33rd National Nutrient Databank Conference

Innovations in Food Composition and Nutrition Research: A Global Perspective

17 April 2009
New Orleans Marriott –Canal Street
New Orleans, LA

Annual Meeting

33RD NATIONAL NUTRIENT DATABANK CONFERENCE

INNOVATIONS IN FOOD COMPOSITION AND NUTRITION RESEARCH: A GLOBAL PERSPECTIVE

PROGRAM & ABSTRACTS

NEW ORLEANS MARRIOT HOTEL
555 CANAL STREET
NEW ORLEANS, LA

17 April 2009

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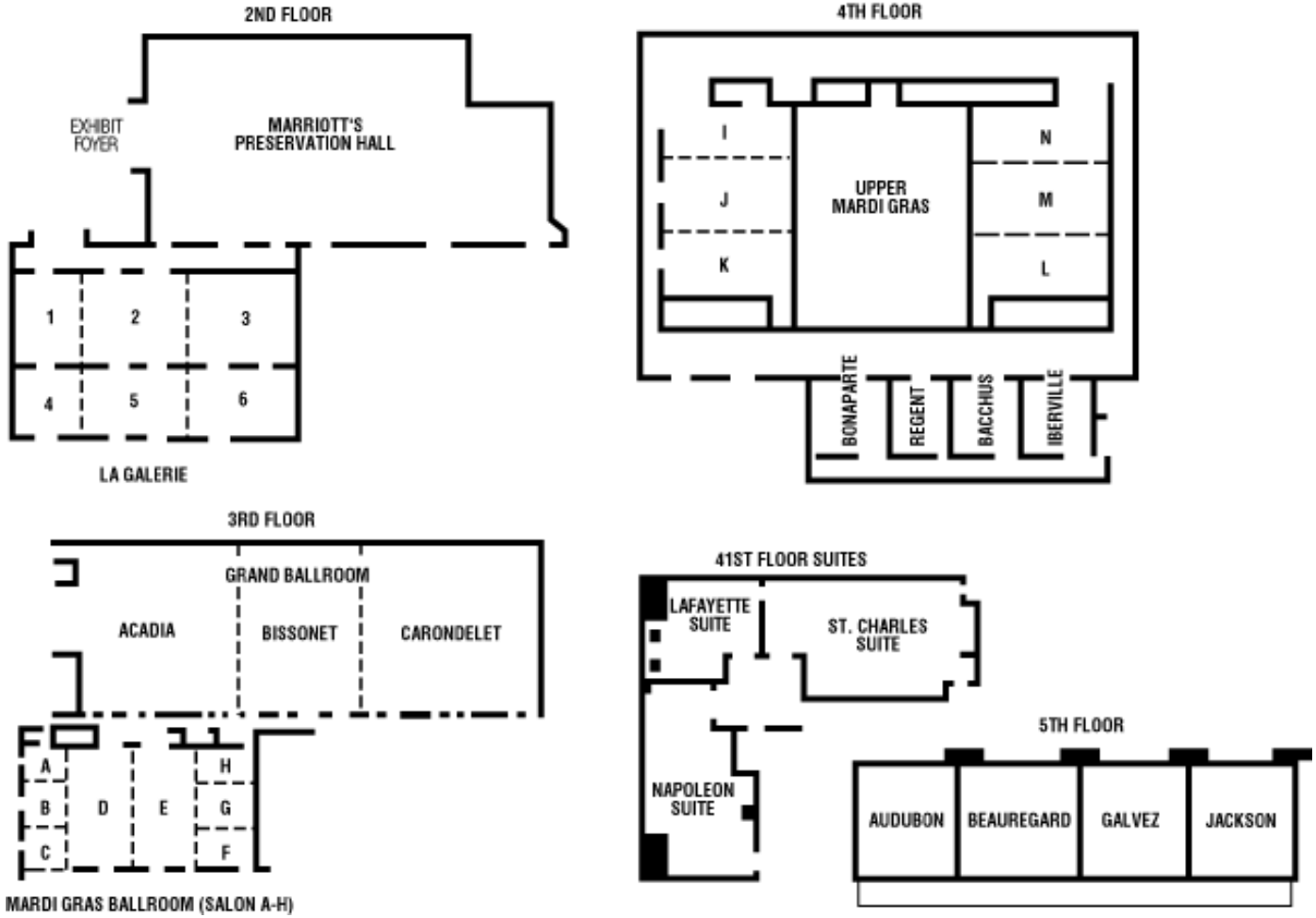

This Conference is convened by the National Nutrient Databank Steering Committee. We wish to acknowledge the following sponsorship:

In conjunction with Experimental Biology 2009

Message from the Conference Chair, Catherine Champagne:

It is my personal pleasure to welcome each and every one of you to this 33rd National Nutrient Databank Conference. I extend a warm welcome to those of you I have known for many years as colleagues and friends. Additionally, we have a number of international colleagues who are attending and I especially welcome you to New Orleans. I believe you will all agree that we have witnessed many global changes, so the conference theme fits well into the arena of "change." I want to express my sincere thanks to Lisa Jahns and Rachel Fisher for the fine job they have done in organizing the program. While you are here, I do hope you get to enjoy some of the fine cuisine of New Orleans, Louisiana's Crescent City, the home of the Big Easy!! And, as we Cajuns say "laissez les bon temps roulez," which translated means: *Let the good times roll!!*

Message from the Program Co-Chairs, Lisa Jahns and Rachel Fisher:

It is with great pleasure that we present this fabulous line-up of speakers and posters for the 33rd National Nutrient Databank Conference. We are truly grateful for the contributions of all the presenters and we thank them for their willingness to share their research and expertise with conference participants. Throughout the day, we will be hearing about a wide variety of experiences related to the theme of this year's conference, *Innovations in Food Composition and Nutrition Research: A Global Perspective*. We are honored to have Dr. Harriet Kuhnlein, Founding Director of the Centre for Indigenous Peoples Nutrition and Environment and Professor of Human Nutrition at McGill University, deliver the Keynote address and share with us her insights from working with Indigenous people. The rest of the presentations will highlight some of the issues pertaining to database development and dietary assessment from both a global and domestic perspective. This program would not have been successful without the time and support of the Program Planning Committee members and the guidance of the Conference Chair. We can't thank them enough for their efforts.

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Innovations in Food Composition and Nutrition Research: A Global Perspective
33rd National Nutrient Databank Conference
Friday, April 17, 2009

Conference Program

8:00-8:30 Registration

8:30-9:00 Conference Welcome
- *Rose Tobelmann, MS, RD, LD (General Mills, Inc, Plymouth, MN), National Nutrient Databank Steering Committee Chair*
- *Lisa Jahns, PhD, RD (Grand Forks Human Nutrition Research Center USDA-ARS, Grand Forks, ND) and Rachel Fisher, MS, MPH, RD (National Institutes of Health, Bethesda, MD), Program Co-Chairs*
- *Catherine Champagne, PhD, RD, LDN (Pennington Biomedical Research Center, Baton Rouge, LA*), *Conference Chair*

Global Experiences in Database Development

Session Chairs: Rachel Fisher, *MS, MPH, RD - National Institutes of Health, Bethesda, MD and Diane Mitchell, MS, RD - Penn State Universit*y, *University Park, PA*

9:00-9:45 **Keynote Address**: Adventures in Food Composition and Nutrition Research with Indigenous Peoples
- *Harriet Kuhnlein, PhD, MS - Centre for Indigenous Peoples' Nutrition and Environment (CINE), McGill University, Sainte-Anne-de-Bellevue, Quebec, Canada*

9:45-10:05 Development of Databases to Support Analysis of Dietary Recalls in Rural Kenya
- *Suzanne Murphy, PhD, RD - Cancer Research Center of Hawaii, Honolulu, HI*

10:05-10:25 Development of Version 4.0 of the ILSI Crop Composition Database
- *Rob Alba, PhD - Monsanto Company, St. Louis, MO*

10:25-10:55 Break/Posters

Dietary Assessment Challenges from a Global Perspective

Session Chairs: Tomoko Shimakawa, ScD – U.S. Food and Drug Administration, College Park, MD and Ana Chavez, MS, RD – Centers for Disease Control and Prevention, National Center for Health Statistics, Hyattsville, MD

10:55-11:15 Comparison of Computerized Dietary Assessments with Diet History and Food Record Data at Baseline in an Australian Food-Based Clinical Trial
- *Yasmine Probst, PhD, AP - Smart Foods Centre, University of Wollongong, Wollongong, Australia (Presentation by Linda Tapsell, PhD)*

11:15-11:35 Development of a Food Composition Laboratory Network in Canada
- *Josephine Deeks, RD - Health Canada, Ottawa, ON, Canada*

11:35-11:55 How EPA Uses Dietary Data from USDA for Exposure Assessments
- *David Hrdy, BS – Office of Pesticide Programs, Environmental Protection Agency, Washington, DC (Presentation by Joanne Holden, MS)*

12:00 -1:30 Lunch (on your own) / Posters

- *Note: From 1:00-1:30 poster presenters will be available at poster display to answer any questions.*

Advances in Dietary Databases and Assessment - a Domestic Perspective

Session Chairs: Marie Fanelli-Kuczmarski, PhD, RD, LDN - University of Delaware, Newark, DE and Suzanne McNutt - Westat, Rockville, MD

1:30-1:50 Nutrition Facts and Ingredient Database for Processed Foods

- *Lisa Harnack, DrPH - University of Minnesota, Minneapolis, MN*

1:50-2:10 Using the MyPyramid Equivalents Database to Estimate MyPyramid Equivalents for the Third School Nutrition Dietary Assessment Study

- *Elizabeth M. Condon, MS, RD - Mathematica Policy Research, Inc., Cambridge, MA*

2:10-2:30 Developing Portion Questions for the Automated Self-Administered 24-hour Dietary Recall

- *Thea Palmer Zimmerman, MS, RD - Westat, University Heights, OH*

2:30-2:50 Evaluation of the USDA Food and Nutrient Database for Dietary Studies Search Tool for Use with a Mobile Phone Food Record for Adolescents

- *Bethany L. Six, RD - Purdue University, West Lafayette, IN*

2:50-3:20 Break/Posters

3:20-3:40 Availability of Nutrition Facts and Ingredient Information on Manufacturer's Websites for Cookies and Savory Snacks

- *Sarah Johnson, BS - University of Minnesota, Minneapolis, MN*

3:40-4:00 An Integrated Relational Database System and the Dietary Supplement Ingredient Database Release

- *Karen W. Andrews, BS – Agricultural Research Service, U.S. Department of Agriculture, Beltsville, MD*

4:00-4:20 Predicted Fatty Acid Intakes Resulting from Stearidonic Acid Enriched Soybean Oil Fortification: NHANES 1999-2002

- *Chunling Wang, MD, PhD - Monsanto Company, St. Louis, MO*

4:20-4:40 Defining Nutrient Density of Foods According to Tiers within the Major Food Groups of the USDA Food Guide, MyPyramid

- *Patricia M. Guenther, PhD, RD - Center for Nutrition Policy and Promotion, U.S. Department of Agriculture, Alexandria, VA*

4:40-5:00 Closing Remarks

5:00-6:30 Reception/Posters

Note: ***All presentations (other than the Keynote Address) will be 15 minutes with 5 minutes allotted for questions. Questions will be taken directly after each presentation, not at the end of the session.***

Innovations in Food Composition and Nutrition Research: A Global Perspective
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Poster Presentations

Data Quality, Variability, and Bioavailability

1. Trends in food consumption, 1977-2004
    - *Asefa AS, Brandt MM, Juan WY – Center for Food Safety and Applied Nutrition, US Food and Drug Administration, College Park, MD*
2. Absorption estimates improve the validity of the relationship between dietary and serum lycopene
    - *Burri BJ, Nguyen T, Neidlinger TR – Western Human Nutrition Research Center, USDA, ARS, PWA, Davis, CA*
3. Modifications to the nutrient database are needed to prevent underreporting of DHA intake
    - *Campbell CG, Department of Food Science & Human Nutrition, Iowa State University, Ames, IA*
4. Serum carotenoid concentration predicted by dietary intake in the US
    - *Chun OK, Chung SJ, Song WO – Nutritional Sciences, University of Connecticut, Storrs, CT; Foods and Nutrition, Kookmin University, Seoul, Korea; Food Science and Human Nutrition, Michigan State University, East Lansing, MI*
5. A critical assessment of almond composition data in global databases
    - *Yada S, Lapsley K, Joice C – Almond Board of California, Modesto, CA*

Analytical Methods and Food Sampling

6. Fluid intake and its association with hydration in an aging population: the Nuage Longitudinal Study
    - *Boutier V, Gueye NR, Coulombe C, Payett H – Research Center on Aging, Health & Social Services Center, University Institute of Geriatrics of Sherbrooke, Faculty of Medicine and Health Sciences, University of Sherbrooke, Sherbrooke, QC, Canada*

New Data for Foods and Food Components

7. Food label and package survey: trends of manufacturer use of nutrient content claims on processed, packaged foods regulated by FDA
    - *Brandt MM, Shimakawa T, Juan WY – Center for Food Safety and Applied Nutrition, US Food and Drug Administration, College Park, MD*
8. Development of database for pesticide residues in foods for risk assessment
    - *Kim DH, Lee HS, Lee JY, Lee Y, Lee HJ, Jang YA, Moon JJ, Lee SH, Kim HS, Jeong ES, Kim C – Center for Nutrition Policy & Promotion, Korea Health Industry Development Institute; Risk Management Division, Korea Food & Drug Administration, Seoul, Korea*
9. Database development for the representative ingredient composition of processed foods manufactured in Korea
    - *Lee JY, Lee HS, Kim DH, Lee Y, Lee HJ, Jang YA, Moon JJ, Kwon KI, Kim JW, Hee-Kim S, Kim C – Center for Nutrition Policy & Promotion, Korea Health Industry Development Institute; Nutrition Evaluation Division, Korea Food & Drug Administration, Seoul, Korea*
10. Vitamin D and selected fatty acids in U.S. infant formulas
    - *Pehrsson PR, Lemar LE, Patterson KY, Exler J – USDA Beltsville Human Nutrition Research Center, Nutrient Data Laboratory, Beltsville, MD*

Data for Special Population Groups

11. Schools meeting school breakfast calorie standards tend to be larger and have lower community poverty rates than schools that don't meet calorie standards
    - *Cashman L, Bergman E, Englund T, Elkins A, Tibay J, Aragon M, Oakley C – Central Washington University, Ellensburg, WA; National Food Service Management Institute, University, MS*
12. Beverage consumption in participants from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) Study
    - *Kuczmarski MF, Mason M, Zonderman AB, and Evans MK – Department of Health, Nutrition and Exercise Sciences, University of Delaware, Newark, DE; Statistical Information Systems, MedStar Research Institute, Baltimore, MD; Research Resources Branch, National Institute of Aging, NIH, Baltimore, MD; Intramural Research Program, National Institute of Aging, NIH, Baltimore, MD*
13. Evaluation of nutrient intakes of Korean adults: comparison of 2001 and 2005 national surveys
    - *Shim JE, Kim D, Jung H, Paik HY – Research Institute of Human Ecology, Seoul National University; Department of Food and Nutrition, Seoul National University, Seoul, Korea*

Advances in Using Food Composition Data for Dietary Assessment

14. Priority foods approach to managing and updating USDA's Food and Nutrient Database for Dietary Studies
    - *Ahuja JKC, Montville JB, and Moshfegh AJ – Food Surveys Research Group, Beltsville Human Nutrition Research Center, ARS, USDA, Beltsville, MD*
15. Assessing consumption of fruit juices and juice drinks
    - *Bodner-Montville J, Heendeniya KY, Anand J, Goldman JD – Food Surveys Research Group, Beltsville Human Nutrition Research Center, ARS, USDA, Beltsville, MD*
16. Sources of key nutrients in the home food environment
    - *Byrd-Bredbenner C, Bredbenner C, Abbot JA – Rutgers, The State University of New Jersey; The Nutrition Company, Long Valley, NJ*
17. Healthy Eating Index (HEI) – 2005: comparison using CSFII_98, FNDDS 1.0 and FNDDS 2.0 Reference Databases
    - *Douglass D, Day RS, Garcia L – Dell Center for the Advancement of Healthy Living, School of Public Health, University of Texas, Houston, TX*
18. Analysis of foods and nutrients obtained at the final probing step in 24-hour recall method
    - *Kang H, Jung H, Shim JE, Paik HY – Department of Food and Nutrition, Seol National University; Research Institute of Human Ecology, Seoul National University, Seoul, Korea*
19. Nationwide survey: voluntary nutrition labeling of raw fruits, vegetables, and fish by retailers
    - *Shimakawa T, Andriano A, Brandt MB – Center for Food Safety and Applied Nutrition, US Food and Drug Administration, College Park, MD; Retail Diagnostics, Inc., Saddle Brook, NJ*
20. Nutrient content of single-muscle pork cuts
    - *Williams J, Howe J, Trainer D, Snyder C, Lofgren P, Buege D, Holden J – Nutrient Data Laboratory, Nutrition Research Center, ARS, USDA, Beltsville, MD; National Pork Board, Clive, IA, University of Wisconsin, Madison, WI*

Database Technology (Software, Internet, Information Dissemination)

21. Recipe database development for home-made dishes based on the national dietary intake survey
    - *Lee HJ, Lee HS, Lee Y, Jang YA, Moon JJ, Kim D, Lee J, Kim C – Center for Nutrition Policy & Promotion, Korea Health Industry Development Institute, Seoul, Korea*

33RD NATIONAL NUTRIENT DATABANK CONFERENCE
NEW ORLEANS, LA – 17 APRIL 2009

ABSTRACTS – ORAL PRESENTATIONS

KEYNOTE ADDRESS: ADVENTURES IN FOOD COMPOSITION AND NUTRITION RESEARCH WITH INDIGENOUS PEOPLES. Harriet V. Kuhnlein, PhD. Centre for Indigenous Peoples' Nutrition and Environment (CINE), McGill University, Sainte-Anne-de-Bellevue, Quebec, Canada.
Keywords: *indigenous peoples, food systems, food analysis, dietary assessment*
Research on food systems of Indigenous Peoples provides unique new information and important clues on how to build successful nutrition promotion programs with these special population groups. The great diversity of cultures and ecosystems known and used by rural Indigenous Peoples contains a wealth of knowledge on biodiversity of foods, many of which are now threatened with extinction in the face of technological advancement. Understanding the nutrient composition of these often unique foods and cultural practices for their harvest, preservation and preparation is required to address dietary assessment with Indigenous People. A methodology to address processes of food systems assessment, including use of both traditional local foods and purchased market foods, will assist researchers with issues of species identification, sample collection and analysis. Involving the community for setting research priorities, objectives and process is essential for successful research. Challenges often faced in food composition studies relate to requirements for replicate samples, sufficient sample size and composites, judgments on simplification of food preparation and recipes, and adequate storage and transportation of samples from distant community settings. Nevertheless, this research field is a great world of adventure and discovery. It is essential for building successful nutrition research with Indigenous Peoples that addresses the circumstances of change in ecosystems, cultures, and food resources for building health promotion programs.

DEVELOPMENT OF DATABASES TO SUPPORT ANALYSIS OF DIETARY RECALLS IN RURAL KENYA. Suzanne P. Murphy, PhD, RD[1]; Constance A. Gewa, PhD[2]; Charlotte G. Neumann, MD[3]. [1]Cancer Research Center of Hawaii, University of Hawaii, Honolulu, HI; [2]George Mason University, Fairfax County, VA; [3]University of California at Los Angeles, CA.
Keywords: *international food composition databases; recipe databases; gram weight databases; dietary assessment; food groups*
Background: Multiple 24-hour recalls were collected for approximately 600 school-aged children as part of the Child Nutrition Project (CNP) in rural Kenya, conducted in 1998-2000. The CNP provided a snack at school, and an evaluation of the impact of the intervention on total daily intakes was needed.
Objective: To convert the 24-hour recall data into nutrient and food group intakes.
Description: The challenge was to find an electronic method of converting the dietary data from the field (recorded as food codes, recipe codes, and amounts in household measures) into daily intake variables that could be used to evaluate the feeding intervention. The solution was to develop five databases and a SAS program: (1) A food composition table (the International Minilist (IML)) provided the levels of 54 nutrients in 196 basic food items; (2) A cross-reference file indexed each of the 480 foods that were reported during the study to one or more of the foods on the IML; (3) A weight conversion file specified the gram weight and percent refuse for up to 15 household measure for each reported food; (4) A standard recipe file contained typical ingredients and proportions for 157 local food mixtures; and (5) A food group assignment file categorized each of the basic food items into one of 24 food groups, which could be collapsed into 9 major food groups. A program was written to read the dietary data, access the five databases, and calculate daily intakes of nutrients and food groups.
Conclusion: Multiple databases are often needed to analyze 24-hour recalls. In the US, relevant databases are publicly available, but they may need to be modified or newly developed for studies conducted elsewhere. Ample personnel and funding should be allocated for this task. Funded by the Global Livestock CRSP through USAID grant # PCE-G-00-98-00036-00.

DEVELOPMENT OF VERSION 4.0 OF THE ILSI CROP COMPOSITION DATABASE. Rob Alba[1]; William P. Ridley[1]; Raymond Shillito[2]; Marci Levine[3]. [1]Monsanto Company, St. Louis, MO; [2]Bayer CropScience, Research Triangle Park, NC; [3]International Life Science Institute (ILSI), Washington DC.
Keywords: *International Life Sciences Institute (ILSI), crop composition, maize, soybean, cotton*
Background: The ILSI Crop Composition database supports research and regulatory science in areas such as plant biology, agricultural biotechnology, food chemistry, and animal nutrition. The database is a useful tool for the safety assessment of genetically modified food and feed. Version 3.0 of the database contains 118,000 data points pertaining to nutrients, anti-nutrients, and metabolites in conventional varieties of corn, soybean, and cotton.
Objective: Ongoing efforts serve to maximize database utility for a broad range of academic, industry, and regulatory scientists.
Description: the ILSI International Food Biotechnology Committee and representatives from seven agricultural biotechnology companies are collaborating to improve database performance, make the graphical user interface more intuitive, and increase the volume of informative data. Usability has been improved by shifting from the PERL language to the enhanced database structure and performance features inherent in the Java language. Performance, security, availability, and scalability will be enhanced by employing the Oracle Database 11g Standard Edition One software on a new Dell™ PowerEdge™ R200 Quad-Core server. Version 4.0 provides amino acid and fatty acid data in multiple formats, including % FW, % DW, % Total, and mg/g. Data summaries now include the number of values for analytes that were below the Limit of Quantitation (LOQ), which aids interpretation of data output. Version 4.0 also allows users to obtain data output as Excel tables, which facilitates downstream processing and analyses. Additional corn and soybean data will soon be added to the Crop Composition database, and data for crops like rice, wheat, and canola continue to be encouraged. Conclusion: The ILSI Crop Composition database is undergoing a significant upgrade and desired improvements are targeted for completion early in 2009. These improvements serve to maximize the usefulness of this tool for a broad range scientists, agricultural companies, and regulatory agencies.

COMPARISON OF COMPUTERISED DIETARY ASSESSMENTS WITH DIET HISTORY AND FOOD RECORD DATA AT BASELINE IN AN AUSTRALIAN FOOD-BASED CLINICAL TRIAL. Yasmine Probst, PhD, APD; Virva Sarmas; Linda Tapsell, PhD, FDAA. Smart Foods Centre, University of Wollongong, Wollongong, NSW, Australia.
Keywords: *computerised dietary assessment, food-based clinical trial*
Background: Food-based clinical trials are vital to advance the scientific evidence for the impact of food on health. These trials require stringent dietary assessment to substantiate effects. We are evaluating the use of a self-administered computerised dietary assessment (DietAdvice) in a current food based weight loss trial.
Objective: This cross sectional study aims to compare data from DietAdvice with diet history (DH) and food record (FR) dietary assessments measured at baseline.
Materials and Methods: Baseline data for n=71 overweight (23-60 years, BMI 25-37 kg/m^2) participants was utilised. Macronutrient data for matched dietary assessments from n=32 participants was obtained for the DH assessment while only n=30 matched FR data sets were available. Pearson's correlations and Goldberg cut-off limits were calculated to determine relationships and levels of underreporting between assessment methods respectively.
Results: DietAdvice provided significantly higher reported energy intake (kJ) compared to both the DH and the FR ($P < 0.01$). There were relatively high correlations (r^2=0.740 and 0.596, respectively) between data from the methods. In the DH 35% (n=25/71) of participants underreported their energy intake whereas only 19% (n=13/69) underreported in the FR and only 16% (n=5/32) while using DietAdvice.
Significance: This study suggests that further evaluations of the DietAdvice program in a clinical trial is warranted, particularly in determining the efficiency of food based interventions.. Biomarker validation of data may be of value as DietAdvice consistently provided larger reported intakes compared to the DH and FR and the traditional dietary assessment methods displayed high levels of underreporting of energy intake. The results indicate that the DietAdvice and the FR are more comparable than the DH though replacement of the traditional FR is not yet warranted.
Funding Disclosure: The work of this project was funded under an NHMRC project grant and a University of Wollongong Early Career Researcher Health and Behavioural Sciences grant.

DEVELOPMENT OF A FOOD COMPOSITION LABORATORY NETWORK IN CANADA. Josephine Deeks, RD; Margaret Munro, RD; Maya Villeneuve, PDq; Rita Klutka, RD. Nutrition Survey Section, Nutrition Research Division, Bureau of Nutritional Sciences, HPFB, Health Canada, Ottawa, Canada.
Keywords: *sampling, analysis, laboratory network*
Background: Canada's food composition database, the Canadian Nutrient File (CNF) has traditionally been based upon USDA's Nutrient Database for Standard Reference. These data are modified to reflect the Canadian market and regulations. However this does not allow us to tailor the database to the research, surveillance and decision making activities specific to Health Canada's (HC) goals.
Objectives: Collaboration has been initiated this year between the Nutrition Research Division (NRD) and the HC Regional laboratories (RLs) to build a Food Composition Laboratory Network. This new lab network will empower HC to possess its own food sampling and analysis program to analyze priority foods for key nutrients.
Description: Food samples which form a nationally representative sample set, are collected and sent to the various RLs for subsequent processing and analysis. According to sample designs prepared by NRD, food samples which form a nationally representative sample set are collected and sent to four RLs for subsequent processing and analysis. The results are then sent back to NRD for compilation and entry in the CNF. For this fiscal year, flour and granola bars were chosen as the priority foods for a variety of reasons. Flour is a staple and a simple matrix for the setup phase of the project. Granola bars formulations are uniquely Canadian, have changed in response to the trans fat monitoring program, and are highly consumed by specific age groups such as children.
Conclusion: This ambitious project was initiated this year and is still in the development phase. We are beginning with flour and granola bars as the identified priority foods. We are determining the exact costs and logistics for streamlining the process and organizing the budget. A full profile of 96 nutrients for 4 types of flour and 12 types of granola bars will be compiled from the results and entered into the CNF this year with an aim to continuing this as an ongoing program.
Funding Disclosure: All funds provided by Health Products and Foods Branch, Health Canada

HOW EPA USES DIETARY DATA FROM USDA FOR EXPOSURE ASSESSMENTS. David E. Hrdy, BS[1]; Linda Lemar, MS[2]; Joanne M. Holden, MS[2]. [1]Office of Pesticide Programs, Environmental Protection Agency, Washington, DC; [2]Nutrient Data Laboratory, BHNRC, ARS, USDA, Beltsville, MD.
Keywords: *pesticide, surveillance, food composition*
Background: To present the procedures the US Environmental Protection Agency's (EPA's) Office of Pesticide Programs (OPP) is using to update the estimates of dietary exposure to pesticides using the consumption data from the National Health and Nutrition Survey, What We Eat in America and methodology adapted from the National Nutrient Databank for Food Composition.
Description: The EPA's OPP is responsible for ensuring the safety of pesticides. A significant activity of OPP is the evaluation of dietary exposure to pesticides. Evaluating dietary exposure to pesticides involves combining data on food consumption with data on pesticide residues on food. Currently, pesticide residue exposure is calculated by multiplying residue by consumption level. Residue data for any particular raw agricultural commodity may come from field trial data, the US Food and Drug Administration surveillance/monitoring data, or from USDA/PDP monitoring data. Dietary consumption data used currently are based on food consumption data from the USDA's Continuing Survey of Food Intakes by Individuals (CSFII) from 1994 through 1996, and the 1998 Supplemental Children's Survey data. More current data on dietary consumption (1999 through 2006) is now publicly available through the National Health and Nutrition Examination Survey's (NHANES)"What We Eat In America" (WWEIA) food consumption survey. The OPP is collaborating with the USDA Nutrient Data Laboratory (NDL) to modify the NHANES, WWEIA data from its current "foods, as eaten" basis (e.g., lasagna, ice cream) to a "food commodity" basis (e.g., milk, beef, wheat flour, tomatoes). NDL's formulation estimation program, a module in the USDA Natioinal Nutrient Databank System, is being adapted to the EPA program. Standard procedures to estimate ingredient amounts, including standard recipes are being developed by the EPA.
Conclusion: This presentation will focus on how EPA currently estimates dietary exposure, how NHANES, WWEIA data is converted to the format used by OPP, and how EPA's switch from CSFII to NHANES,WWEIA is being conducted. This change in food consumption patterns could have implications for OPP's dietary exposure estimates, estimated by EPA's calculations.

NUTRITION FACTS AND INGREDIENT DATABASE FOR PROCESSED FOODS. Lisa Harnack, DrPH; Juliana Olsen; Janet Pettit; Jennifer Stevenson; Scott Slocum; Nancy Van Heel. Nutrition Coordinating Center, University of Minnesota, Minneapolis, MN.
Keywords: *nutrient database; brand name foods*
Objectives: There is a commercial database (Gladson Interactive E-Commerce Database) that includes key food product information needed by food and nutrient database developers when adding and updating brand name food products. We conducted an evaluation of one food product category (brand name candies) included in this database as a preliminary step in determining its potential utility for food and nutrient database developers.
Materials and Methods: One in four brand name candies in the University of Minnesota Nutrition Coordinating Center (NCC) Food and Nutrient Database that are currently in the marketplace were systematically sampled (n=52). The Gladson database was then searched to identify matching products, thus allowing us to determine the proportion of sampled candies that could be located in the Gladson database. The currency of nutrition facts panel information in the Gladson database was evaluated by comparing information in the database with that which is available in the marketplace.
Results: Most (87%) of the brand name candies sampled from the NCC Food and Nutrient Database were found to be included in the Gladson database, with many products available in multiple food specific units. For example miniature, fun, snack, regular, and king size Snickers candy bars are included in the Gladson database. When comparing the nutrient information available in the marketplace with that in the Gladson database discrepancies were found for about three-fourths of the sampled candies. It is important to note though that in most cases the magnitude of the discrepancies were small (e.g. 14 g versus 15 g of sugars).
Significance: The Gladson Database has the potential to streamline the task of maintaining food and nutrient databases that include brand name food products. However, further evaluation of this database is first needed. In particular, food product categories that contain products that are frequently reformulated should be evaluated.

USING THE MYPYRAMID EQUIVALENTS DATABASE TO ESTIMATE MYPYRAMID EQUIVALENTS FOR THE THIRD SCHOOL NUTRITION DIETARY ASSESSMENT STUDY. Elizabeth M. Condon, MS, RD; Mary Kay Fox. Med. Mathematica Policy Research, Inc., Cambridge, MA.
Keywords: *MyPyramid, MyPyramid Equivalents Database, FNDDS, recipes, specially-modified foods*
Background: Using the MyPyramid Equivalents Database (MPED) with data other than WWEIA/NHANES is challenging because (1) MPED includes only foods reported in these surveys; and (2) foods reported in other dietary surveys may differ in ingredients and nutrients from the "closest" match in FNDDS.
Objective: To describe approaches for estimating MyPyramid equivalents (MPEs) for foods that differ in ingredient and nutrient content from foods in MPED. Methods were used in analyzing 24-hour recalls from SNDA-III (coded using FNDDS) for modified recipes and pre-prepared foods, specific to school foodservice, that were added to the database based on manufacturer ingredient and nutrition information.
Description: Out of 3,021 unique foods reported, 458 modified recipes and 75 pre-prepared foods were not directly linked to MPED using FNDDS food codes. We used two methods to obtain better estimates of MPEs for these foods than would have been obtained by using the "closest match" in MPED. For modified recipes and pre-prepared foods, we used ingredient-level recipes to link individual ingredients to MPED. Challenges were encountered because ingredient-level food codes in FNDDS often differed from codes in MPED; some raw or dry ingredients were not available in MPED; and applying moisture and/or fat changes was not always feasible/straightforward. For foods that could not be linked at the ingredient level, we ratio adjusted selected MPEs based on a comparison of nutrients in the food and its "closest match." Because differences in nutrient content can be attributed to more than one ingredient, assumptions were made and not all MPEs were adjusted.
Conclusion: MPEs should reflect modifications to ingredients in recipes created in 24-hour recalls to more accurately represent ingredient and nutrient content. There is a need for an ingredient-level MyPyramid database than can produce accurate estimates of MPEs for foods with underlying recipes that differ from those in MPED.
Funding Disclosure: This research was funded by USDA's Economic Research Service. The SNDA-III study was funded by USDA's Food and Nutrition Service.

DEVELOPING PORTION QUESTIONS FOR THE AUTOMATED SELF-ADMINISTERED 24-HOUR DIETARY RECALL. Thea Palmer Zimmerman[1]; Stephen G. Hull[1]; Noemi Islam[2]; Suzanne W. McNutt[1]; Nancy Potischman[3]; Frances E. Thompson[3]; Patricia M. Guenther[4]; Amy F. Subar[3]. [1]Westat, Rockville, MD; [2]Baylor College of Medicine, Houston, TX; [3]NCI, NIH, Rockville, MD; [4]USDA Center for Nutrition Policy and Promotion, Alexandria, VA.
Keywords: *portion size, 24hr recall*
Objective: To develop portion questions for the US National Cancer Institute's (NCI's) Automated Self-Administered 24-Hour (ASA24) food probe database, based on the US Department of Agriculture's (USDA's) Automated Multiple Pass Method (AMPM), Food and Nutrient Database for Dietary Studies (FNDDS), and the requirements of ASA24's application.
Description: The NCI developed the ASA24 in collaboration with Westat, Archimage, Baylor College of Medicine, and USDA. The instrument is modeled after USDA's AMPM, but adapted for self-administration and auto-coding. All reported foods link to USDA food codes, which include portion size descriptions and gram weights. Because AMPM is interviewer-based, a continuous range of portion sizes are elicited, while ASA24 asks respondents to report discrete amounts eaten by selecting from photographs of various portion sizes of each food. Adapting AMPM for ASA24 involved: (1) reviewing AMPM questions to determine the types of portion questions asked (e.g., size, dimensions, quantity), (2) matching AMPM questions to the available portion codes for food codes, (3) determining the appropriate range of portion sizes to present (based on either the default size or portions reported in the National Health and Nutrition Examination Survey 2001-2004), and (4) ordering questions so that the final question presents an understandable range of portion photographs. The resulting portion questions ask both unit (e.g., cups or pieces) and size (e.g., small, medium, large) before presenting photographs of actual amounts. The option is available to report eating a portion greater than the largest portion presented.
Significance Conclusion: Information from AMPM portion questions, the FNDDS portion database, and portions reported in NHANES was all incorporated into determinations of the portion-size range to use for foods in ASA24. From this effort, guidelines for a series of photographs representing food-specific portions were developed to enable the ASA24 to collect portion data.
Funding Disclosure: National Cancer Institute, NIH

EVALUATION OF THE USDA FOOD AND NURTIENT DATABASE FOR DIETARY STUDIES SEARCH TOOL FOR USE WITH A MOBILE PHONE FOOD RECORD FOR ADOLESCENTS. Bethany L. Six, RD[1]; TusaRebecca E. Schap, MSc, RD[1]; Deborah A. Kerr, PhD[2]; Carol J. Boushey, PhD, MPH, RD[1]. [1]Department of Foods and Nutrition, Purdue University, West Lafayette, IN; [2]School of Public Health, Curtin Institute of Technology, Bentley, WA, Australia.
Keywords: *dietary assessment, adolescents, nutrient database, technology*
Background: The use of a mobile phone with an integrated camera and software that will automatically identify and estimate quantities of foods consumed may lead to more accurate dietary assessment. However, this tool may not be able to identify each food item or the user may forget to take an image of his/her food. Users of a mobile phone food record (mpFR) will need methods for labeling foods not automatically identified or for recording foods not captured in images.
Objective: The objective of this study was to determine if words used by adolescents to describe foods eaten will lead to a correct match in FNDDS.
Methods: Adolescents between 11-18 yr were recruited to eat all meals and snacks in a controlled feeding environment over a 24-hour period (12 boys, 3 girls). For two of the eating occasions, participants were asked to identify in writing 13 distinct food and beverage items that were direct matches to foods coded in FNDDS. The "What's In The Foods You Eat Search Tool, 3.0" was used to determine the likelihood of finding the exact match of words as written.
Results: Twelve of the thirteen foods were misspelled by at least one of the participants. These misspellings could not be found in FNDDS, but all made sense (e.g., lettuse for lettuce). Three of the thirteen foods were misidentified at least once (e.g., chocolate cake identified as brownie). "Garlic bread, toasted" was found with either "garlic bread" or "garlic toast". Common terms used by adolescents to describe regular Coca-Cola®, i.e., soda, coca-cola, or pop, did not match.
Significance: These results indicate that FNDDS has many usable search mechanisms that can be applied to the mpFR. However, for successful use with adolescents there is a need to supplement with phonetic searching and inclusion of common food terms.
Funding Disclosure: Support for this work comes from the National Cancer Institute and the National Institute of Diabetes, Digestive, and Kidney Disorders.

AVAILABILITY OF NUTRITION FACTS AND INGREDIENT INFORMATION ON MANUFACTURE'S WEBSITES FOR COOKIES AND SAVORY SNACKS. Sarah Johnson; Lisa Harnack, DrPH; Jennifer Stevenson; Janet Pettit; Nancy Van Heel, MS. Division of Epidemiology and Community Health and Nutrition Coordinating Center, University of Minnesota
Keywords: *nutrient database; brand name foods*
Objectives: Nutrient composition and ingredient information for brand name food products is increasingly available on manufacturers' websites. To date no one has evaluated the integrity of this source of product information. Thus, we conducted an evaluation of a sampling of brand name cookies and savory snacks as a first step in evaluating this source of product information.
Materials and Methods: A sampling of cookie (n=52) and savory snack (n=42) products was conducted in the grocery department of a Wal-Mart Supercenter in the Minneapolis St.Paul, MN metropolitan area. An internet search was then conducted for each sampled product to find any nutrient and/or ingredient information available for it on the manufacturer's website. Nutrient and ingredient information located on the manufacturer's website were then compared with information from the product packaging.
Results: Nutrient information was found on manufacturer websites for 71% of the sampled cookies and 76% of the savory snacks. Ingredient information was found online for 52% and 74% of cookie and savory snack products respectively. When comparing the nutrient information available online with that on the product packaging discrepancies were found for 52% of the cookies and 20% of the savory snacks. It is important to note though that nearly all of the discrepancies were small in magnitude (e.g. 1.5 g versus 1 g saturated fat). The prevalence and magnitude of discrepancies in ingredient information available online versus on product packaging were similar to that found for nutrient information.
Significance: Nutrient and ingredient information available on manufacturer websites appears to be reasonably market reflective for brand name cookies and savory snacks. Thus, this information source may be useful to those developing and maintaining food and nutrient databases that include brand name products in these food categories.

AN INTEGRATED RELATIONAL DATABASE SYSTEM AND THE DIETARY SUPPLEMENT INGREDIENT DATABASE RELEASE. Karen W. Andrews, BS[1]; Janet M. Roseland, MS, RD[1]; Cuiwei Zhao, MS[1]; Angela Middleton, MS[1]; Matthew Feinberg, BS[1]; Joanne Holden, MS[1]; Larry Douglass, PhD[2]; Johanna T Dwyer, DSc, RD[3]; Mary Frances Picciano, PhD[3]; Kenneth Fisher, PhD[3]; Leila G. Saldanha, PhD, RD[3]; Elizabeth A. Yetley, PhD[3]. [1]Nutrient Data Laboratory (NDL), Beltsville Human Nutrition Research Center (BHNRC), Agricultural Research Service (ARS), U.S. Department of Agriculture (USDA); [2]Consulting Statistician; [3]Office of Dietary Supplements (ODS), National Institutes of Health, Bethesda, MD.
Keywords: *dietary supplement ingredient database, dietary supplement, DSID-1, multivitamin*
Background: In collaboration with the Office of Dietary Supplements (ODS) at NIH, the Nutrient Data Laboratory (NDL), Beltsville Human Nutrition Research Center, USDA, is developing an analytically validated database of representative ingredient values for dietary supplement products. The purpose of the Dietary Supplement Ingredient Database (DSID) is to provide ingredient intake estimates for dietary supplements that can be combined with food data to better estimate total dietary intake for the U.S. population. Analytical studies are focusing first on multivitamin/mineral (MVM) products since they are the most commonly reported supplements in NHANES.
Objective: The objective of this report is to summarize the development of NDL's dietary supplement database and announce the first release of the DSID.
Description: NDL's new in-house database, the Dietary Supplement Ingredient System (DSIS), is being developed to integrate dietary supplement information from analytical studies and from other sources including government and academic product label databases. In 2007, a needs assessment was conducted which included cost/benefit evaluations and technical recommendations for the design of the DSIS. Functional requirements for the DSIS were prioritized based on rankings by NDL staff and other government stakeholders. In 2008, development and implementation of the architecture for the DSIS began. On-going software development included utilities that enabled the recent dissemination of the first data release, DSID-1. This release includes nutrient estimates determined by regression analysis for 18 vitamins and minerals in adult MVMs. DSID-1 includes tables of nutrient estimates identified by nutrient and nutrient level and application tables formatted for integration with the NHANES dietary supplement label database. The DSID-1 is now publicly available.
Conclusion: The DSIS will provide an integrated system for data acquisition, statistical data analysis, data applications, and data storage and to expedite data report generation and dissemination for a wide variety of dietary supplement product types and ingredients.
Funding Disclosure: This research was funded by USDA and the Office of Dietary Supplements at the National Institutes of Health, Interagency agreement

PREDICTED FATTY ACID INTAKES RESULTING FROM STEARIDONIC ACID ENRICHED SOYBEAN OIL FORTIFICATION: NHANES 1999-2002. Chunling Wang, MD, PhD[1]; Kimberly Smith, MSc[2]; Barbara Petersen, PhD[2]; Shawna Lemke, PhD[1]. [1]Monsanto Company; [2]Exponent Inc.
Keywords: *stearidonic acid, soybean oil, recipe modification*
Objective: To estimate the changes in total fat and selected fatty acids intakes that result from the inclusion of stearidonic acid (SDA) enriched soybean oil as food fortification at level of 375 mg per serving of food.
Materials and Methods: SDA soybean oil (SBO) at two SDA levels derived from biotech soybeans were used to modify recipes in this analysis. Fatty acid intakes of pre- and post- inclusion of 1.8 grams of 30% SDA SBO and 1.3 grams 20% SDA SBO, both contain 375 mg SDA per serving of food were calculated and compared. When possible, the total fat content of food was kept constant by replacing existing SBO or non-SBO oil; however; when there was no oil to replace in the original food, SDA SBO was added. Food and oil consumption data were derived from the NHANES 1999-2002. The proprietary Exponent recipes database (that provides the oil contents of food) were used to determine the types and amount of oils for substitution. Fatty acid components of commercially used oils were derived from the USDA Nutrient Database.
Results and Significance: Results suggest that the US population will get 2.2 g/day of SDA on average and 4.2 g/day at the 90th percentile by introducing 375 mg SDA per serving of food in proposed food categories. The inclusion of either 30% or 20% SDA SBO also resulted in a slight increase in total fat intake and minor changes in the intakes from a few other fatty acids. Methods developed in this study provide researchers with tools for evaluating the dietary impact of changes in the components of foods and food ingredients.
Funding Disclosure: None

DEFINING NUTRIENT DENSITY OF FOODS ACCORDING TO TIERS WITHIN THE MAJOR FOOD GROUPS OF THE USDA FOOD GUIDE, MYPYRAMID. Patricia M. Guenther, PhD, RD; Patricia Britten, PhD; Kristin L. Marcoe, MBA, RD; Kellie M. O'Connell, PhD, RD; Colette I. Rihane, MS, RD. USDA Center for Nutrition Policy and Promotion, Alexandria, VA.
Keywords: *nutrient density, MyPyramid, dietary guidance, fats, sugars*
Background: The MyPyramid graphic visually represents the concept of moderation through the narrowing of bands for each food group. The wider base represents more nutrient-dense foods, and the narrower top less nutrient-dense foods.
Objective: The objective was to classify foods into tiers according to nutrient density, defined by solid fat and added sugar content.
Description: The number of cup/ounce equivalents per 100 grams of a food was obtained from the MyPyramid Equivalents Database 2.0. Foods that contributed primarily to only one food group were selected. The number of calories provided by discretionary solid fats and added sugars per cup/ounce equivalent was calculated. Using these calorie values, three tiers of nutrient density (I-III) were defined for each major food group. A fourth tier (IV) was defined as foods so high in solid fat and/or added sugar that they should not be considered when choosing foods for the purpose of meeting MyPyramid recommendations. Preliminary cut-offs, expressed in terms of calories from solid fats and added sugars per cup or ounce equivalent, separating tier I (most nutrient-dense) from tier II, and tier II from tier III, respectively, were set as follows: Fruit, 0, 60; Vegetables, 0, 60; Grains, 15, 60; Milk, 20, 75; and Meat, 0, 25. In 2003-2004, the percent of total foods consumed by the U.S. population from each of the three tiers was: Fruit, 94%, 2%, 4%; Vegetables, 62%, 21%, 16%; Grains, 45%, 48%, 11%; Milk, 18%, 47%, 32%; and Meat, 29%, 41%, 28%.
Conclusion: These tiers will allow the development of quantitative recommendations regarding how often food choices from the various tiers can be chosen, so that nutrient adequacy is assured while avoiding excessive energy intake. This approach addresses the important imbalances in the U.S. diet rather than focusing on specific nutrients as many current food scoring systems do.

ABSTRACTS – POSTER PRESENTATIONS

TRENDS IN FOOD CONSUMPTION, 1977-2004. Aden S. Asefa, MPH; Mary M. Brandt, PhD; WenYen Juan, PhD. Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, College Park, MD.
Keywords: *food label, serving size, NHANES*
Objective: The United States Food and Drug Administration (U.S. FDA) continues to monitor trends and patterns in food consumption to identify the amount consumed per eating occasion as well as daily average intake of foods. Food consumption data support FDA regulations on determining Reference Amounts Customarily Consumed (RACCs), which are the basis of serving sizes used on food product labels. Serving size is an important component of the food label, with over two out of five individuals (46.4%) 16 years of age and older reporting use of serving size information.
Methods: FDA analyzed nationally representative data from the 1977-1978 and 1987-1988 Nationwide Food Consumption Surveys conducted by the U.S. Department of Agriculture to support the current serving size regulation, published in 1993. For that regulation, statistical estimates were reviewed to determine the amount of food customarily consumed per eating occasion. To examine trends in U.S. food consumption, FDA has analyzed current food consumption data from the 1999-2002 and the 2003-2004 National Health and Nutrition Examination Surveys (NHANES). Consumption data were reviewed for all individuals four years and older for foods in 129 FDA-defined food product categories, stratified over 21 product groups, which represent the general food supply.
Results: Consumption data show that for many foods there are relatively consistent intake patterns from 1977 to 2004 based on the product groups and categories. The amount customarily consumed varies by food category with the largest increase in intake shown in some foods with relatively higher levels of energy. For example, bakery items (e.g., muffins and bagels) and mixed dishes (e.g., pizza, sandwiches, burritos/enchiladas) show a considerable increase from 1997 to 2004 in the amount customarily consumed.
Significance: This data will help FDA to keep abreast of changes in food consumption patterns.

ABSORPTION ESTIMATES IMPROVE THE VALIDITY OF THE RELATIONSHIP BETWEEN DIETARY AND SERUM LYCOPENE. Betty Jane Burri, PhD; Thuan Nguyen, MS, MD; Terry R. Neidlinger, BA. Western Human Nutrition Research Center, USDA, ARS, PWA, Davis CA.
Keywords: *lycopene, food frequency, food record, human, triads*
Objective: Research typically shows low correlations between dietary intakes and serum concentrations of lycopene, a carotenoid that may protect against prostate cancer. These low correlations make it difficult to assess the effectiveness of dietary interventions with this carotenoid. Our objectives were to determine whether combining information from food frequency questionnaires (FFQ) and three day diet records (3D) by the triads method would improve the validity of this relationship, and whether correcting dietary information for differences in lycopene absorption from its food matrices would further improve correlations.
Materials and Methods: We measured dietary intakes of lycopene from 49 adults by 3D and FFQ. Serum lycopene was measured by HPLC with diode array detection. Cholesterol and triacylglycerol (TAG), concentrations were measured spectrophotometrically. Lycopene containing foods were given absorption factors based on literature and laboratory values. Associations between dietary and serum lycopene were modeled using a multiple regression forward procedure. The triads method was used for validation amongst FFQ, 3D and serum lycopene.
Results: Raw data gave low correlations between dietary and serum lycopene r = +0.15 for 3D, +0.35 for FFQ, as expected. Mathematical modeling showed that both 3D and FFQ contributed independently to the relationship between serum and dietary lycopene, demonstration that both methods must be used to collect accurate dietary information for lycopene. Correcting for absorption estimates increased the validity of the relationship between diet and serum lycopene.
Significance: Results from this study show that the correlation between dietary intakes and serum concentrations of lycopene was improved by collecting both 3D and FFQ records. These results may also apply to other nutrients that are infrequently consumed, and suggest that the triads method may be especially useful in their dietary assessment.

MODIFICATIONS TO THE NUTRIENT DATABASE ARE NEEDED TO PREVENT UNDERREPORTING OF DHA INTAKE. Christina Gayer Campbell, PhD. Department of Food Science and Human Nutrition, Iowa State University, Ames, IA.
Keywords: *docosahexanoic acid, DHA, omega-3 fatty acid*
Objective: The purpose of this analysis was to determine the importance of modifying a nutrient analysis database to assess the intake of docosahexanoic acid (DHA) in pregnant women.
Materials and Methods: A food-frequency questionnaire (FFQ) was developed to assess DHA intake and validated ($r=0.77$; $p<0.05$, data not yet published). Data were reviewed for 30 subjects from an on-going observational study that investigates DHA intake in pregnant women living in a non-coastal community. A sub-set (n=15) of the existing data revealed that these individuals consumed supplements that did not exist in the nutrient analysis database (Nutritionist Pro v4.1 Diet Analysis Software, Axxya Systems, Stafford, TX). Paired t-tests were conducted to compare differences in DHA intake between the "unmodified" and "modified" database. The level of significance was set at $p<0.05$.
Results: Supplements consumed by the subjects that did not exist in the nutrient database included: Lil Critters Omega 3 Gummy Fish with DHA™ (0.200 g DHA; Northwest Natural Products, Vancouver, WA), Expecta Lipil™ (0.200 g DHA; Evansville, IN), Nordic Naturals Omega 3™ (0.220 g DHA; Watsonville, CA) and Efacor™ (0.340 g DHA; Minneapolis, MN). DHA intake for the unmodified and modified database was 0.226 g/day compared to 0.352 g/day, respectively ($p<0.001$). Additionally, USDA food composition choices were selected over brand name products because they provided complete fatty acid data. For example, USDA "rich vanilla ice cream" (0.004 g DHA/serving) and "plain waffle, prepared" (0.0004 g DHA/serving) were chosen over brand names like Ben and Jerry's ice cream™ (Waterbury, VT) and Kellogg's Eggo waffle™ (Battle Creek, MI), respectively, which had no fatty acid data beyond those required for the nutrition label.
Significance: In the subset of data analyzed, additions to the nutrient database were essential to prevent underreporting of DHA intake.

SERUM CAROTENOID CONCENTRATION PREDICTED BY DIETARY INTAKE IN THE US. Ock K. Chun, PhD, MPH[1]; Sang-Jin Chung, PhD, RD[2]; Won O. Song, PhD, MPH, RD[3]. [1]Nutritional Sciences, University of Connecticut, Storrs, CT; [2]Foods and Nutrition, Kookmin University, Seoul, Korea; [3]Food Science and Human Nutrition, Michigan State University, East Lansing, MI.
Keywords: *carotenoid; serum; diet; NHANES; U.S. adults*
Objective: Protective effects of carotenoid intake against chronic diseases have been presumed to be mediated through serum concentrations, yet data lack to support the association in large, free-living population. We tested if serum concentration is predicted by 24-hr intake of carotenoids.
Materials and Methods: Our data were from 4,391 US adults aged 19+ yrs that completed 24-hr dietary recalls (DR) and had serum carotenoid data in NHANES 2001-2002.
Results: Serum carotenoid averaged 2.7 ug/dL for α-carotene, 12.7 ug/dL for trans-β-carotene, 0.8 ug/dL for cis-β-carotene, 7.2 ug/dL for β-cryptoxanthin, 13.6 ug/dL for lutein+zeaxanthin, and 20.3 ug/dL for trans-lycopene. Serum carotenoid concentrations were higher in women (except for lutein+zeaxanthin), older adults (except for b-cryptoxanthin), non-Hispanic White (except for cis-β-carotene and trans-lycopene), and dietary supplement users (except for trans-lycopene) compared to their counterparts ($p<0.05$); positively associated with BMI and income ($p<0.05$). One day intakes of carotenoids predicted corresponding measures in serum ($p<0.05$) after adjusting for all covariates affecting to the serum concentrations.
Significance: The possible health implications of serum carotenoids that can be predicted by 24-hr DR offer opportunities for dietary interventions and education for various subgroups.
Funding Disclosure: Supported by grants from the American Heart Association and the University of Connecticut.

A CRITICAL ASSESSMENT OF ALMOND COMPOSITION DATA IN GLOBAL DATABASES. Sylvia Yada, MSc[1]; Karen Lapsley, PhD[2]; Colleen Joice, RD[1]. [1]Consultant; [2]Almond Board of California, Modesto, CA.
Keywords: *almonds, California, representative data*
Background: Almonds are a nutrient-dense food, rich in vitamin E, riboflavin, several minerals, fiber, monounsaturated fatty acids and protein. Almonds are consumed globally in many regional diets and increasingly as a healthy snack. Today over 80% of the world's almonds are produced in California, U.S.A., and two-thirds of California almonds are exported to about 90 markets worldwide. During the past decade the Almond Board of California (ABC) has worked closely with the U.S. Department of Agriculture (USDA) to update the macro and micronutrient composition data for almonds. Currently available USDA data for whole natural almonds represents a comprehensive sampling of the major varieties from the entire growing region in California. This up-to-date, scientifically sound and accurate almond composition data (referred to as USDA SR21) is readily available online. A recent comparison of almond nutrient data in selected European and Asian nutrient databases revealed many examples of data discrepancies and gaps when compared with USDA SR21 data. Data sources, where provided, were often several decades old. ABC is actively working to increase awareness of the USDA SR21 almond data, and to promote adaptation by national nutrient databases in Europe and Asia.
Objective: To assess how and why almond macro and micronutrient composition data in selected national nutrient databases differs from current USDA SR21 almond data.
Description: Composition data for whole natural almonds (with skin) provided in selected European and Asian national nutrient databases were compared to USDA SR21 data. Major discrepancies in nutrient data were highlighted and critically assessed for data source(s), analytical method(s), and variations in nutrient terms or calculation factors, where information was available.
Conclusion: Nutrient databases should best represent national food supplies. Countries that import and consume California almonds are encouraged to adapt the high-quality updated USDA almond data for their nutrient databases.
Funding Disclosure: This study was funded by the Almond Board of California, Modesto, CA.

FLUID INTAKE AND ITS ASSOCIATION WITH HYDRATION IN AN AGING POPULATION: THE NUAGE LONGITUDINAL STUDY. Véronique Boutier, MSc; N.R. Gueye, PhD; C. Coulombe, MSc; H. Payette, PhD. Research Center on Aging, Health & Social Services Centre-University Institute of Geriatrics of Sherbrooke, Faculty of Medicine and Health Sciences, University of Sherbrooke, Sherbrooke, QC, Canada.
Keywords: *aging, water intake, hydration*
Objective: 1) To describe a method to measure total fluid intake in a large population study, 2) To assess the relationship of fluid intake with hydration status.
Materials and Methods: Baseline data from community-dwelling generally healthy men (n=843) and women (n=934) aged 68-82 yrs were used for the analyses. Intake of tap and mineral water, other beverages (tea, coffee, carbonated and non-carbonated drinks, juices) and water from foods was assessed using 3 non-consecutive 24-hour dietary recalls. Portion models and standardized procedures were used in the estimation of portion sizes. In a subset of study subjects (n=440), fat-free mass was measured by dual-energy x-ray absorptiometry (DXA), and volumes of intra- and extracellular water by the Bio-Impedance Spectrum Analyzer.
Results: Mean daily total fluid intake was 2.26±0.71 and 2.12±0.62 liters in men and women respectively ranging from 0.53 to 7.32 liters in men and 0.84 to 4.5 liters in women. Tap water contributed 18% (M: 466ml) and 24% (W: 568ml) to total fluid intake. Forty-four per cent of men and 57% of women had adequate fluid intake according to the standard 30ml/kg body weight/day proposed by Arnaud (2000) for the elderly. Those meeting this recommendation had higher total ($p<.0001$), intra- ($p=.002$) and extracellular ($p<.0001$) body water, higher fat-free mass ($p<.0001$) and bone mass ($p<.0001$), and lower fat mass ($p<.0001$) as compared to those with total fluid intake below the standard. They also reported higher taste for fish, fruits and vegetables but lower taste for meat, fat and sweets.
Conclusion: Precise measures of total fluid intake can be obtained in a large population study, is associated with hydration status and reflects a better diet. Tap water can and should be measured owing to its significant contribution to total fluid intake.
Funding Disclosure: Canadian Institute for Health Research

FOOD LABEL AND PACKAGE SURVEY: TRENDS OF MANUFACTURER USE OF NUTRIENT CONTENT CLAIMS ON PROCESSED, PACKAGED FOODS REGULATED BY FDA. Mary M. Brandt, PhD; Tomoko Shimakawa, ScD; WenYen Juan, PhD. Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, College Park, MD.
Keywords: *food labels; nutrient content claims; dietary intake of nutrients.*
Background: The Nutrition Labeling and Education Act of 1990 (NLEA) permits the use of nutrient content claims that characterize the level of a nutrient in a food and are made in agreement with U.S. Food and Drug Administration (FDA) regulations. The requirements that govern the use of nutrient content claims specify that only those claims that are defined in the regulations may be used. An expressed nutrient content claim is a statement that describes the level of a nutrient (e.g., "fat *free," "low saturated fat") or* compares the level of a nutrient in a food to that of another food (e.g., *"reduced sodium," "fewer calories").*
Objective: 1) Determine pre and post-NLEA trends in the manufacturer use of nutrient content claims on FDA-regulated foods and 2) Compare the prevalence of use of nutrient content claims with reported nutrient consumption in the U.S. for similar time periods.
Description: The FDA studies product labels through the Food Label and Package Survey (FLAPS). FLAPS data from 1991 (pre-NLEA, with related rules effective in 1994), 1993 (during the NLEA rulemaking), 1995 (post-NLEA), 1997, 2000/2001, to 2006/2007 were used to compute the percent of products sold with nutrient content claims for calories, total fat, saturated fat, cholesterol, sodium, and sugars. Results show an increase in 1995 in the manufacturer use of nutrient content claims for total fat compared to all other nutrients. Population-weighted mean nutrient intakes were similar for total fat, saturated fat, cholesterol, and sodium among U.S. national food consumption surveys (NHANES III, CSFII 1994-96, NHANES 1999-2000 and NHANES 2005-06).
Conclusion: FDA uses FLAPS to monitor the market response to food label regulations. Manufacturers continue to use nutrient content claims, with the greatest increase for total fat. Consumer nutrient intake may not follow the same trends as the manufacturer use of nutrient content claims.

DEVELOPMENT OF DATABASE FOR PESTICIDE RESIDUES IN FOODS FOR RISK ASSESSMENT. Do-Hee Kim, MS[1]; Haeng-Shin Lee, PhD[1]; Jee-Yeon Lee, MS[1]; Yoonna Lee, PhD[1]; Hae-Jeung Lee, PhD[1]; Young-Ai Jang, PhD[1]; Jae-Jin Moon, MS[1]; Sun-Hwa Lee, PhD [2]; Hee-Sun Kim, PhD[2]; Eui-Seob Jeong, PhD[2]; Cho-il Kim, PhD[1]. [1]Center for Nutrition Policy & Promotion, Korea Health Industry Development Institute, Seoul, Korea; [2]Risk Management Division, Korea Food & Drug Administration, Seoul, Korea.
Keywords: *pesticide residue, database, food, risk assessment*
Objective: This study was conducted to develop a database for pesticide residues in foods available in Korea to enable risk assessment with a nutrition evaluation/dietary exposure assessment system, **DREAMS**, which was built in 2007.
Materials and Methods: The monitoring data on pesticide residues in foods at agricultural commodity level was collected from KFDA (Korea Food & Drug Administration). A total of 3,431 agricultural goods were monitored for 737 types of pesticides over 6 occasions during past 2 years by KFDA. First, a standard input format for the monitoring data was prepared through an extensive expert consultation. Then, within this standard format, systematic codes were assigned for each entry based on the product name, product group, pesticide residue, unit, content, information source, analysis equipment, etc. according to the coding scheme of the Code Standardization guidelines of the **FANTASY** system built in 2007. Finally, the content of pesticide residues was built into a database.
Results: A pesticide residue database for 3,431 agricultural commodities produced in Korea was developed. And this database includes information on 737 kinds of pesticides.
Significance: This database will enable an accurate and scientific dietary exposure assessment for pesticide residues by integrating with food intake data produced from dietary intake surveys to ensure the food safety of the Korean population.
Funding Disclosure: This study was supported by 2008 R&D fund of Korea Food and Drug Adminstration.

DATABASE DEVELOPMENT FOR THE REPRESENTATIVE INGREDIENT COMPOSITION OF PROCESSED FOODS MANUFACTURED IN KOREA. Jee-Yeon Lee, MS[1]; Haeng-Shin Lee, PhD[1]; Do-Hee Kim, MS[1]; Yoonna Lee, PhD[1]; Hae-Jeung Lee, PhD[1]; Young-Ai Jang, PhD[1]; Jae-Jin Moon, MS[1]; Kwang-Il Kwon, PhD[2]; Jong-Wook Kim, PhD[2]; So Hee-Kim, PhD[2]; Cho-il Kim, PhD[1]. [1]Center for Nutrition Policy & Promotion, Korea Health Industry Development Institute, Seoul, Korea; [2]Nutrition Evaluation Division, Korea Food & Drug Administration, Seoul, Korea.
Keywords: *ingredient composition, processed food, database*
Objectives: This study was conducted to develop a food ingredient database compatible with a nutrition evaluation/dietary exposure assessment system, **DREAMS**, which was built in 2007.
Materials and Methods: All documents filed to register new processed foods during last 5 years in Korea were collected under the supervision of KFDA (Korea Food & Drug Administration) and the information regarding the ingredient composition was reviewed and systemized for database input. To facilitate the classification and systemization process, the Food Ingredient Validation System was developed and used to extract valid data for a database from the aforementioned information. After reviewing a total of 572,396 products manufactured domestically, those fell within the cumulative market share of 90% were selected based on the annual report of the domestic processed food statistics. Starting with these 65,537 products, individual product and their ingredient materials were renamed with generic names and assigned codes according to the coding scheme of the Code Standardization guidelines of the **FANTASY** system built in 2007. Systematic codes were assigned based on the product group, product name, cultivar, degree of preparation, preparation method, characteristics, etc. Then, to calculate the representative ingredient composition for similar food products, ingredients appeared in a group of similar products were aligned and those appeared in 10% or more of products and those used for 5% or more by weight basis were considered.
Results: A food ingredient database for over 65,000 processed foods marketed in Korea was developed. And a subset of database was built for the representative ingredient composition of 250 processed food groups to facilitate dietary exposure assessment.
Significance: With this database, fast, accurate and scientific dietary exposure assessment for Korean population will be possible by integrating with food intake data produced from dietary intake surveys.
Funding Disclosure: This study was supported by 2008 R&D fund of Korea Food and Drug Administration.

VITAMIN D AND SELECTED FATTY ACIDS IN U.S. INFANT FORMULAS. Pamela R. Pehrsson; Linda E. Lemar; Kristine Y. Patterson; Jacob Exler. USDA Beltsville Human Nutrition Research Center, Nutrient Data Laboratory, Beltsville, MD.
Keywords: *vitamin D, DHA, ARA, infant formula*
Objectives: Vitamin D, a nutrient critical to normal calcium absorption and bone health, plays a significant role in preventing rickets in infants and very young children. The 1980 Infant Formula Act and subsequent legislation mandated fortification of all infant formulas with at least 40 IU but not more than 100 IU/100 kilocalories; manufacturers are required to assure these levels. Many manufacturers have also voluntarily fortified formulas with two fatty acids found in breast milk, docosahexaenoic acid (DHA) and arachidonic acid (ARA). Some studies suggest these nutrients may play a role in visual and mental development of infants.
Materials and Methods: USDA has analyzed selected samples of infant formula from 12 locations nationwide to provide the first analytical USDA-generated dataset for these nutrients. Vitamin D, fatty acids, proximates, minerals, and some vitamins were analyzed in 13 highly consumed infant formulas, including ready-to-feed or reconstituted milk-based and soy-based types; the formulas were analyzed unheated and heated to determine vitamin D retention. Samples were analyzed for vitamin D by HPLC with ultraviolet detection, using vitamin D2 as the internal standard; fatty acids were analyzed by gas chromatography. These values were compared to standard values reported by the industry and currently included in SR. Analytical values for vitamin D, DHA, and ARA (means ± SEM) were reviewed for release in SR22 (2009) and compared with existing industry-provided data.
Results: Preliminary review shows vitamin D values are variable and meet or exceed label claims. For non-breastfed infants, infant formulas are consumed during a relatively short but critical growth period; for at least part of this time, the formula is usually the sole source of nutrition and thus verifying that vitamin D and long-chain fatty acids are present at or above levels indicated on the label is important for monitoring infant formula.
Significance: This is the first USDA-generated analytical dataset for infant formulas produced in the U.S.
Funding in part from USDA and NIH Contract # YICN5010
Funding Disclosure: USDA and NIH, Agreement No. Y1CN5010

SCHOOLS MEETING SCHOOL BREAKFAST CALORIE STANDARDS TEND TO BE LARGER AND HAVE LOWER COMMUNITY POVERTY RATES THAN SCHOOLS THAT DON'T MEET CALORIE STANDARDS.
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Keywords: *calories, School Breakfast Program, SNDA-III*
Background: An objective of the School Breakfast Program (SBP) is to ensure that all children have access to healthy meals. The Food and Nutrition Services of the United States Department of Agriculture (USDA) sponsored the third School Nutrition Dietary Assessment Study (SNDA-III) to provide information about school meals and whether they met the calorie and nutrient standards. Data were collected from a nationally representative sample of schools during the 2004-2005 school year.
Objective: The objective was to determine characteristics of schools not meeting the current USDA regulatory calorie standards set for the SBP.
Description: The percentage of schools meeting the USDA calorie standard was related to the size of the school and the poverty level of the community in which the school was located. Schools with fewer than 400 students met the standard for foods offered 18% of the time while schools with more than 1000 students met the standard 42% of the time ($p < 0.0001$). Analyzing served data, smaller schools met the standard 26% of the time versus 35% in the larger schools ($p < 0.01$). School districts were divided into groups based on the percent of households under the poverty level: A: < 20%; B: > 20% and < 30%; and C: > 30%. Schools in Group A met the standard for foods offered 30% of the time versus Group C, 7% of the time ($p < 0.005$). Analyzing served data, Group A schools met the standard 29% of the time versus 14% in Group C ($p < 0.04$).
Conclusion: Larger schools and schools located in less impoverished communities tend to offer a breakfast menu that meets the USDA standard for calories and results in a greater likelihood that students will accept the foods being offered.
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BEVERAGE CONSUMPTION IN PARTICIPANTS FROM THE HEALTHY AGING IN NEIGHBORHOODS OF DIVERSITY ACROSS THE LIFE SPAN (HANDLS) STUDY.
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Keywords: *beverage consumption, energy, body mass index*
Objective: To determine the amount and pattern of beverage consumption across sex and race groups by body mass index.
Materials and Methods: The HANDLS study is a prospective 20-year longitudinal study examining the influences of race and socioeconomic status on the development of cardiovascular and cerebrovascular diseases and cognitive function among African American and white residents of Baltimore. The present sample consists of 1991 subjects (African Americans, n=1213; whites, n=778), 30 to 64 years of age. Approximately 46% of the sample has an income <125% poverty status. Two 24-hr dietary recalls were collected in-person by trained interviewers using the USDA Automated Multiple Pass Method. Foods and beverages were coded and analyzed using USDA Survey net system and the Food and Nutrient Database for Dietary Studies 3.0. Weight status was measured using cutoff points for BMI and defined as under/normal, over-weight, and obese. Height and weight were measured. SAS version 9.1 was used to generate descriptive and analytical statistics.
Results: Energy intake from all beverages ranged from 17% to 19% for obese to normal weight persons, respectively. Mean energy from beverages by weight status was not significantly different by race. However, percent of energy contributed by fat and sugar was significantly lower among whites compared to African Americans. The percent of total energy from all beverages consumed by overweight and obese women was significantly lower than that of normal weight women. Obese men also consumed significantly less energy from beverages than normal weight men. In comparison to men and women aged 40+ years examined in the NHANES 1999-2000, the estimated percent of energy from beverages was higher for HANDLS study participants.
Significance: The findings contribute to knowledge of beverage consumption patterns observed among different race and BMI groups. Understanding factors that influence beverage consumption are important for nutrition professionals and policymakers.
Funding Disclosure: The research was funded by the Intramural Research Program, National Institute of Aging, National Institute of Health.

EVALUATION OF NUTRIENT INTAKES OF KOREAN ADULTS: COMPARISON OF 2001 AND 2005 NATIONAL SURVEYS. Jae Eun Shim, PhD[1]; Dongwoo Kim, MS[2]; Hyunju Jung, MS[2]; Hee Young Paik, ScD[1,2]. [1]Research Institute of Human Ecology and [2]Department of Food and Nutrition, Seoul National University, Seoul, Korea.
Keywords: *EAR cut-point method, nutrient adequacy, fat intake*
Objective: This study was conducted to estimate the prevalence of inappropriate nutrient intakes of Korean adults from dietary intake data of the Korean National Health and Nutrition Examination Survey (KNHANES) conducted in 2001 and 2005.
Subjects and Methods: One day dietary intake was obtained by 24 hour recall method from each participant selected by nationwide household sampling in each survey. Nutrient intake data from adults 20~64 years of age (N=6,062 in 2001, 5,436 in 2005) were selected and adjusted for day-to-day variations using Software for Intake Distribution Estimation(C-SIDE), with two day intake data from sub samples in 2001 KNHANES and 2002 Seasonal Dietary Survey. Proportions of subjects below and over the lower and upper limits of the Acceptable Macronutrient Distribution Range (AMDR) of Korean Dietary Reference Intakes (KDRIs) of each macronutrient were calculated. Prevalence of inadequate intakes of micronutrients was estimated by EAR cut-point method. Proportions of subjects over UL values were negligible.
Results: Proportion of subjects consuming over the upper range of AMDR increased from 3.0% in 2001 to 12.8% in 2005 for fat, while the proportion decreased from 29.2% to 19.6% for carbohydrate. Percent of subjects below EAR was highest for Ca (70.9% and 56.3% in 2001 and 2005, respectively), followed by riboflavin (44.4% and 38.7%) and iron in women (31.2% and 22.9%). Proportion of subjects below EAR decreased from 13.4% to 3.4% for vitamin A but increased from 2.9% to 14.4% for vitamin C.
Significance: The results show the increase in prevalence of overconsumption of fat among Korean adults. Micronutrient inadequacies are also quite prevalent for Ca, riboflavin, and Fe in women. Some attention may be needed for vitamin A and C. Nutrition policies and programs need to target these nutrients in order to promote healthful diet among Korean adults.
Funding Disclosure: This research was funded by the Korean Ministry for Health, Welfare, and family Affairs.

PRIORITY FOODS APPROACH TO MANAGING AND UPDATING USDA'S FOOD AND NUTRIENT DATABASE FOR DIETARY STUDIES. Jaspreet KC Ahuja, MS; Jan B Montville, MS; Alanna J Moshfegh, MS, RD. Food Surveys Research Group, Beltsville Human Nutrition Research Center, ARS, USDA, Beltsville, MD
Keywords: *Food and Nutrient Database for Dietary Studies; FNDDS; Priority Foods; survey database maintenance.*
Background: The Food and Nutrient Database for Dietary Studies (FNDDS) is used to process and code dietary intakes from the nationwide *What We Eat In America* (WWEIA), National Health and Nutrition Examination Survey (NHANES). It is a database of about 7,000 foods as consumed by the U.S. population, their nutrient values, and weights for typical food portions. Nutrient values in the FNDDS are based on the USDA National Nutrient Database for Standard Reference. The database is updated biennially to reflect the current marketplace and to incorporate new available data. The need to review and update foods that are most important for the study population is critical.
Objective: To describe the criteria used to identify important foods for the US population for maintaining and updating the FNDDS.
Description: The Priority Foods approach is used for identifying important foods for the U.S. population. A subset of foods in the FNDDS is identified, based on frequency of consumption and nutrient contribution in the past survey, and given priority for comprehensive review and update. For example, for the next release of the FNDDS, about 400 foods were identified based on WWEIA, NHANES 2005-2006 dietary intake data. Data will be presented as how these foods, representing only 6% of all the foods in the FNDDS, account for significant proportion of the reported foods, energy, and nutrients consumed by the total population and subsets of the population, such as infants and Hispanics.
Conclusion: The Priority Foods approach ensures that foods that are most important for the US population are given priority for comprehensive review and update, given the size of the FNDDS and the constraints of time and resources.

ASSESSING CONSUMPTION OF FRUIT JUICES AND JUICE DRINKS. Janice Bodner-Montville; Kaushalya Y. Heendeniya; Jaswinder Anand; Joseph D. Goldman. Food Surveys Research Group, U.S. Department of Agriculture, Agricultural Research Service, Beltsville Human Nutrition Research Center, Beltsville, MD.
Keywords: *juice intake; NHANES; Food and Nutrient Database for Dietary Studies (FNDDS-3.0).*
Background: Fruit juices (containing 100% juice) and juice drinks (containing juice and other ingredients) are popular beverages. Data from What We Eat In America, NHANES 2003-2004, day 1, show that 45% of the population consumed at least one beverage from these two categories on the day of the survey. For those consumers, these products contributed a mean of 9% (0.3 SE) of daily energy.
Objective: When collecting data for NHANES about intake of these beverages, a series of questions is asked to elicit the kind of beverage, whether it was 100% juice or a juice flavored drink, and what the brand name was. Answers to these questions are linked to items in the Food and Nutrient Database for Dietary Studies (FNDDS). In addition to entries for single fruit juices, FNDDS-2.0 included a wide variety of juice blends categorized by specific juice names, and many juice drinks of various flavors.
Description: To analyze NHANES 2005-2006, the database was compared to products on the market. It was found that regardless of product name, the major juices in non-citrus 100% juice blends were apple, grape, and/or pear; the same was found for juice drinks (usually less than or equal to 10% juice).
Conclusion: Given that little additional accuracy in nutrient intake estimates could be gained by specifying product name or flavor, composite generic blends and drinks were developed. As a result, database entries have been revised for FNDDS-3.0 to better reflect the market.
Funding Disclosure: None

SOURCES OF KEY NUTRIENTS IN THE HOME FOOD ENVIRONMENT. Carol Byrd-Bredbenner, PhD, RD, FADA[1]; Carl Bredbenner, BS[2]; J.A. Abbot, PhD, RD[1]. [1]Rutgers, The State University of New Jersey; [2]The Nutrition Company, Long Valley, NJ.
Keywords: *household food inventory, home food supply, nutrients, Universal Product Code (UPC)*
Objective: This study describes the sources of key nutrients supplied by the home food environments of 100 families with children $\leq$12 years.
Materials and Methods: Trained researchers inventoried home food supplies using diet analysis software (FoodWorks) modified to use barcode scanners and access databases linking UPCs with nutrient data (Gladson Interactive; FoodFacts.com). Each food was coded according to these food groups (and subgroups): grains (dry grains, breakfast cereals, sweet baked goods, grain snacks); fruits/vegetables (fresh, thermally processed, frozen, dried); dairy (desserts, non-dessert dairy); meat (fresh, thermally processed, frozen, nuts/nut butters, dried, legumes, vegetarian alternatives); high added sugar foods (sweets, beverages); calorie-free beverages; packaged entrees; salty/fatty snacks; soups; and other. Calories, protein, fat, saturated fat, carbohydrate, cholesterol, sugar, dietary fiber, sodium, vitamin A, vitamin C, calcium, and iron supplied by each food group and subgroup were calculated.
Results: Grains, especially dry grains (e.g., rice, pasta, bread) and breakfast cereals, supplied the largest amount of calories (43%), carbohydrates (57%), dietary fiber (46%), sugar (27%), sodium (38%), and iron (64%). The greatest availability of total fat (38%), cholesterol (61%), and protein (39%) was from meat, especially fresh meat and nuts/nut butters. Dairy products were the source of the greatest quantities of saturated fat (35%) and calcium (42%). Fruits and vegetables, especially fresh and thermally processed, provided the most of vitamin A (70%) and vitamin C (76%).
Significance: This study expands the limited research on the home food supply and provides insights that may have important implications for dietary guidance and nutrition interventions. Because foods available in the household food supply constitute a significant portion of the foods families consume and because food availability is associated with dietary intake, it follows that changes to the home food supply could result in significant changes in dietary quality and nutritional health.
Funding Disclosure: Funding or in-kind services for this study were provided by the Canned Food Alliance; Gladson Interactive; FoodFacts.com; and The Nutrition Company.

HEALTHY EATING INDEX (HEI) – 2005: COMPARISON USING CSFII_98, FNDDS 1.0 AND FNDDS 2.0 REFERENCE DATABASES. Deidre Douglass, MS, RD; R. Sue Day, PhD; Lupe Garcia, MS. University of Texas, Houston, School of Public Health, Dell Center for the Advancement of Healthy Living, Houston, TX.
Keywords: *Healthy Eating Index, HEI, CSFII_98, FNDDS 1.0, FNDDS 2.0, FIAS*
Objective: This project's aim was to calculate population HEI 2005 component and total scores for a data set using three different food and nutrient databases: CSFII_98, FNDDS 1.0 and FNDDS 2.0, and to determine differences in HEI scores.
Materials and Methods: A data set with 2,827 common foods was assembled from food records entered using the Food Intake Analysis System, Millennium Edition, Version 2.0 (FIASMe, 2.0). This data set was analyzed for nutrient amounts and MyPyramid Equivalents using FIASMe, 2.0 using each of the three reference databases: CSFII_98, FNDDS 1.0 and FNDDS 2.0. These nutrients and MyPyramid Equivalents were used in calculating the HEI 2005 component and total scores following standard guidelines. Since the HEI-2005 has a whole fruit component, the whole fruit servings must be singled out from the total fruit servings provided by MyPyramid Equivalents. USDA/CNPP created a whole fruit/fruit juice table using the FNDDS 1.0, the database developed for the NHANES, 2001 -2002. Following the SAS program script and instructions for the whole fruit/fruit juice table provided by USDA/CNPP, ACCESS 2007 was used to produce a whole fruit/fruit juice table for the CSFII_98 and FNDDS 2.0 reference databases and to produce population HEI component and total scores.
Results: Each HEI component and total score using CSFII_98, FNDDS 1.0 and FNDDS 2.0 varied depending on the reference database. The total HEI score was lowest with CSFII_98 and highest with FNDDS 2.0, but this pattern did not hold true for all of the component scores. There were subtle differences in each component due to changes in recipes and nutrient values for some foodcodes and the changes in MyPyramid Equivalents apportioned for those and other foodcodes.
Significance: HEI-2005 scores produced with different databases cannot be compared before first considering the food variations between the food and nutrient reference databases.

ANALYSIS OF FOODS AND NUTRIENTS OBTAINED AT THE FINAL PROBING STEP IN 24-HOUR RECALL METHOD. Hera Kang, BS[1];·Hyunju Jung, MS[1]; Jae Eun Shim, PhD[2] ; Hee Young Paik, ScD [1]. [1]Department of Food and Nutrition and [2]Research Institute of Human Ecology, Seoul National University, Seoul, Korea.
Keywords: *24-hour recall, 3-step interview, nutrient intake*
Objective: This study was conducted to examine the usefulness of adding final probing step in dietary assessment by 24-hour recall method among Korean adults.
Subjects and Method: One-hundred fifty five adults (35 males and 118 females) above 30 years of age who came for health examination were recruited at major hospitals in Korea. One day dietary intake was obtained using 24-hour recall method from each subject. The dietary interview was conducted by 3 steps, (1) quick list of foods eaten during the previous day, (2) detailed information of all the foods eaten, (3) the final probing for any items forgotten. Items added at the final probing step were identified and contributions of energy nutrient intakes were calculated
Results: The average duration of interview was 11 min 46 sec, and time spent for each step was 5 min and 20 sec for step 1, 5min 52 sec for step 2, and 34sec for step 3. The average number of dishes consumed by the subjects was 15.4 and 2.1 (13.6%) dishes were added at the step 3. From mean total energy intake of 1,589 kcal (Men=1,846 kcal, Women =1,509 kcal), 179 kcal (11.3%) was added at the step 3. Nutrients increased significantly at the step 3 were included carbohydrate (14.2%), K (16.9%), Vit B1 (20.2%), Vit B2 (17.0%), niacin (14.7%) and iron (13.1%). The frequently reported dishes in the step 3 were tea (152), fruits (112), beverages (18), noodles and dumplings (18), pan-broiled fishes and shells (18), seasonings (14), and breads (11).
Significance: The final probing step can add significant information on intakes of foods and many nutrients with only about 34 seconds of interview time. Confirmation of the results with larger samples of different age groups is needed.

NATIONWIDE SURVEY: VOLUNTARY NUTRITION LABELING OF RAW FRUITS, VEGETABLES, AND FISH BY RETAILERS. Tomoko Shimakawa, ScD[1]; Anthony Andriano[2]; Mary B. Brandt, PhD[1]. [1]Center for Food Safety and Applied Nutrition, US Food and Drug Administration, College Park, MD; [2]Retail Diagnostics, Inc., Saddle Brook, NJ.

Keywords: *survey, compliance, voluntary nutrition labeling, fruits, vegetables, fish*

Objective: The Nutrition Labeling and Education Act (NLEA) of 1990 amended the Food, Drug and Cosmetic Act to mandate nutrition labeling on most foods. For raw fruits, vegetables and fish, the NLEA required FDA to issue voluntary nutrition labeling guidelines for retail stores offering these food products for sale and to determine whether substantial compliance by retail stores is achieved with the guidelines (Title 21 of the Code of Federal Regulations, Sections 101.42 - 101.45 (21 CFR 101.42 – 101.45). To evaluate the degree of compliance by retail stores, FDA conducted under contract a survey of retail stores across the United States.

Materials and Methods: During June and July of 2008, field auditors visited 2,000 retail grocery stores that were randomly selected to be representative of a store population defined as all grocery stores within the continental United States. Stores were sampled by the following strata: store size; store type; state; and county size. A store was considered to be in compliance with the guidelines if the store provided valid nutrition labeling for at least 90 percent of the foods it sold, listed among the 20 most frequently consumed raw fruits, vegetables, and fish in the United States (21 CFR 101.44), in proximity to the relevant foods in the store.

Results: The percent of stores that are in compliance with the guidelines was 51.8 percent for raw produce (fruits and vegetables) and 55.2 percent for raw seafood. After adjusting for sample allocation, the percent of compliance was 45.7 percent for raw produce and 51.8 percent for raw seafood. Percent of compliance based upon annual sales volume (i.e., annual sales of stores with labeling) was 58.2 percent for raw produce and 57.8 percent for raw seafood. A higher percentage of compliance was found with stores with larger annual sales.

Significance: This survey helped FDA to understand the extent of voluntary nutrition labeling of raw fruits, vegetables, and fish provided by retailers.

NUTRIENT CONTENT OF SINGLE-MUSCLE PORK CUTS. Juhi Williams[1,2]; Juliette Howe[1]; Denise Trainer[1]; Ceci Snyder[2]; Phil Lofgren[2]; Dennis Buege[3]; Joanne Holden[1]. [1]Nutrient Data Laboratory, Beltsville Human Nutrition Research Center, ARS/USDA, Beltsville, MD; [2]National Pork Board, Clive, IA; [3]University of Wisconsin, Madison, WI.

Keywords: *nutrient profile, fresh pork*

Objective: To determine the nutrient profiles of four fresh pork cuts (fabricated from individual muscles extracted from subprimals) for dissemination in the USDA National Nutrient Database for Standard Reference (SR). To determine cooking yields and nutrient retention factors of these single-muscle pork cuts.

Materials and Methods: A total of twelve samples from pork shoulder (Pectoralis profundi (PP), Teres major (TM)); leg (Gracilis(GR)) and knuckle (Vastus lateralis/Rectus femoris (VL)) were obtained from production plants in North Carolina and Iowa. Six paired cuts were fabricated from the left and right sides of the carcass. One member of each pair was prepared raw and the other cooked either by broiling (PP, TM, and GR) or braising (VL). After cooling, the cooked product was cubed, hand mixed and divided into individual samples or composites of two- or three-carcass samples. Proximate nutrients and cholesterol were determined on individual muscle samples, both raw and cooked. Fatty acids, choline, folate and amino acids were analyzed on three-carcass composites. Vitamins and minerals were analyzed on two-carcass composites.

Results: VL, raw and cooked contained the highest level of protein and the lowest amount of fat when compared to the other cuts. Conversely, PP cooked contained the highest amount of fat and the lowest amount of moisture. Sodium was higher in GR (raw and cooked) and lower in VL (cooked) compared to other cuts. Niacin levels, raw and cooked, were highest among B-vitamins measured particularly for PP. Cooking yield was lowest (72%) for braising compared to broiling (82%). The highest nutrient retentions were obtained with braising when compared to broiling.

Significance: The new pork cuts represent good sources of iron, zinc and B–vitamins, especially niacin. These nutrient profiles for single-muscle pork cuts were released in USDA National Nutrient Database for Standard Reference, version 21.

Funding Disclosure: The National Pork Board and USDA, ARS.

RECIPE DATABASE DEVELOPMENT FOR HOME-MADE DISHES BASED ON THE NATIONAL DIETARY INTAKE SURVEY. Hae Jeung Lee, PhD; Haeng Shin Lee, PhD; Yoonna Lee, PhD; Young Ai Jang, PhD; Jae-Jin Moon, MS; Dohee Kim, MS; Jeeyeon Lee, MS; Cho-il Kim, PhD. Center for Nutrition Policy & Promotion, Korea Health Industry Development Institute, Seoul, Korea
Keywords: *Korean, recipe database, home-made dish, Korea National Health and Nutrition Examination Survey*
Objective: To develop a representative recipe database for home-made dishes to be used in the processing of the dietary intake survey results from the Korea National Health and Nutrition Examination Survey (KNHANES).
Methods: Recipes collected from the survey households of the 2005 KNHANES and the 2005 Seasonal Nutrition Survey were analyzed. More than 12,000 recipes from about 7,000 households were subjected to review and sorted by dish category, name of dish, and the frequency of appearance. To select 100 dishes commonly consumed in Korean Households, the top 3 entries from each of the18 dish categories (e.g. cooked rice, stews, soups, roasted meats/fishes, cooked vegetables, etc.) were selected first for a total of 54. An additional 5 entries were selected from the 5-10 categories contributing more than 5% in frequency of consumption/appearance. Serving size for each type of dish was drawn from the individual intake data of the adult population, and this was applied to each household recipe to make comparison of ingredients among different household recipes possible. Next, the ingredients reported for each recipe were pooled and sorted by amount and appearance frequency. Those ingredients with less than 5% of frequency were taken out and the remaining ingredients were averaged and adjusted to total 100% in order to produce a preliminary version of a representative recipe for each selected dish. The next step was to prepare dishes using this preliminary version of the recipes to check on the edibleness and feasibility.
Results: We produced a representative recipe database for 100 home-made dishes, which will be used in estimating ingredient food intake from dietary intake of home-made dishes reported in volume without recipes.
Significance: This database will be incorporated into the fundamental databases used in processing of KNHANES dietary intake data from 2010.
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