be purchased with the Food Stamp allotment. Using the new prices database, the Plan is being revised to reflect the 2005 Dietary Guidelines for Americans and the USDA's new food guide, MyPyramid.

ASSESSMENT OF TARGET GROUPS, POPULATIONS (3020)

ASSESSMENT OF THE FOOD AND NUTRIENT INTAKE OF PEOPLE LIVING WITH HIV/AIDS IN NORTHERN NIGERIA. Victor Ohuruogu, MSc; Isaac Akinyele, MSc, PhD, College of Medicine, University of Ibadan, Nigeria

Keywords: HIV/AIDS, food composition, nutrient database, dietary status
Objective: To present the methodology proposed to assess the food intakes of people living with HIV/AIDS in Northern Nigeria and to discuss the design of a food composition database appropriate to this group so that nutrient intake can be assessed.
Methods and Materials: The survey participants will be institutional- and home-based adult clients of the Community-Based Care and Support Office in the Kaduna area in northern Nigeria. Food intake information will be obtained by 24-hour dietary recall and 7-day food records and will be augmented by observation of food intake and focus group discussions. The food composition database will include the foods reported in the food consumption survey and will include the cereals and dairy products that are the major dietary staples of this area.
Significance: The work will initiate the development of a food composition database suitable for northern Nigeria, and the results of the food consumption survey will help raise awareness of the nutritional status of persons living with HIV/AIDS in this area and help initial appropriate dietary interventions.
Funding Disclosure: None. (Funding is being sought for this work.)

ASSESSMENT OF TARGET GROUPS, POPULATIONS (3020)

DIETARY EXPOSURE ASSESSMENT OF SELENIUM FOR KOREANS AND COMPARISON OF INTAKE LEVELS BY GROUPS WITH KRDIS. Younju Choi[1], Hye Young Lee[1], Chang-Hwan Oh[2], Haeng-Shin Lee[3], Cho-il Kim[3], Hye Kyoung Park[1]; [1]Korea Food and Drug Administration, [2]Semyung University, [3]Korea Health Industry Development Institute

Keywords: selenium, dietary intake, KDRIs

Objective: This study was undertaken to assess the dietary exposure of selenium and evaluate intake levels with the DRIs for Koreans (KDRIs) and to construct a food and nutrient database.

Methods and Materials: The key food lists for analysis of selenium was determined by food consumption data from the 2001 National Health and Nutrition Survey (NHNS) and selected foods were analyzed using ICP-MS. To estimate dietary exposure to selenium, the concentration data of selenium in foods were merged with the raw data of food consumption by 24hr recall in the NHNS. The intake estimates for selenium were compared with KDRIs set in 2005. Selected foods were purchased in 3 different batches, mixed, and analyzed in triplicate.

Results: A wide range of selenium content was found among various food groups, and high levels were found for fish, meat, eggs, and milk. The average intake of selenium for Koreans was 60.2 μg/person/day. As a group, 35.1% had selenium intakes below the EAR, and 0.4% had intakes above the UL. The selenium intakes for 1-2 year-olds was higher than any other groups because of high concentrations in infant formula. The selenium intakes for those over 65 yr did not come up to the RI. There were differences in selenium intakes by region (urban and rural). The distribution of selenium intake showed that the group above the RI was larger than the group below the RI. The dietary exposure assessment of selenium will be useful in nutrition policy and education as well as risk assessment.

SUPPLEMENTAL NUTRIENTS, BOTANICALS (3100)

NHANES 2001-2002 DIETARY SUPPLEMENT DATABASE USE FOR DESCRIBING THE REPORTED DIETARY SUPPLEMENT USE IN THE NEW ENGLAND BLADDER CANCER STUDY. Anna G McIntosh, MS, RD, Judith H Walsh, Pat D Clark, Barbara J Hamilton, Paul E Hurwitz, MPH, Westat; Debra T Silverman, ScD, Dalsu Baris, MD, PhD, Rashmi Sinha, PhD, National Cancer Institute, NIH; Margaret Karagas, PhD, Dartmouth Medical School; Alison Johnson, CTR, Vermont Cancer Registry; Sai Cherala, MD, MPH, New Hampshire Department of Health and Human Services

Keywords: dietary supplements, coding, bladder cancer

Objective: To identify a method for describing dietary supplement use when less than optimal detail is reported.

Description: The New England Bladder Cancer Study, a population-based, case-control study, was conducted by the National Cancer Institute in collaboration with Dartmouth Medical School and state health agencies in Maine, New Hampshire, and Vermont, to determine factors contributing to persistently high rates of bladder cancer among residents of the area. Data collection included subject dietary supplement use, documented as open-ended text, producing general and imprecise descriptions of specific supplements. These text items were coded using the NHANES Dietary Supplement Database, 2001 – 2002 Release, a database consisting of 2,181 diet supplement codes. Coding rules were established, verbatim text was double-coded by expert food coders, a coding supervisor adjudicated differences, and a nutritionist reviewed and researched unknowns. Additional consistency and logic checks were conducted to improve data quality.

Results: Coders matched 1,361 of 1,449 total (94%) verbatim reports by emphasizing use of available default and generic codes. Unknowns accounted for 88 reports; of these, 22 were medicines, 6 were foods or meal replacements, and 18 were either illegible or misspelled making a match impossible. The remaining 42 were herbal or health food preparations without code matches or enough internet hits for description. Vitamin/mineral preparations represented 71% of the total while herbal preparations accounted for 18%. Fiber, antacids, and other biological compounds (omega-3 fatty acids, enzymes, etc.) were the remaining portion.

Significance: This effort demonstrates that the NHANES database can be useful for describing reported dietary supplement use when less than optimal detail is available.

Funding: National Cancer Institute, NIH

MESSAGE FROM THE CHAIR OF THE NNDC STEERING COMMITTEE

The NNDC brings together scientists and others with skills and experience in food composition data development and use. For 28 years, interested scientists and entrepreneurs have planned and organized this conference on an informal, collegial basis. The group continues to benefit from the generous support of government agencies, the food industry, and other groups. In previous years, the NNDC had no treasury; therefore, NNDC Program Committees volunteered the support of their own organizations and raised funds to cover conference costs. Recently the NNDC Steering Committee (SC) formed a non-profit corporation to strengthen the NNDC structure and developed a treasury to finance its work. NNDC activities are conducted through the SC and the SC Executive Committee, which consists of the Chair, Chair-Elect, and Treasurer. The SC work is carried out by the Organizing, Program, Communication, and Fund-Raising Committees. Conference attendees are welcome to volunteer to serve on these committees. An *ad hoc* committee is responsible for publishing a directory of databases and software applications that use food composition databases. Since 2003 when the 27th NNDC in 2003 was held in conjunction with the 5th International Food Data Conference, the NNDC databank directory has been called the *International Nutrient Databank Directory* (2004 edition available at www.medicine.uiowa.edu/gcrc/nndc/survey.html). We invite attendees and interested participants to share your thoughts on how this organization can best serve workers in the field of food composition.

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ANNOUNCEMENT OF THE 31ST NNDC AND FUTURE MEETINGS

27 April 2007
The 31st NNDC, "Turning Concepts into Reality," will be held as a one-day meeting prior to the Experimental Biology (EB) 2007 Meetings in Washington DC. The EB Meetings will be from April 28 to May 2, 2007. The 31st NNDC Conference Co-Chairs are Lois Steinfeldt, ARS, USDA (lsteinfeldt@rbhnrc.usda.gov; 301 504-0179) and Marie Kuczmarski, University of Delaware and NIH (mfk@udel.edu; 410 558-8622).

2007
The 7th International Food Data Conference (IFDC) will be held in Sao Paulo, Brazil. Details will be available at http://www.fao.org/infoods/meetings_en.stm.

2008
Hosts are needed for the 32nd NNDC. If you are interested, please contact Suzanne Murphy or a member of the NNDC Steering Committee.

Please visit the NNDC website at http://www.nal.usda.gov/fnic/foodcomp/conf/ for updated information on these meetings.

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