Final Program
37TH NATIONAL NUTRIENT DATABANK CONFERENCE
"Emerging Researcher Needs and Applications of Food and Nutrient Databases"
April 19, 2013

7:30-8:30 **Registration**

8:30-8:40 **Welcome: Laura Sampson (Local Arrangements Chair) and Diane Mitchell (SC Chair)**

SESSION 1: EMERGING RESEARCH NEEDS
Session Chairs: David Haytowitz and Rose Tobelmann

8:40-9:10 **Keynote Address: Joanne Holden; USDA/ARS Nutrient Data Laboratory (retired)**
Food Composition Data: Keeping Pace with Emerging Trends in Research and Database Applications

2013 award recipient for outstanding lifetime achievement in the area of nutrient databases

9:10-9:20 **Award Presentation:** Diane Mitchell, Rose Tobelmann and David Haytowitz

9:20-9:40 **Development of a Database of Fortified Foods in WWEIA/NHANES 2007-2008 to Model Nutrient Intakes Under Proposed Revisions to the Daily Values**
Mary Murphy, Exponent, Inc.

9:40-10:00 **Identification of Sentinel Foods for Monitoring Sodium Intake of the U.S. Population, What We Eat in America, NHANES 2007-2009**
Katherine Hoy, USDA Food Surveys Research Group

10:00-10:20 **Lutein & Zeanthin Dietary Assessment**
Elizabeth Johnson, Jean Mayor USDA Human Nutrition Research Center on Aging, Tufts University

10:20-10:40 **Break and Poster Viewing**

SESSION 2: APPLICATIONS OF AVAILABLE DATABASES
Session Chairs: Lisa Harnack and Phyllis Stumbo

10:40-11:00 **Water Foot Print Database**
Marissa Cloutier, Harvard School of Public Health, Department of Nutrition

11:00-11:20 **Using U.S. Department of Agricultural and Proprietary Databases to Compare Processed and Home Recipe Foods**
Mary Muth, RTI International

11:20-11:40 **Dietary Supplement Label Database for Research**
Johanna Dwyer, NIH Office of Dietary Supplements

11:40-12:00 **Sodium and Sugar Content of Commercial Baby and Toddler Foods**
Joyce Maalouf, Epidemiology and Surveillance Branch, Division for Heart Disease and Stroke Prevention National Center for Chronic Disease Prevention and Promotion, CDC

12:00-1:50 **Lunch and Poster Viewing (presenters by posters 1:00-1:50)**

SESSION 3: GLOBAL APPLICATIONS
Session Chairs: Laura Sampson and Julie Eichenberger Gilmore

1:50-2:10 **Tribute to Nevin Scrimshaw: His Food Composition Legacy**
Barbara Burlingame, Food and Agriculture Organization of the United Nations, Rome, Italy

2:10-2:30 **Development of a Nutrient Composition Database for Ghanaian Foods**
Seth Armah, Department of Nutrition and Food Science, University of Ghana

2:30-2:50 **Food Composition Database for Bangladesh (FCDB)**
Nazma Shaheen, Institute of Nutrition and Food Science, University of Dhaka, Bangladesh

SESSION 4: ADVANCES IN DOMESTIC DATABASES AND ASSESSMENT
Session Chairs: Carol Boushey and Susie McNutt

2:50-3:10 **Is it Time to Revise the Atwater Energy Values of Some Foods?**
Edward Farnworth, Knowledge Broker: Food, Nutrition, Health

3:10-3:30 **Update of Selected Nutrients in U.S.-grown Peanuts**
Ronald Pegg, Department of Food Science & Technology, The University of Georgia

3:30-3:45 **Break (poster take-down)**

3:45-4:05 **Identification and Quantification of Food Flavonoids**
Julia Peterson**,** Friedman School of Nutrition Science and Policy, Tufts University

4:05-4:25 **Executing a Collaborative Nationwide Study to Update Beef Data in the USDA Database, 2007 to 2013**
Janet Roseland, USDA/ARS Nutrient Data Laboratory

4:25-4:45 **Updating USDA's Key Foods List for NHANES 2009-2010**
David Haytowitz, USDA/ARS Nutrient Data Laboratory

4:45-5:05 **Diet Quality of Americans in 2001-02 and 2007-08 as Measured by the Healthy Eating Index-2010 (HEI-2010)**
Patricia Guenther, USDA Center for Nutrition Policy and Promotion

5:05-5:15 **VALEDICTION:** Laura Sampson and Julia Jordan

Abstracts for Oral Presentations at the 37th National Nutrient Databank Conference
April 19, 2013

8:40-9:10 am

Title: Food Composition Data: Keeping Pace with Emerging Trends in Research and Database Applications.

Author: Holden, J.M. Nutrient Data Laboratory, ARS, USDA (retired)

Abstract:
A healthy population is a key resource for any country. To assure the health of a population scientists in government, academia, and industry conduct research to monitor national food (and dietary supplement) consumption patterns and to assess the impact of dietary patterns on health status. Current and accurate composition data for foods and supplements are an essential tool in these areas of nutrition research and food manufacturing.

Over the last 50 years food supplies have become more complex and dynamic, with the increase in multi-ingredient processed products, including restaurant foods, to complement animal and plant–based commodities. Foods have continued to evolve with advances in industrial technology, global ingredient supplies, and immigration.

Scientific interest in dietary components continues to expand. To keep pace with changes in food composition in light of emerging trends in research and consumption database developers must continue to track nutrients and other dietary components in foods and supplements that reflect the changing marketplace. Also, knowledge of food chemistry and production technology is essential to setting priorities for new or updated data entries. Guidelines for calculations must also be reconsidered. Scientists from industry, government, and academia must work together to contribute new composition data for foods and dietary supplements to public databases.

Key words: food composition data, dietary supplements, emerging trends, database applications,

Funding disclosure (if applicable): None

9:20-9:40 am

Title: Development of a Database of Fortified Foods in WWEIA/NHANES 2007-2008 to Model Nutrient Intakes Under Proposed Revisions to the Daily Values

Authors: Mary M. Murphy, MS, RD;[1] Judith H. Spungen, MS, RD;[1] Leila M. Barraj, DSc;[1] Regan L. Bailey, PhD, RD;[2] Johanna Dwyer, DSc, RD.[3]

[1]Exponent, Inc., Washington, DC; [2]Office of Dietary Supplements, Bethesda, MD; and [3]Jean Mayer USDA HNRC on Aging, and Schools of Medicine, Tufts University, Boston, MA.

Abstract:
Background: The Daily Values (DVs) on the Nutrition Facts Panel will be evaluated and potentially updated to represent current Dietary Reference Intakes. There is debate about which reference values should be used to update label DVs: population-weighted (w) or highest (h) values of the current EARs or RDAs. To help inform decisions in revising the DVs, nutrient intakes by the US population ages 4+ years were modeled assuming potential DV scenarios for contributions of vitamins and minerals (V/M) from fortified foods using WWEIA/NHANES 2007-2008 data. In each scenario, levels of fortified V/M were adjusted to maintain the current % DV in fortified foods, keeping levels of other nutrients constant.

Objective: Since fortified foods are not systematically identified in WWEIA, the objective was to develop a database of foods fortified with the V/M so potential changes in intakes could be assessed.

Description: The database of fortified foods was constructed using USDA's Food and Nutrient Database for Dietary Studies 4.1 and related files. A total of 279 fortified foods or representative composites of fortified and non-fortified foods were identified. Many of these fortified foods were also ingredients in mixtures. Fortified ready-to-eat (RTE) cereals accounted for more than half of the fortified foods (52%), followed by fortified fruit/fruit juice drinks (8%), and fortified bars (7%). Fortified foods accounted for 28% of vitamin C intake; 20-23% of intakes of folate, vitamin B6, and iron; 8-19% of intakes of vitamins B12 and A, thiamin, niacin, vitamin D, riboflavin, zinc, calcium, and vitamin E; and ≤1% of magnesium and potassium intakes.

Conclusion: The database we developed identifies fortification practices reflected in the USDA nutrient data files, therefore allowing estimation of representative intakes of fortified foods by the US population and corresponding nutrient intakes under each DV modeling scenario.

Key words: Fortification, Daily Values, modeling

Categories: Database Issues Involving Food Labeling and Front of Pack Labels

Funding disclosure (if applicable): Supported by the Fortification Committee of The International Life Sciences Institute, North America

9:40-10:00 am

Title: Identification of Sentinel Foods for Monitoring Sodium Intake of the U.S. Population, What We Eat In America, NHANES 2007-2008.

Authors: Katherine Hoy, EdD RD[1]; Donna Rhodes, MS RD[1]; Joseph Goldman, MA[1]; Carrie Martin, MS RD[1]; Rhonda Sebastian MS[1]; Jaspreet Ahuja MS[2]; David Haytowitz, MS[2]; Pamela Pehrsson, PhD[2]; Molly E. Cogswell, DrPH RN[3]; Alanna Moshfegh, MS RD[1]; [1]Food Surveys Research Group and [2]Nutrient Data Laboratory, Agricultural Research Service, USDA; [3]Centers for Disease Control

Abstract:
Background: Monitoring the sodium intake of the population was a key recommendation identified in the 2010 Institute of Medicine report "Strategies to Reduce Sodium Intake in the United States". In response, a monitoring plan has been developed by the U.S. Department of Agriculture, Agricultural Research Service Food Surveys Research Group and Nutrient Data Laboratory in close collaboration with the Centers for Disease Control and the Food and Drug Administration.

Objective: Describe the identification of Sentinel Foods to be tracked as primary indicators and subsequently used to assess change in the sodium content of foods and population sodium intake.

Description: Day-1 dietary intakes of all individuals excluding breastfed children (n=9118) in What We Eat In America (WWEIA), NHANES 2007-2008, weighted to reflect the population were used to identify the foods that contributed substantially to sodium intake of the population. In addition to potential for sodium reduction, criteria for selection of the Sentinel Foods included sodium density (mg/100gm), level of sodium per report and frequency of consumption. The identified Sentinel Foods (n=125) accounted for approximately 35% of total sodium intake of the population and included commercial/packaged (75%) and restaurant (25%) items. About 70% total sodium intake was accounted for by mixed dishes (30%), meat, poultry, fish items (21%), and bread/grain products (19%). Of the sentinel foods, 37 were mixed dishes (macaroni and cheese, chili, pizza), 23 were meat, poultry, fish items (deli ham, fried chicken, fish sticks) and 20 were bread/grain products (bread, flour tortilla, read-to-eat cereal).

Conclusion: Regular tracking and analysis of Sentinel Foods is critical for monitoring sodium intake of the population and evaluating effectiveness of sodium reduction initiatives.

Key words: Nutrition monitoring, sodium, sodium intake

Categories: Nutrition monitoring to meet goals for government projects such as changing sodium levels in foods and diets in a timely fashion.

Funding disclosure (if applicable): Supported by U.S. Department of Agriculture, Agricultural Research Service

10:00-10:20 am

Title: Lutein & Zeaxanthin Dietary Assessment

Author: Elizabeth Johnson, Jean Mayor USDA Human Nutrition Research Center on Aging, Tufts University

Abstract:
The carotenoids, lutein and zeaxanthin, selectively accumulate in the center or the retina (known as the macula), where they may protect against the development of age-related macular degeneration . The presence of lutein and zeaxanthin in human blood and tissues is a result of the ingestion of food sources of these carotenoids. Because the distribution of lutein and zeaxanthin differ within the macula, with a higher ratio of zeaxanthin to lutein centrally but a lower ratio eccentrically, there is discussion on their individual associations in eye health. Of the two, lutein predominates in fruit and vegetables. Accurate assessment of individual intakes of lutein and zeaxanthin are crucial in the evaluation of their individual associations in eye health. This is difficult given the limited information in current dietary databases which provide combined levels of lutein and zeaxanthin. Furthermore, there is there is little information on corn and egg products, with the exception of one recent publication. This is of interest given that these foods are substantial sources of these carotenoids for many individuals. Corn stands apart from other vegetables in that the relative amount of zeaxanthin is greater than for other vegetables commonly consumed by the US population. Eggs and egg products are of interest because of the high bioavailability of lutein from eggs. Therefore, a dietary assessment tool was developed for a quick, accurate, and inexpensive quantification of individual intakes of lutein and zeaxanthin providing information on fruits and vegetables as well as corn and egg food products. Dietary assessment using individual estimates of lutein and zeaxanthin intakes are needed for determination of their individual associations with eye health.

Key words: food composition data, database applications

Categories: Advances in Using Food Composition Data for Dietary Assessment

Funding disclosure (if applicable): None

10:40-11:00 am

Title: Measuring the Water Footprint of Dietary Consumption

Author: Marissa Cloutier, MS, RD; Harvard School of Public Health, Department of Nutrition

Abstract:
One of the most serious aspects of global climate change is its effect on the global water cycle. With an uncertain climate future, attention must be given to the use of fresh water resources. Agriculture is the largest sector of fresh water resource use. Hence, it is indicative that food consumption patterns are measured in terms of their impact on global water resources. This discussion reviews the Water Footprint concept as it pertains to food, and how a Water Footprint food database can be compiled. Research challenges in doing so will also be discussed.

Key words: Water Footprint

Funding disclosure (if applicable): None

11:00-11:20 am

Title: Using U.S. Department of Agriculture and Propriety Databases to Compare Processed and Home Recipe Foods

Authors: Mary K. Muth, PhD, Shawn A. Karns, and Michaela C. Coglaiti (RTI International), Kiyah Duffey, PhD (Virginia Tech), Carolyn Dunn, PhD, RD (North Carolina State University), Helen Jensen, PhD (Iowa State University), and Christian Gregory, PhD (Economic Research Service)

Abstract:
Objective: Develop a database of food values including price, nutrients, food groups, shelf-life, preparation time, cooking time, and food safety concerns for processed and home recipe foods to populate a web-based application.

Materials and Methods: Foods with a home recipe version in the USDA Food and Nutrition Database for Dietary Studies (FNDDS) or the USDA National Nutrient Database for Standard References (SR) were selected to represent a range of commonly consumed entrees, baked goods, side dishes, fruits, vegetables, desserts, and beverages. Multiple databases were used to create the values: FNDDS, SR, and Gladson Nutrition Database for nutrient values using equivalent serving sizes across food forms; USDA MyPyramid Equivalents Database for food groups; Center for Nutrition Policy and Promotion Food Prices Database and Nielsen Homescan for prices per serving; popular cookbooks for preparation and cooking time; and extension publications and package use-by dates for shelf-life and food safety concerns. The proprietary Gladson Nutrition Database linked to the Nielsen Homescan data was used to fill gaps in nutrient values and prices in the USDA data while adjusting for moisture losses and gains. For foods without preparation times in cookbooks, we prepared the foods to estimate times.

Results: Per-serving and per-100 gram values were constructed for 108 unique foods with a home recipe and one or more processed forms. The data were incorporated into a web-based application allowing users to compare individual foods or a daily diet constructed from foods in the database.

Significance: Nutrition educators can use the populated web application to advise individuals in selecting foods to consume to meet dietary guidelines while taking into consideration cost, preparation time, food preparation skills, and individual preferences.

Key words: food values, processed foods, home recipe foods, nutrition education

Categories: Advances in Using Food Composition Data for Dietary Assessment, Third party databases

Funding disclosure (if applicable): ILSI North America

11:20-11:40 am

Title: Dietary Supplement Label Database for Research

Authors: Johanna Dwyer D.Sc.RD[1], Karen W Andrews BS[2], Richard Bailen MBA[1], Regan L Bailey PhD[1], Joseph M Betz PhD[1], Vicki L Burt MSc[3], Hua Florence Chang MS[4] , Rebecca B Costello PhD[1], Nancy J Emenaker PhD RD[5], Jaime J Gahche MPH[3], Jeanne Goshorn MS [4] Constance J Hardy MS,RD[6], Pamela R Pehrsson PhD[2], Janet M Roseland MS, RD[2], Leila G Saldanha PhD,RD[1] 1ODS, NIH [2] ARS, USDA, Beltsville, MD, [3] NCHS, CDC, Hyattsville, MD, [4] NLM, NIH Bethesda MD [5]NCI NIH Bethesda, MD , [6]CFSAN, FDA, College Park, MD

Abstract:
Background: Assessment of population groups at risk of nutrient inadequacy or excess must account for the contributions of dietary supplements (DS) since >50% of U.S. adults consume them.

Objective: To develop a publicly available dietary supplement label database (DSLD) of essentially all dietary supplements sold in the U.S.

Description: A dietary supplement label database (DSLD) with full label information and a web-based user interface has been developed for public use. It presents all nutrition related information printed on product labels including label images, and extending what is included in the Supplement Facts panel. The names and forms of all ingredients, amounts of active ingredients and information about label claims, warning statements, percent of Daily Value, and the manufacturer/distributor name are captured. The DSLD will include label information for products no longer on the market. Approximately 15,000 labels have been entered at present, and 1000 more per month are being added. Labels from the latest NHANES are included. The web-based interface has searchable fields by brand name, product, and ingredient. The calculator feature allows users to compare disparate nutrient units. Enhanced search options are planned to enable users to locate specific terms on aspects of a label using the browse and search and advanced search functions. Download capability and addition of terms from LanguaL, an indexing thesaurus for food ingredients including dietary supplement products and ingredients are under development.

Conclusions: DSLD provides researchers and other health professionals with a tool for on-line access to DS label data. Consumers as well as others in public and industry sectors can also obtain much useful information for research,quality assurance, quality control and regulatory enforcement. The DSLD can be accessed at http://dsld.nlm.nih.gov.

Key words: dietary supplements, label database

Categories: dietary supplement databases, new data for food components

Funding disclosure (if applicable): Office of Dietary Supplements and National Library of Medicine, National Institutes of Health, and Nutrient Data Laboratory, Agricultural Research Service USDA

11:40-12:00 am

Title: Sodium and sugar content of commercial baby and toddler foods.

Authors: Joyce Maalouf, MS MPH; Mary E. Cogswell DrPH, RN; Janelle P. Gunn, MPH; Sohyun Park, PhD; Robert Merritt, MA. National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Abstract:
Objectives: Determine the sodium and sugar content of commercial baby and toddler foods sold in the U.S.

Methods: Gladson database was used to identify major brands of baby and toddler food products. Nutrition information from manufacturer websites and grocery stores (e.g. private label products) was used to develop a database. A total of 1115 food products were coded and categorized according to the main ingredient and food categories commonly used in the literature (Table). Serving sizes were converted to their Reference Amount of food Customarily Consumed (RACC) per eating occasion by age defined by the Food and Drug Administration. Mean sodium and sugar content was computed per RACC. Food products were assessed for high sodium (>210 mg/RACC) and high sugar (≥20% of total calories from sugar) content. Results: 77% of the products (n=860) had a high content of sodium or sugars. The mean sodium content of baby foods ranged from 1.8 mg/RACC in dry instant cereals to 75 mg/RACC in pasta-based baby dinner (Table). Toddler meals and savory snacks had the highest sodium content. The majority of the toddler meals (71%) exceeded 210 mg sodium/RACC, while some contained as much as 630mg/RAAC. Seventy-one percent of the baby and toddler products examined had high levels of sugars and some derive up to 80% of their total calories from sugars (pureed baby fruit, cereals, snacks and juices).

Significance: The majority of the baby and toddler foods had high sodium or sugar content. Ongoing monitoring of these products would inform if the content changes overtime. Product labels do not distinguish added sugars from naturally occurring sugars; the amount of total sugars displayed on the label was used to assess the sugar content of the foods.

Key words: sodium, sugar, baby foods, toddler foods, commercial

Categories: Nutrition monitoring to meet goals for government projects such as changing sodium levels in foods and diets in a timely fashion. Data for Special Population Groups (both by characteristics such as obesity or by demographics)

Funding disclosure (if applicable): Both Joyce Maalouf (the lead author) and a portion of the costs of this project were supported by the Oak Ridge Institute for Science and Education (ORISE) Research Participation Programs at the Centers for Disease Control and Prevention (CDC). CDC's participation in the ORISE program is made possible by an agreement between the Department of Energy and CDC.

Table: Sodium and sugar content in commercial baby and toddler foods (n=1115)

Food categories	n	RACC (g)	Sodium content		Sugar content	
			Mean mg/RACC	n (%) >210 mg/RAAC	Mean g/RACC	n (%) ≥20% total calories from sugars
Pureed Baby Dinner*	297					
Vegetable Based-Stage 1	43	60	12	0	2.7	40 (93%)
Vegetable Based-Stage 2	108	110	23	0	4.5	86 (80%)
Vegetable Based-Stage 3	22	170	44	0	5.5	10 (45%)
Meat Based-Stage 2	61	110	35	0	3.5	30 (49%)
Meat Based-Stage 3	36	170	53	0	4.2	11 (30%)
Pasta Based-Stage 2	8	110	75	0	3.7	5 (62%)
Pasta Based-Stage 3	18	170	55	1 (5%)	4.3	2 (11%)
Pureed Baby Fruit (Stages 1-3)	239	60-170	4.4	0	12.0	237 (99%)
Toddler Meals	90	170	369	64 (71%)	4.5	11 (12%)
Cereals						
Dry, instant	47	15	1.8	0	1.1	4 (8%)
Fruits & Grains, ready to serve	72	110	5.1	0	10.0	69 (96%)
Bars (for toddlers)	37	20	45	0	6.2	33 (89%)
Snacks						
Savory-small RACC	21	7	42	0	0.6	1 (5%)
Savory-large RACC (for toddlers)	4	20	184	2 (50%)	0.9	0
Sweet/Desserts	156	7	10	0	5.0	103 (66%)
Fruit snacks (for toddlers)	40	125	6.6	0	14.7	40 (100%)
Dairy Products	61	110	46	0	12.8	60 (98%)
Juices	51	120	11	0	14.2	51 (100%)

NOTES: g = gram; mg = milligram; RACC = reference amount customarily consumed

*Stage 1 baby foods (from 4-6 months): pureed solid food (rice cereal and finely pureed fruits and vegetables); Stage 2 baby foods (from 7-8 months): strained foods; Stage 3 baby food (from 9-12 months): partially strained, with small, tender chunks of food

1:50 - 2:10 pm

Title: A Tribute to Nevin Scrimshaw: His Food Composition Legacy

Author: Barbara Burlingame, John Klensin, Ute Ruth Charrondiere, Food and Agriculture Organization of the United Nations, Rome, Italy

Abstract:
In the early 1980's, Nevin Scrimshaw convened a group of scientists to discuss one of the most glaring gaps in nutrition – food composition. With some notable exceptions, food composition, as data generation, compilation and dissemination, was being neglected globally. At the same time, in almost every corner of the world, dietary surveys were being conducted, nutrition and food policies were being developed, nutrient-based and food-based dietary guidelines were being formulated, therapeutic diets were being fed to patients, nutrient panels were printed on food labels; yet the essential data underpinning all these activities were exceedingly poor or non-existent. Moreover, without good data, the role of agriculture in solving the problems of malnutrition focused solely on dietary energy, while industry provided supplements, fortificants, RUTF, etc., to address the problems of micronutrient malnutrition. Most, but not all, in attendance at these early meetings agreed that something must be done, and through the efforts of Scrimshaw, renewed attention and resources were given to food composition. One of the important outcomes was INFOODS, the International Network of Food Data Systems, founded in 1983-84 under the auspices of UNU. Through INFOODS, Scrimshaw established a worldwide network of food composition experts based on a Regional Data Centre model, he initiated consultations and publications to promote international standards for food composition, he established the Journal of Food Composition and Analysis, and he provided resources to scientific institutions in developing countries to undertake more and better food composition work. All continue to function today. In honor of his contribution to food composition, the Nevin Scrimshaw award was created in 2009. It is presented at the biannual International Food Data Conference to an awardee judged to have made important contributions to the field of food composition, with an emphasis on developing countries. Nevin Scrimshaw, deservedly, was its first recipient.

Key words: Nevin Scrimshaw, INFOODS, food composition

Funding disclosure (if applicable): N/A

2:10-2:30 pm

Title: Development of a Nutrient Composition Database for Ghanaian foods

Authors: Seth Armah[1] MPhil; Husein Mohammed [1,2] MPhil; Shibani Ghosh [3,4] PhD; and Fred Vuvor, MPhil[1]

1. Department of Nutrition and Food Science, University of Ghana, Legon
2. School of Allied Health Sciences, University of Ghana, Legon
3. Nevin Scrimshaw International Nutrition Foundation, USA
4. Tufts University, Boston, USA

Abstract:
Background: A comprehensive nutrient composition database is key in nutritional epidemiology for assessing intakes of nutrients and for informing policies looking at improving nutrition. Unfortunately, the existing Ghanaian food composition tables lack information on some micronutrients, particularly amino acids and some vitamins.

Objective: To develop a nutrient database for analyzing Ghanaian foods for their macro and micronutrient compositions. Description: As part of a large clinical trial conducted in a peri-urban community in the Greater Accra Region, we developed this new database using field survey data, the USDA nutrient database for standard reference, and the Ghana Food Composition tables. For individual foods, the nutrient compositions were obtained from the USDA nutrient database matching the protein and energy content to foods in the existing Ghana Food composition tables. For composite foods, data were collected on the ingredients used in their preparation and their respective quantities. For each composite food, the nutrient composition of the raw ingredient was obtained from the USDA nutrient database. These nutrients were summed up (based on relative proportions of each component) to determine the total nutrient composition for each composite food. Total nutrient composition obtained for each food was compared to values in the Ghanaian food composition tables to ensure that the two sets of values were reasonably close, particularly for the macronutrients. Additional functions namely dietary diversity score, food variety score, contributions of animal and plant foods to total protein intake, and the contributions of different macronutrients to energy intake were incorporated into the database as measures of diet quality.

Conclusion: A comprehensive nutrient database of Ghanaian foods was developed which is vital tool for nutrition assessment of individuals and populations in Ghana.

Key words: Macronutrients, micronutrients, food composition, Ghana.

Categories: New Data for Foods and Food Components

Funding disclosure (if applicable): Ajinomoto Company

2:30-2:50 pm

Title: Food Composition Database for Bangladesh (FCDB)

Authors: Nazma Shaheen[1], Abu Torab MA Rahim[1], Md. Mohiduzzaman[1], Latiful Bari[2], SM Mizanur Rahman[3], Cadi Parvin Banu[1], Avonti Basak[1] and T Longvah[4]
[1]Institute of Nutrition and Food Science (INFS), University of Dhaka, Dhaka-1000, Bangladesh
[2]Center for Advanced Research in Sciences (CARS), University of Dhaka, Dhaka-1000, Bangladesh
[3]Department of Chemistry, University of Dhaka, Dhaka-1000, Bangladesh
[4]National Institute of Nutrition, Hyderabad-500007, AP India

Abstract:
Objective: To develop updated and comprehensive FCDB in response to long-term change in food chain including emergence of high-yield variety (HYV) and limitations of current Food Composition Table lacking in reliable and valid compositional data for a considerable number of food items as well as nutritionally significant constituents.

Method: Primary compositional values for twenty key foods (KFs), prioritized on the basis of recent consumption-composition and consumption frequency (HIES, 2010), were generated using AOAC and FAO-recommended procedures. Secondary compositional data were collected from all relevant institutions and possible sources followed by a careful scrutiny for reliability, suitability and adequacy. Finally, all the data generated and collected were compiled using INFOOD compilation tool 1.2.1.

Results: Key foods for Bangladesh were identified and ranked using their composition-consumption frequency. A complete archival databank for foods, containing approximately 2575 entries, was constructed for the first time in Bangladesh. A comprehensive and updated FCDB was developed that provides primary analytical data for 20 prioritized key foods analyzed during last one year of research and secondary data on about 626 foods generated during the last three decades. Nutrients in the main table included proximate, SFA, MUFA, iron, calcium, sodium, potassium, zinc, magnesium, copper, vitamins C, B1, B2, B6, folate, niacin eq., vitamin A, retinol eq., ß-Carotene while other nutrients and bioactive compounds viz. fatty acids, amino acids, antinutrient factors (phytate and oxalate), bioactive compounds (phenol, DPPH), heavy metals, total sugar, free sugar etc in the annexes. FCDB also included information on the inedible portion of numerous indigenous foods thereby increasing its usefulness in evaluating the food consumption of Bangladeshi population.

Significance: FCDB provides detailed information on nutrient composition of local foods and will serve as a basic tool for achieving sustainable nutrition security through supporting the government of Bangladesh in improving food and dietary planning.

Key words: Key foods, composition-consumption frequency, compositional data, food composition database

Categories: Data generation, secondary data collection and compilation

Funding disclosure (if applicable): The technical support from National Food Policy Capacity Strengthening Programme (NFPCSP), Government of Peoples Republic of Bangladesh and Food and Agriculture Organization of the United Nations (FAO); Funded by EU and USAID

2:50-3:10 pm

Title: Is it Time to Revise Atwater Energy Values of Some Foods?

Authors: Edward Farnworth, PhD; Private Consultant, Ottawa, Canada; Karen Lapsley, PhD ; Almond Board of California, Modesto California

Abstract:
Background: Atwater determined energy values for various foods over 100 years ago with studies on a small number of human subjects. Atwater factors are still generally applied to individual foods and food ingredients to determine their caloric content by using compositional data – protein, fat, carbohydrate (by difference) and correcting for digestibility. The belief that for most applications the Atwater factors "are good enough" has hindered any major revision of energy values. While health experts are recommending greater consumption of plant-based foods, many of these foods may have overestimated caloric values. Improved knowledge on the effect of food structure on digestibility and compositional analyses, especially for carbohydrates, indicate that some energy values should be revised.

Objective: To demonstrate that there is enough new scientific data to support the revision of energy values for almonds and other plant foods.

Description: The accuracy of values for the digestibility of certain higher fiber cereals, nuts and legumes may be impacted by advances in composition analyses and human clinical trial design. For example, recent almond data question the traditional Atwater-based energy values. Microscopy analysis reveals that not all almond cell walls are broken during mastication, and not all lipid in the cells is available during digestion. A recent USDA clinical trial showed that the traditional digestibility value may be overestimated. Advanced fiber analyses of a variety of plant foods, such as oats and pulses, indicate that the energy contribution previously reported as total carbohydrate also needs to be revised.

Conclusion: It may be time to officially revise the energy values of some foods using new composition and digestibility data. Already, Health Canada has acknowledged that the energy factor for "carbohydrate" does not apply to dietary fibre, opening the way for the revision of many foods; a decision that should be copied elsewhere.

Key words: Atwater, energy value

Categories: Database Issues Involving Food Labeling and Front of Pack Labels; Industry and Other Initiatives Impacting Databases

Funding disclosure (if applicable): Funded by the Almond Board of California

3:10-3:30 pm

Title: Update of Selected Nutrients in U.S.-grown Peanuts

Authors: Ronald B. Pegg, PhD; Ronald R. Eitenmiller PhD; Eui-Cheol Shin; Department of Food Science & Technology, The University of Georgia

Abstract:
Objective: Determine the nutrient composition of present-day U.S.-grown peanuts and their commercially-relevant cultivars across two harvest years.

Methods: Proximate analyses of U.S. peanuts (n = 221), based on a well-designed sampling plan that provided cultivars representative of those in current production, were performed. Lipid extracts were further investigated for their fatty acids profile as well as contents of tocopherol isomers and phytosterols.

Results: The macronutrient content of U.S. peanuts had overall means of 5.55, 2.32, 23.7, and 47.5% for moisture, ash, crude protein, and total lipids, respectively. Variations in these levels were noted against type and cultivar. GC-FID revealed oleic/linoleic ratios to be 1.93±0.30, 5.25±1.1, and 16.9±5.2 for normal, mid-, and high-oleic peanut lipids, respectively. Vitamin E in normal, mid- and high-oleic peanuts was quantified by HPLC. No significant ($P > 0.05$) differences were noted in total tocopherol levels in normal (22.4 mg/100g), mid- (23.9 mg/100g), and high-oleic (22.4 mg/100g) Runner peanuts; however, α-T levels did vary significantly among the Runner cultivars classified by their oleic acid content (mid 11.7 mg/100g; normal 10.9 mg/100g; high 9.8 mg/100g). The phytosterols in U.S. peanuts were quantified by a newer methodology involving a combination of acid hydrolysis and alkaline saponification steps followed by GC-FID and GC-MS analysis of the TMS derivatives. Free and esterified phytosterols accounted for ~80% of the total sterols; the remainder was attributed to steryl glucosides. Total phytosterol contents were significantly higher than those reported in the literature because of the steryl glucosides.

Significance: The findings provide up-to-date nutrient contents of peanuts for inclusion into the USDA National Nutrient Database for Standard Reference. For example, the mean α-T level in Runner peanuts was 10.5±1.5 mg/100g, which is 26.7% greater than the imputed value for peanuts, all types (NBD No. 16087) provided by the Database, now making peanuts an excellent source of vitamin E.

Key words: Peanuts, nutrient profile, fatty acids, vitamin E, phytosterols

Categories: New Data for Foods and Food Components; Data Quality, Variability and Bioavailability

Funding disclosure (if applicable): Supported in part by a grant from the Georgia Food Processing Advisory Council (FoodPAC) of Georgia's Traditional Industries Program for Food Processing.

3:45-4:05 pm

Title: Identification and Quantification of Food Flavonoids

Authors: Julia J Peterson PhD,[1] Johanna T Dwyer DSc,[1-2] Paul F Jacques PhD,[1-2] James A Harnly PhD[3]
[1]Friedman School of Nutrition Science and Policy, [2]Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University, Boston, MA, [3]Food Composition and Methods Development Laboratory, Beltsville Human Nutrition Research Center, Agricultural Research Service, USDA, Baltimore Avenue, Beltsville, MD

Abstract:
Background: To investigate the role that food flavonoid intake may play in prevention certain chronic diseases, it is critical to accurately identify and quantify individual flavonoids.

Objective: This presentation describes the principles, history and advances in current analytical methods for identifying and quantifying dietary flavonoids.

Description: Among the key chemical analytic developments is the better identification of flavonoids. Analytical methods for identifying flavonoids involve extraction, separation, and characterization (detection, identification). Extraction methods continue to change to reduce flavonoid loss from samples and to reduce the time and cost of extracting the compounds. Separation can be done with or without prior hydrolysis. If glycosides are not important to the analysis, hydrolysis is done to simplify the separation and quantification. High performance liquid chromatography remains the most robust separatory technique. Characterization involves both detection and identification with ultraviolet (UV) the most common initial detector. Retention time and spectra (UV, NMR, MS) are used to identify individual compounds. Remaining advances involve better quantification. Recent developments of interest include: 1) Availability of standards (although those are expensive). 2) Use of one standard compound to quantify several similar compounds (one anthocyanidin glycoside standard for several anthocyanidin glycosides). 3) Development of extractable chromatograms from certain MS systems that can quantify compounds. 4) UV molar relative response factors. The analytical idiosyncrasies of each flavonoid class will be discussed and practical examples will be described.

Conclusion: Databases are improving thanks to changes over time in flavonoid chemical analyses that have been applied to more foods, which has affected the completeness and precision of the databases, and thus their utility for studies of flavonoid intake and health.

Key words: Flavonoids, analysis, HPLC, quantification

Categories: Analytical methods

Funding disclosure (if applicable): None

4:05-4:25 pm

Title: Executing a collaborative nationwide study to update beef data in the USDA database, 2007 to 2013

Authors: Janet M. Roseland[1], MS RD; Juliette C. Howe[2], PhD; Kris Patterson[1], PhD; Juhi Williams[1], MS, RD; Joanne Holden[2], MS; Larry Douglass[3], PhD; Chance Brooks[4], PhD; Leslie Thompson[4], PhD; Jeffrey W. Savell[5], PhD; Kerri Harris[5], PhD; Dale R. Woerner[6], PhD; Terry E. Engle[6], PhD; Shalene McNeill[7], PhD, RD; Amy Cifelli[7], MS

[1]Nutrient Data Laboratory, USDA/ARS, Beltsville, MD; [2]Consultant, Beltsville, MD; [3]Consultant, Longmont, CO; [4]Texas Tech University, Lubbock, TX; [5]Texas A & M University, College Station, TX; [6]Colorado State University, Ft. Collins, CO; [7]National Cattlemen's Beef Association, Centennial, CO

Abstract:
Background: A comprehensive beef research study was designed and conducted through collaboration between Nutrient Data Laboratory (NDL) and meat scientists at Colorado State University, Texas A & M University, and Texas Tech University, with support from National Cattlemen's Beef Association.

Objective: The objective was to develop a comprehensive research protocol for updating nutrient and composition data for retail beef cuts in USDA's National Nutrient Database for Standard Reference (SR).
Description: Sample collection and analyses were conducted in three phases, grouped by primal: chuck and brisket; rib and plate; loin and round. A statistical sampling plan was used to obtain 72 beef carcasses (per phase) with nationally representative quality grade, yield grade, gender and genetic type from packing plants in six US regions. Retail cuts were fabricated, cooked according to protocols, and dissected to obtain component weights for separable lean, fat, and waste. Nutrient values were determined by validated laboratories using approved methodology and quality assurance procedures.

Results: To date, full nutrient profiles for 32 retail cuts have been included in SR. This study introduced new omega-3 fatty acids, vitamin D3, and 25-hydroxy-vitamin D values for beef. Furthermore, new data for cooking yields were derived from these cuts. For example, the cooking yield for roasted rib eye (76%) was significantly lower ($p<0.0001$) than for grilled rib eye (85%), or for either chuck eye grilled (80%) or roasted (84%). A total of 45 beef items were included in USDA's new cooking yields table (http://www.ars.usda.gov/nutrientdata). Additionally, datasets for 19 retail beef cuts were released for vendor use in meeting new labeling regulations.

Conclusion: This research demonstrates the impact of multifaceted research protocols to provide up-to-date beef data in SR, databases linked to SR, and retail meat labels. New cooking yield data are valuable for developing nutrient estimates for foods. The retailer datasets help vendors meet labeling requirements.

Key words: Beef, nutrient data, composition

Categories: Data Quality, Variability, and Bioavailability; or Analytical Methods and Food Sampling

Funding disclosure (if applicable): Supported in part by a cooperative agreement with the National Cattlemen's Beef Association

4:25-4:45 pm

Title: Updating USDA's Key Foods List for NHANES 2009-2010

Authors: Haytowitz, David.B, Nutrient Data Laboratory, USDA/ARS

Abstract:
Background: The Nutrient Data Lab (NDL) has used the Key Foods approach to select and prioritize foods for nutrient analyses since the mid-1980s. This allows NDL to concentrate analytical resources on those foods that contribute significant amounts of nutrients of public health interest to the diet and is a major aim of the National Food and Nutrient Analysis Program (NFNAP).

Objective: The Key Foods list is updated every two years with each NHANES—What We Eat in America data release, in this case for 2009-10. Materials and Methods: The Key Foods approach uses food composition data from the USDA National Nutrient Database for Standard Reference (SR24, 2011) for 17 nutrients of public health significance as identified in the 2010 dietary guidelines, intake data from NHANES 2009-10, and the USDA Food and Nutrient Database for Dietary Studies (FNDDS 5.0, 2012) to connect food composition and food consumption data. For each food in SR reported as consumed, the nutrient content was multiplied by the grams consumed and then ranked by percent and divided into quartiles.

Results: The Key Foods list based on NHANES 2009-10 contains 574 food items, while that based on 2007-08 contains 538. There were 9 food items in the 1st quartile, 35 in the 2nd, 93 in the 3rd, and 437 in the 4th. Various milks comprise 4 of the items in the 1st quartile, due t vitamin D contribution, as well as many other nutrients. There were minor shifts in the number of foods in each quartile and the relative ranking of each food.

Significance: Nutrient values are continuously updated in SR and the FNDDS so periodic updates of the Key Foods list are essential. Key Foods, along with other inputs, provides NDL with essential tools to select and prioritize foods and nutrients for analysis and thereby supports current, representative data for researchers, policy makers, the food industry, and consumers.

Key words: Food Composition, Nutrients, Prioritization

Categories: Analytical Methods and Food Sampling

Funding disclosure (if applicable): USDA

4:45-5:05 pm

Title: Diet Quality of Americans in 2001-02 and 2007-08 as Measured by the Healthy Eating Index-2010 (HEI-2010)

Authors: Patricia M. Guenther, PhD, RD[1]; Sharon I. Kirkpatrick, PhD, RD[2]; Jill Reedy, PhD, RD[2]; Kellie O. Casavale, PhD, RD[3]; Hazel A.B. Hiza, PhD[1]; Kevin J. Kuczynski, MS, RD[1]; Lisa L. Kahle[4]; Susan M. Krebs-Smith, PhD, RD[2]

[1]USDA Center for Nutrition Policy and Promotion, Alexandria, VA; [2]National Cancer Institute, Bethesda, MD; [3]HHS Office of Disease Prevention and Health Promotion, Rockville, MD; [4]Information Management Services, Inc., Calverton, MD.

Abstract:
Objective: HEI-2010 scores were estimated for 2001-02 and 2007-08. The HEI-2010 measures compliance with the 2010 Dietary Guidelines. It has 12 components: Total Fruit; Whole Fruit (forms other than juice); Total Vegetables; Greens and Beans (dark green vegetables and beans and peas); Whole Grains; Dairy (all milk products and soy beverages); Total Protein Foods; Seafood and Plant Proteins; Fatty Acids (ratio of poly- and monounsaturated fat to saturated fat); Refined Grains; Sodium; and Empty Calories (calories from solid fats, added sugars, and alcohol beyond a moderate level). For most components, higher intakes result in higher scores; however, for Refined Grains, Sodium, and Empty Calories, lower intake levels result in higher scores because lower intakes are more desirable.

Methods: HEI-2010 scores were estimated using data from the National Health and Nutrition Examination Survey, 2001-02 (N=9,033) and 2007-08 (N=8,529). Intakes of energy, fatty acids, sodium, and alcohol were calculated using the Food and Nutrient Database for Dietary Studies. Food group intakes for 2001-02 were calculated using the MyPyramid Equivalents Database; for 2007-08 an addendum to that database was used. Average daily, long-term intakes were estimated using the population ratio method.

Results: In 2007-2008, HEI-2010 scores were below the maximum for all components, except Total Protein Foods. Scores for Whole Grains; Greens and Beans; Sodium; and Empty Calories were below 50% of their maximums. Scores for remaining components were also substantially below their maximums (57%-74%) in most cases. Between 2001-02 and 2007-08 scores declined significantly ($P<0.05$) for Sodium (from 51% to 43%), but improved for Whole Fruit (68% to 82%) and Empty Calories (43% to 49%). The total HEI-2010 score did not change significantly between 2001-02 (54%) and 2007-08 (55%).

Significance: The diet quality of Americans needs substantial improvement to ensure adequate nutrient intake and to reduce the risk of chronic diseases.

Key words: Dietary assessment, diet quality, Healthy Eating Index

Categories: Advances in Using Food Composition Data for Dietary Assessment

Funding disclosure (if applicable): N.A.

Poster Abstracts for 37th National Nutrient Databank Conference

Advances in Using Food Composition Data for Dietary Assessment

Poster 1: Title: Consumer sales data provide a useful tool for managing databases monitoring the US food supply

Authors: Jaspreet Ahuja, MS; Robin Thomas, MS, RD; USDA-ARS Nutrient Data Laboratory

Abstract:
Background: The USDA National Nutrient Database for Standard Reference (SR) is the major source of food composition data in the United States (US). Monitoring the breadth and pace of changes in the US food system is a major challenge for databases.

Objective: The objective of this study is to explore the use of AC Nielsen market sales data as a database management tool.

Description: AC Nielsen consumer sales data have been used by Nutrient Data Laboratory (NDL), USDA intermittently in the past for selection of specific brands for analysis and for market share weighting of the nutrient data, as part of their National Food and Nutrient Analysis Program (NFNAP). Recently, comprehensive sales data on commercial packaged foods were purchased by NDL, as part of an ongoing inter-agency sodium monitoring project. Additional use of these data as a database management tool is being explored. For example, a sales-driven, proactive approach for coverage for the food groups, 'Breakfast Cereals', 'Nuts and Seed Products' and 'Spices and Herbs' was implemented for SR 25 and SR 26. Sales criteria of at least 1 million units and 0.1% of total food group sales was established for inclusion in the database. Of the over 3,000 ready-to-eat (RTE) cereals that have market sales information in AC Nielsen data, 127 products met the criteria and represent about 88% of RTE cereals sold in the US. Of these, 17 are not currently in the SR; hence, they will be added. Foods representing the top quartile of sales were reviewed for analysis under NFNAP. For example, two out of the eight RTE cereals in the top quartile of sales have not been analyzed under NFNAP; hence, they will be analyzed.

Conclusion: Consumer sales data have several limitations and challenges. However, they provide a valuable tool for databases monitoring the US food supply and are essential in ensuring national representativeness of the nutrient data generated under NFNAP.

Key words: USDA National Nutrient Database for Standard Reference, SR, database management, consumer sales data

Categories: Advances in Using Food Composition Data for Dietary Assessment; Nutrition monitoring to meet goals for government projects such as changing sodium levels in foods and diets in a timely fashion.

Funding disclosure (if applicable): CDC-USDA Agreement 60-1235-0-185

Poster 2: Title: Aggregating UPC-level Nutrient Data for Use in the UNCFRP Nutrient Database

Authors: B Hollingsworth, MPH RD; J Davis, MPH RD; J Kang, MS RD; Carolina Population Center, University of North Carolina

Abstract:
Background: The University of North Carolina Food Research Program (UNCFRP) is creating a database that links time-specific purchase and consumption data to provide current, market representative nutrient information.

Objective: To link commercial time-specific UPC-level purchase and nutrient data to food codes as they exist in WWEIA, NHANES.

Materials and Methods: Product information data for UPCs, including product description, attributes, package size, nutrient information, sales, and purchase data, is obtained from commercial sources including Nielsen Homescan, Gladson, Mintel, and Product Launch Analytics and connected at the UPC-level. A team of Registered Dietitians reviews the 8-digit food codes reported in WWEIA, NHANES 2007-2008 and delineates groups based on similarities in food description and commercial categorization. We determine the best match between individual UPCs and 8-digit food codes by investigating specific products and considering consumer purchasing behavior. Unique UPCs are linked to multiple 8-digit food codes when appropriate, e.g. UPC for generic brand Grapefruit Juice 12oz can is linked to both 61201220 Grapefruit juice, canned, bottled or in a carton and 61201020 Grapefruit juice, Not Specified as to form. For an individual 8-digit food code, a nutrient profile is calculated from UPC-linked information, with weighting based on sales within the food code.

Results: To-date, the UNCFRP Nutrient Database for beverages at baseline is complete. The results presented are preliminary.
31,363 unique beverage UPCs
202 8-digit food codes with food descriptions
39,897 links between UPCs to corresponding 8-digit food codes

Significance: The UNCFRP Nutrient Database will be a valuable resource for understanding how the US food supply is changing and how those changes affect diet. The food items and associated nutrient profiles in the UNCFRP Nutrient Database will better reflect the diverse and constantly changing products available in the US food supply.

Key words: US food system trends, Nutrient Database

Categories: Advances in Using Food Composition Data for Diet Assessment

Funding disclosure (if applicable): Supported by funds from the Robert Wood Johnson Foundation (RWJF) (Grant 67506 and 68793).

Poster 3: Title: Adapting Nutrition Facts Panel Information for Use in a Nutrient Database that Links Food and Beverage Product Data with Consumption Data

Authors: Jessica Davis, MPH RD; Bridget Hollingsworth, MPH RD; Jiyoung Kang, MS RD; Carolina Population Center, University of North Carolina

Abstract:
Background: The University of North Carolina Food Research Program (UNCFRP) is creating a database that links time-specific purchase and consumption data to provide current, market representative nutrient information.

Objective: To translate nutrition information from consumer packaged goods into “per 100g” nutrient profiles for groups of similar products.

Methods: Information at the Universal Product Code (UPC) level includes product description, attributes, package size, and nutrition information obtained from commercial sources (Nielsen Homescan, Gladson, Mintel, and Product Launch Analytics). Unique UPCs were linked to 8-digit USDA food codes that were reported in WWEIA, NHANES 2007-2008 and, if needed, were converted to the same form as the USDA food code. UPCs that required addition of water (1mL=1g) received “food form factors” to adjust the “per 100g” nutrient values. UPCs that required addition of other ingredients (e.g., milk) received preparation instructions in the form of grams of ingredient per gram of product, using nutrition information from the USDA Standard Reference. UPCs in fluid form received USDA food code-specific “density factors” to convert “per 100mL” nutrient values to “per 100g”.

Results: Preliminary results are based on adjustments for beverages in 2007-2008, which included 29,722 UPCs, 133 USDA Codes, and 3 forms: ready to drink, liquid concentrate, or powdered mix. For example, a frozen orange juice concentrate contains 185 calories per 100mL in the unprepared form. When linked to 61210620 ORANGE JUICE, FROZEN (RECONSTITUTED WITH WATER), it receives a food form factor of 4 and a density factor of 1.052. The ready-to-drink orange juice contains 44 calories per 100g.

Significance: These adjustments are important to ensure that products as purchased and as consumed are comparable. It will allow researchers to begin using data on food purchases alongside dietary intake data to capture changes in the US food supply from the introduction of new products, reformulations to existing products, and shifts in dietary trends.

Key words: Consumer packaged goods, nutrition facts panel, Universal Product Code, density, food system trends

Categories: Advances in Using Food Composition Data for Diet Assessment, Database Issues Involving Food Labeling and Front of Pack Labels

Funding disclosure (if applicable): Supported by funds from the Robert Wood Johnson Foundation (RWJF) (Grant 67506 and 68793)

Poster 4: Title: Developing a Systematic Approach to Estimating Added Sugars: Keeping Pace with a Dynamic Food System

Authors: J Kang, MS RD; SW Ng, PhD; Carolina Population Center, University of North Carolina

Abstract:
Background: There is a growing interest in the role of added sugars in the food supply. Its potential adverse health effects have made it an ingredient of public health concern; however, it remains difficult to capture the use of added sugars in the food supply due to the large number of new and reformulated products that are introduced into the marketplace every year.

Objective: To develop a systematic, batch-mode approach to estimating added sugars in Consumer Packaged Goods (CPG).

Description: We utilized full ingredient list and nutrition facts panel (NFP) data from Gladson Nutrition Database and nationally representative purchases of consumer packaged foods from Nielsen Homescan in 2005 through 2009 to understand the use of added sugars (including Fruit Juice Concentrate) in CPG foods and beverages. A team of Registered Dietitians and Programmers collaborate to clean, manage, and process the data. Ingredients from unique UPCs are linked to appropriate records from a proprietary commercial ingredient database (ESHA) for which nutrient composition values are known. Constraints are applied to the ingredients using information gathered from FDA food labeling laws, scientific journals, or manufacturing information. Added sugars are estimated by running the data through a program that has been developed to estimate product formulations using mathematical optimization techniques of linear programming.

Conclusion: This systematic batch-mode technique for estimating added sugars in CPG foods and beverages will enhance the capability of food composition databases to continually review and update estimated nutrients for commercial brand name foods.

Key Words: Consumer packaged goods, nutrition facts panel, Universal Product Code

Categories: Advances in Using Food Composition Data for Diet Assessment, Database Issues Involving Food Labeling and Front of Pack Labels

Funding disclosure (if applicable): Supported by funds from the Robert Wood Johnson Foundation (RWJF) (Grant 67506 and 68793)

Poster 5: Title: The Effect of Editing Open-Ended Text Responses on Nutrient and Food Group Estimates from the Automated Self-Administered 24-hour Dietary Recall (ASA24)

Authors: Thea Palmer Zimmerman[1], Deirdre Douglass[1], Sujata Dixit-Joshi[1], Sharon Kirkpatrick[2], Nancy Potischman[2], Amy F. Subar[2], Suzanne McNutt[1], Laura A. Coleman; Marshfield Clinic*; Abbott Nutrition, Gwen L. Alexander[3], Larry Kushi[4], Frances E. Thompson[2]; [1]Westat; [2]NCI, NIH; [3]Henry Ford Health System; [4]Northern California Kaiser Permanente

Abstract:
Objective: To assess the impact on nutrient and food group estimates of editing recalls collected using the National Cancer Institute's (NCI's) ASA24 system.

Methods: The NCI Food Observing and Reporting Study (FORCS) compares nutrient and food group estimates obtained from ASA24 to standard interviewer-administered recalls among 1054 adults. We conducted this analysis to assess one aspect of data cleaning for ASA24 data. Within the ASA24 software, respondents are given two opportunities to enter open-ended text: "other" and "unfound food." "Other" is available as a response to questions about food details, such as brand name or cooking method. The system collects but does not use the text response, instead assigning a default food code. "Unfound food" is a response available if respondents cannot find a food they want to report; the ASA24 system asks a series of general questions to better identify the food, assigning a default food code. "Other" and "Unfound Food" data were reviewed to compare free-text responses to the default, system-assigned food codes to identify and correct mismatches. We then compared the nutrient and My Pyramid (MPE) values of unedited and edited ASA24 data to determine the effect of editing.

Results: The editing process required over 60 hours of specialized staff time. Edits were made to 268 foods (1.4% of total foods reported), affecting 188 intakes (18.5% of all intakes). The average difference in nutrients and MPE values per intake between the corrected and uncorrected files and the statistical significance will be presented.

Significance: The results of this study will help researchers using ASA24 to weigh the benefits and costs of manually reviewing open-ended text responses.

*At the time the research was conducted, LAC was an employee of Marshfield Clinic

Key words: ASA24, QC review

Funding disclosure (if applicable): National Cancer Institute, NIH

Poster 6: Title: Fruits and Vegetables: What are American children eating?

Authors: Donna G. Rhodes, Meghan E. Adler, John C. Clemens, Alanna J. Moshfegh; USDA-ARS Food Surveys Research Group

Abstract:
Objective: Analyze current fruit, vegetable, and 100% juice consumption patterns of U.S. children.

Methods: The study sample included nationally representative one-day dietary data from What We Eat in America (WWEIA), NHANES 2007-2010. The 5-step USDA Automated Multiple-Pass Method was used to collect a 24-hour dietary recall from children ages 2-19 years (n=6389). Intakes of "intentional choices" of fruit, vegetable, and 100% juice were estimated using WWEIA Food Categories. "Intentional choices" excluded the intakes of fruit, vegetable, and juice contained in mixed dishes. Also excluded were baby foods/beverages. Data are reported for the following age groups: 2-5 years (n=1693), 6-11 years (n=2275), and 12-19 years (n=2421).

Results: On any given day, many American children do not report consuming vegetables. The percentages of children who consumed vegetables at least once in a day were 65% for 2-5 years, 59% for 6-11 years and 55% for 12-19 years. Although white potatoes, baked or boiled were consumed by less than 3% of children, French fries and other fried potatoes were reported by 24% of 2-5 and 6-11 year olds and 20% of 12-19 year olds. The percentages of children who consumed fruit at least once in a day declined with age: 65% for 2-5 years, 53% for 6-11 years and 35% for 12-19 years. Intake of 100% juice also declined with age: 54% for 2-5 years, 35% for 6-11 years and 21% for 12-19 years.

Significance: The large proportion of children who did not consume any fruit or vegetable in a day, as well as the marked decrease in reports after ages 2-5 years, is cause for concern. This research highlights the increased need for analysis of food patterns in addition to nutrient based dietary assessment.

Key words: Food patterns, Fruits and Vegetables, Children

Categories: Advances in Using Food Composition Data for Dietary Assessment; Nutrition monitoring

Funding disclosure (if applicable): USDA

Poster 7: Title: Can Food Frequency Questionnaires (FFQ's) keep Up with Changing Food Trends by Altering the Analysis Programs Using Results from Pilot and Market Share Data?

Authors: Paula Tocco, MS, RD, Harvard School of Public Health; Laura Kent, MS, RD; Harvard School of Public Health

Abstract:
Background: The Nurses' Health Study (NHS), the Health Professionals Follow-up Study (HPFS) and the Nurses' Health Study II (NHS2) are long running prospective cohort studies using the Harvard FFQ. Dietary data is collected every 4 years. The FFQ's and associated analysis programs are routinely updated to capture significant differences in food and nutrient trends, based on Harvard's pilot data and other market data, without major changes to the FFQ format.

Objective: To determine if the application of pilot studies and other market share research to FFQ analysis programs results in significant differences in calculated amounts of consumed whole grain.

Description: Pilot study research completed in 2008 showed an increase in whole grain food selections. Changes were incorporated into the 2006-2007 HPFS, NHS and NHS2 analysis programs to reflect whole grain preference changes. Profiles for pasta, crackers, oatmeal/oat bran, other hot cereal, and pancake/waffle questions were modified to include more whole grain foods. The 2006 HPFS analysis program was copied and altered for the purpose of comparing whole grain output before and after the profile changes. Alterations included eliminating the changes that had been made from the previous 2002 analysis program. Profile changes were made to 5 FFQ items. Both versions of the 2006 HPFS program were run for all FFQ items at one serving per day. The oatmeal/oat bran question resulted in a decrease in the amount of whole grain (whgrn) because oat bran had previously been overestimated in the profile. Overall, there was an ~10% increase in whgrn intake, based on 1 serving per day for these 5 items, this equates to an ~23 gm increase in whole grains.

Conclusion: Applying pilot and market share research to underlying FFQ analysis programs more accurately represents cohorts' consumption patterns and significantly improves the accuracy of whole grain intake.

Key words: Pilot, FFQ, nutrient analysis

Categories: Advances in Using Food Composition Data for Dietary Assessment

Funding disclosure (if applicable): NIH

Poster 8: Title: Obtaining Nutritional Information for Dietary Assessment

Authors: Marc Zimmerman, MS; Alanna Boynton, MS, RD; Eric Meier, MS; Marian Neuhouser, PhD, RD; University of Washington, Fred Hutchinson Cancer Research Center

Abstract:
Objective: Determine the adequacy of food composition data for sweetened beverages and snack foods, and improve the nutrient database for a previously validated FFQ (the Beverage and Snack Questionnaire,BSQ).

Methods: To illustrate the impact of using only USDA Standard Reference-24 to perform nutrient analyses of the BSQ, we populated two nutritional databases. The first database included only BSQ foods whose nutrient profiles were available from USDA SR-24. The second database included nutrient profiles obtained from USDA SR-24 augmented with data from other databases, food manufacturers, and scientific publications. Nutritional analyses of the BSQ were performed separately for each database, and mean estimates for energy, protein, fat, and carbohydrate were compared. We also compared the nutritional databases by selecting a single food to define the nutrient profile of each line item, and subsequently by selecting multiple foods to define line items.

Results: Comparing BSQ nutritional analysis using only information from USDA-SR24 vs. analysis using this information augmented with other sources revealed minor differences (approximately 0-1%) for mean energy and macronutrients in 13 of 19 line items. However, deviations up to 100% with respect to macronutrient composition were observed for other line items including fruit drinks, flavored waters, and frozen desserts. Nutritional analysis using single vs. multiple foods to define line items was similar, although significant deviations (up to 100% were observed for various line items such as candies, cookies, and fruits. **Significance:** If USDA SR-24 is the sole source of food composition data, the accuracy of nutritional assessments could be compromised, potentially leading to underestimating effects of sweetened beverages and snack foods on nutritional status and energy balance. Understanding how food composition data and line item definitions impact the performance of FFQs may improve the accuracy of dietary assessment tools, and advance understanding of the effects of foods on nutritional status.

Key words: FFQ, Nutrient database, dietary assessment

Categories: Advances in Using Food Composition Data for Dietary Assessment, Analytical Methods and Food Sampling

Funding disclosure (if applicable): N/A

Analytical Methods

Poster 9: Title: The Nutrient Content of Ten Indigenous and Traditional Qatari composite foods

Authors: Tahra ElObeid* and Zainab Megdad; Qatar University

Abstract:
Objective: The objective of the study was to determine the nutrient content of 10 indigenous and traditional foods of Qatar.

Methods: Ten Qatari foods were prepared and the ingredients were weighed and recorded. The moisture content was determined using the AOAC Method, fat content by the Soxhlet Extraction Method and the protein content was analysed using the Kjeldahl Method. The mineral content was analysed by Inductively Coupled Plasma Spectrometer.

Results: The proximate composition and the minerals: B (Boron), Na (Sodium), Mg (Magnesium) , Al (Aluminum) , K (Potassium), Ca (Calcium), Ti (Titanium), Cr (Chromium), Mn (Manganese) , Fe (Iron), Ni (Nickel) , Cu (Copper), Zn (Zinc), Rb (Rubidium), Sr (Strontium), Mo (Molybdenum), Sn (Tin), Ba (Barium), Hf (Hafnium), Ta (Tantalum), W(Tungsten), Au (Gold), Hg (Mercury), Tl (Thallium) , Pb (Lead) of the Qatari foods were analysed. The 10 Qatari foods analyzed were Harees Dagag, Makboos Dagag, Madrobat Dagag, Thareed Laham, Margoog Laham, Mashkool Rubian, Barinoish, Koboz Rugag, Sago and Asseda. The highest moisture content was found in Madrobat Dagag (83.57g ± 0.55), highest protein content was in Mashkool Rubian (12.47g ± 0.04), the highest fat content was in Makboos Dagag (0.96g ± 0.02), the highest carbohydrate content was Koboz Rugag (65.47g). The total mineral content was highest in Mashkool Rubian (2626.45 mg) and the lowest of total mineral content was found in Sago (50.08 mg). All values were per 100g values.

Significance: Few studies in the Gulf States have shown significant differences in the nutrient content of similar composite dishes where most of the data was based on calculations. Qatar has a high prevalence of non-communicable diseases which require accurate references for dietetic counseling. As expected, the nutrient composition of the Qatari foods differed from that of the other Gulf States due to variation on raw materials and preparation method.

Key words: Nutrients, Qatar, composite, dishes

Categories: Analytical Methods and Food Sampling

Funding disclosure (if applicable): Research supported by Qatar University Students Grant

Poster 10: Title: Trends in Trans Fatty Acid Content of US Foods 1991-2007

Authors: Mary Franz, MS RD LDN; Laura Sampson, MS RD LDN; Harvard University, School of Public Health, Department of Nutrition

Abstract:
Objective: To report changes in the analyzed TFA content of foods and to assess temporal trends in TFA consumption among adult cohorts enrolled in prospective studies of diet and disease.

Methods: The Biomarker Laboratory at Harvard University conducted analyses of the TFA content of a variety of foods in 1991, 2000, 2002, and 2007. Analyzed foods included butter, margarines, cooking fats, commercially prepared bakery and snack items, chocolate, and fast food French fried potatoes. Samples of each food were prepared based on brand market share analysis for the four time periods. Foods were analyzed using standardized extraction methods, and fatty acid isomers were identified via accepted validation techniques. TFA consumption was assessed using a validated semi-quantitative food frequency questionnaire.

Results: There was a trend toward decreased TFA between 1990 and 2008 for most analyzed items. Slight increases in TFA were noted for a few items, such as chocolate, as a result of changes in sample ingredient content and isomer composition. Contributors to TFA intake among cohorts varied over the four analysis periods.

Significance: This analysis confirms that the total TFA content of commonly consumed foods has declined in the US throughout the past two decades.

Key Words: Trans fatty acids, key food contributors

Categories: Analytical Methods and Food Sampling

Funding disclosure (if applicable): National Institutes of Health Research Grants: CA87969 Dietary and Hormonal Determinants of Cancer in Women and CA55075 Prospective Studies of Diet and Cancer in Men and Women

Poster 11: Title: Sampling and Nutrient Analysis Program of Canada (SNAP-CAN): Vitamin and Mineral Enhanced Water (VW)

Authors: R. Klutka, RD , W. Cheung, MSc, RD, J. Deeks, MSc, RD; Health Canada

Abstract:
Objective: The objective of this study was to use the SNAP-CAN methodology to examine VW and to generate nutrient profiles for inclusion in the Canadian Nutrient File (CNF).

Methods: Canadian market share data were used to identify the most popular VW products. The top 99% of national (14) and control (10) brands were selected for sampling. Samples were collected during the winter of 2012 from randomly assigned retail grocery and drug stores in Ontario, where research indicated top brands could be found. Three lot numbers of each product were sampled and combined into a single product composite. Nutrients were analyzed according to validated and internationally accepted methods by Health Canada's CALA accredited Regional Laboratory in Toronto, Ontario. Data were compiled and aggregated according to established criteria. A subsequent comparison of nutrient values reported on product labels to nutrient values determined by analysis was conducted.

Results: VW composite nutrient profiles were formed using analytical values for vitamins, minerals, sugars, caffeine, and moisture. A comparison of label values to analytical data showed that actual vitamin content in these fortified beverages can vary greatly from what is reported on the label.

Significance: The nutrient data from this study will support activities within Health Canada, such as the upcoming nutrition surveillance component of the Canadian Community Health Survey, 2015. VW nutrient profiles will be released into the upcoming publication of CNF (2014) for general public use. The difference in label versus analytical values noted in this study highlight an important limitation to consider when using label values to populate nutrient databases.

Key words: nutrient data, vitamin water, fortification

Categories: Analytical Methods and Food Sampling

Funding disclosure (if applicable): None

Data for Special Population Groups

Poster 12: Title: Developing a Nigerian Food Composition Database

Authors: [1,2] Sally Akarolo-Anthony MD, MSc; [1,2,3] Clement Adebamowo MD, ScD; [1] Office of Strategic Information and Research, Institute of Human Virology, 252 Herbert Macaulay Way, Abuja, FCT, Nigeria; [2] Department of Nutrition, Harvard School of Public Health, Boston, MA; [3] Institute of Human Virology and Greenebaum Cancer Center, University of Maryland School of Medicine, MD

Abstract:
Background and Objective Worldwide, nutrition plays a major role in the epidemiology of communicable and especially non-communicable diseases such as heart disease, hypertension, diabetes, stroke and cancer. Given the diversity of foods in African populations, population specific databases are the ideal tool to estimate the nutrient composition of foods in large epidemiological studies. However, several African countries do not have a representative food composition database (FCD). The lack of a Nigerian FCD suggests that prior studies conducted in Nigeria based on FCD from other populations may misclassify persons based on dietary exposure and lead to biased results. In addition, the lack of a population specific FCD may be contributing to the dearth of studies assessing the impact of diet and NCDs in Nigeria. The aim of this study was to develop a comprehensive Nigerian food composition database (NFCD) which is representative of the peculiar, ethnic, local dishes, based on recipes collected from several sources in Nigeria and provide nutrient composition values for each food.

Materials and Methods We searched published food composition data sources for foods and identified recipes from cookbooks, websites, surveys, personal communication with dieticians and nutritionists. Each food and recipe was labeled with a unique code. To obtain the nutrient composition of the recipes, we analyzed each food per amount, used in the recipe. All analyses were performed using SAS 9.3 for UNIX statistical software (SAS Institute, Gary, NC, USA).

Results The NFCD provides information on the nutrient composition values of 45 nutrients including energy, carbohydrate, protein, fat, amino acids, vitamins and minerals, are provided for ~500 commonly consumed foods and local Nigerian recipes.

Significance This FCD will facilitate nutritional epidemiology research to classify individuals appropriately by dietary exposure and used for examination of diet-disease relationships in Nigeria and populations with similar dietary habits.

Key words: Food composition database, Dietary intake, Nigeria

Abstract category: Data for special population groups

Funding disclosure (if applicable): This project was supported by the Training Research Program (TRAPING) Grant Number D43TW009106, from the Fogarty International Center.

Poster 13: Title: Does the shape of fruit and vegetable snacks have an effect on consumer response: an exploratory, community-based field study in children and caretakers of children

Authors: Selena Baker[1], BS RD; Collin Payne[2], PhD; Sibylle Kranz[1], PhD RD; [1]Department of Nutrition Science, Purdue University; [2]Marketing Department, New Mexico State University

Abstract:
Objective: To conduct a large, community-based field study to explore whether providing healthy foods in "child-friendly" shapes may be an effective method to increase children's intake of fruits and vegetables.

Materials and Methods: A convenience sample of adult (n=297) and child (n=367) patrons of the local mall and two local grocery stores was recruited to conduct surveys on consumer behavior related to the purchase of foods for children, specifically, to explore if the shape of foods affects their purchase. In addition, samples of fruits (apples and cantaloupe melons) and vegetables (sweet potatoes and cucumbers) were offered to children in either the child-friendly (flower, butterfly, teddy bear or chick) or regular (small chunk) shape to determine if the shape affects children's self-reported liking of the food. Statistical analysis will be conducted using SPSS. The IRB at Purdue University approved this study.

Results: Preliminary results will be presented and implications discussed at the conference.

Significance: Many commercial snack foods high in fat and added sugars are available in child-friendly shapes. However, data on the effect of food shape on purchasing behavior or children's liking of shaped foods are lacking. Based on the results of this study, we will be able to provide novel insights on the potential beneficial effect of offering child-friendly shaped healthy foods and consumer response to these foods.

Key words: consumer behavior, child nutrition

Abstract Category: Data for Special Population Groups

Funding disclosure (if applicable): Self-funded

Poster 14: Title: Dietary patterns of urban African American and White adults examined in the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) Study

Authors: M Fanelli Kuczmarski, PhD RD LDN[1]; MA Mason, MS[2]; D Allegro, MS RD[1]; MA Beydoun, PhD[2]; AB Zonderman, PhD[2]; MK Evans, MD[2]**;** [1] Department of Behavioral Health and Nutrition, University of Delaware**;** [2]Laboratory of Epidemiology and Population Sciences, National Institute on Aging, NIH

Abstract:
Objective: To characterize the dietary patterns of the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study population and to evaluate the micronutrient adequacy of each pattern.

Methods: The (HANDLS) study, a prospective, epidemiological longitudinal study, was designed to examine the influence of aging, race, sex and socioeconomic status on the risk for development of cerebrovascular and cardiovascular disease in African American and White adults. Baseline data collection on this socioeconomically diverse cohort aged 30 to 64 years (n = 3720) began in August 2004 and ended March 2009. During baseline two 24-hr dietary recalls were collected by trained interviewers using the USDA Automated Multiple Pass Method. FASTCLUS, a SAS procedure, was used to determine the clusters from 26 food groups and Mean Adequacy Ratio (MAR) was used to determine the micronutrient adequacy of each cluster.

Results: Ten clusters were identified and were named to reflect the food group which contributed the most energy to the cluster. The clusters were sandwich (44% energy), sweet drink (41% energy), pizza (38% energy), poultry (36% energy), frozen meal (35% energy), dessert (36% energy), alcoholic drink (34% energy), bread (27% energy), starchy vegetables (16%), and pasta/rice dish (16% energy). The MAR, which is based on 15 micronutrients, had scores ranging from 69 for the sweet drink cluster to 82 for the pasta/rice dish cluster. Of all the clusters, the cereal and fruit food groups were the next highest contributors of energy for only individuals consuming the pasta/rice dish cluster.

Significance: The MAR scores of all the clusters suggest inadequacies with respect to micronutrient intakes, especially antioxidant nutrients which may predispose this population to higher risk for developing chronic diseases.

Key words: Dietary patterns, micronutrient adequacy, cluster analysis

Categories: Data for Special Populations

Funding disclosure (if applicable): This work is supported by the Intramural Research Program, National Institute on Aging, National Institutes of Health.

Poster 15: Title: Calculating the Healthy Eating Index-2005 for Adults with Intellectual and Developmental Disabilities.

Authors: Lauren Ptomey, MS RD [1]; Jeannine Goetz PhD RD [2]; Debra Sullivan, PhD RD [2]; Joseph Donnelly EdD FACSM [1]; [1] Center for Physical Activity and Weight Management, University of Kansas Medical Center; [2] Department of Dietetics and Nutrition; University of Kansas Medical Center

Abstract:
Background: Little research has been conducted to examine diet quality of adults with intellectual and developmental disabilities (IDD) in the United States. The purpose of this study was to determine diet quality, as measured by the Healthy Eating Index-2005 (HEI-2005), of adults with IDD.

Methods: Baseline data were obtained from a convenience sample of community-dwelling overweight individuals with IDD enrolled in a weight loss program. 3-day food records were administered and completed with assistance and then reviewed by a dietitian. All records were entered into Nutrition Data System for Research (NDSR) and HEI-2005 was calculated using NDSR output.

Results: 178 records were analyzed from 70 subjects (28 male, 42 female; mean age 33.9 ±11.5 years). The mean energy intake was 1928 ± 891 kcals. The mean total HEI-2005 score was 46.7± 11.5 which is lower than the US adult mean of 58.2. Participants scored the lowest in total fruits, whole grains, and non-hydrogenated vegetable oils, meeting 30.1%, 30.3%, and 12.8% of the federal dietary guidelines, respectively. Subjects also scored low in sodium with 84.0% consuming more than the recommended intake of sodium (0.7 grams per 1,000 kcals).

Conclusions: Adults with IDD appear to consume diets low in fruits, whole grains and healthy oils, and high in sodium. Furthermore, adults with IDD may be at an increased risk of poor diet quality with subjects scoring lower than the average American.

Key words: Healthy eating index-2005, intellectual and developmental disabilities

Categories: Data for Special Population Groups

Funding disclosure (if applicable): NIH: DK083539 from the National Institute of Diabetes and Digestive and Kidney Diseases

Poster 16: Title: Comparison of the nutritive value of milk substitutes (MS) to milk: Alternatives for lactose intolerant individuals.

Authors: Meena Somanchi, PhD and Pamela Pehrsson, PhD; USDA-ARS Nutrient Data Laboratory

Abstract:
Objective: Self-reported LI suggests 12.3% of Americans cannot digest lactose. MS consumption is rising in the US, especially among LI individuals reporting a decrease in gastrointestinal symptoms with diets excluding dairy products. However, without milk and other dairy foods in the diet, meeting calcium and vitamin D recommendations may be challenging. Calcium and vitamin D are important for bone health, and a low intake may increase the risk for osteoporosis. The objective of this abstract is to compare select nutrients of MS to those of milk products.

Methods: Nutrient profiles for milk (whole, 2%, 1%, fat-free milk and lactose-free skim milk), almond milk, soymilk and rice milk were retrieved from the USDA National Nutrient Database for Standard Reference. Analytical milk values were generated from USDA-contracted labs using official AOAC methods. MS, from major market producers, were unsweetened and fortified with calcium and vitamin D; values were compiled from product labels and calories, cholesterol, lactose, calcium, sodium, saturated fat, and vitamin D were compared to the milks.

Results: Results showed that MS do not contain any lactose, saturated fat or cholesterol. All MS are fortified with calcium (118-156mg/100g) and vitamin D (42-49IU/100g), comparable to milk products (112-124mg/100g and 47-51IU/100g, respectively). When compared to all other products, almond milk is lower in sodium (3mg vs. 39-51mg/100g) and calories (12 vs. 33-61cal/100g).

Significance: MS nutrient profiles are needed for consumers and for researchers working with this population. Milk falls only behind carbonated soft drinks, bottled water and beer in beverage consumption in the US. Since MS do not contain lactose, saturated fat, cholesterol and are a comparable source of calcium and vitamin D, consumption may impact not only those with LI, but may be included in a low-sodium, reduced-calorie diet designed to reduce the risk of CVD and maintain bone health.

Key words: Lactose intolerance, milk substitutes

Categories: Data for Special Population Groups

Funding disclosure (if applicable): Not applicable

Data Quality, Variability and Bioavailability

Poster 17: Title: Review and Comparison of Individual Nutrient Values in Selected Processed Foods

Authors: Bethany Showell and Pamela Pehrsson; USDA-ARS Nutrient Data Laboratory

Abstract:
Objective: Increased intake of prepared foods can have public health implications as intake of nutrients such as sodium also increases. The USDA Nutrient Data Laboratory is focused on tracking nutrient intake for some of these foods. Mean nutrient values are reported in the Nutrient Database for Standard Reference (SR) but for many frequently consumed foods, it is useful to know the individual values that determine the mean i.e., the nutrient variability/range. This is particularly true in recent analyses conducted to track sodium in processed foods.

Methods: Highly-consumed, high-sodium baked products and mixed dishes were studied to examine differences in various nutrients in different brands of processed food products. Several of these foods, including prepared corn muffin mix, frozen garlic bread, frozen burritos, and canned meat ravioli with sauce, were analyzed by AOAC methods. The nutrients included total fat, total sugar, calcium, and sodium.

Results: Two popular brands of corn muffin mix were prepared and analyzed. The mean analytical calcium value was 52 ± 3mg/100g (range of 49-95mg/100g) in one brand and 140 ± 4mg/100g (135–147mg/100g) in the other brand. The weighted (by market share) mean value across brands was 135 ± 46mg/100g. Two brands of cheese crackers were analyzed; brand A sodium was 819 ± 84mg/100g (688–928mg/100g) and brand B sodium was 1126 ± 112mg/100g (963–1280mg/100g). The mean sodium value across brands was 973 ± 186mg/100g. Preliminary statistical analyses reveal significant differences between brands of some foods (e.g., cheese crackers ($p=0.0021$) and corn muffin mix ($p=0.0014$)).

Conclusion: Examination of individual values does highlight some variability in several nutrients of public health concern within various food items. Analysis of individual values is critical in determining whether the nutrient value differences are a result of outliers, brand differences, or formulation differences due to a change in ingredients. Nutrient variability information is an important component of nutrition research and for nutrition policy makers.

Categories: Data Quality, Variability and Bioavailability; Industry and Other Initiatives Impacting Databases

Funding disclosure (if applicable): USDA and NIH, Agreement No. Y1CN5010

Poster 18: Title: The energy content of restaurant foods without stated calorie information

Authors: Lorien E. Urban, Ph.D., Alice H. Lichtenstein, D.Sc., Christine E. Gary, M.S., Jamie L. Fierstein, M.S., Ashley Equi, B.S., Carolyn Kussmaul, B.S., Gerard E. Dallal, Ph.D., Susan B. Roberts, Ph.D.; Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University

Abstract:
Objective to determine the energy contents of frequently purchased meals from restaurants that do not provide information on dietary energy.

Methods Dietary energy contents of the 42 most frequently purchased meals from the 9 most common cultural restaurant categories were determined by bomb calorimetry. Non-chain and small chain restaurants were randomly selected and 157 individual meals were analyzed.

Results All cultural meal categories provided excessive dietary energy. Mean energy of individual meals was 1327 kcal (95% confidence interval [CI], 1248-1406 kcal), equivalent to 66% of typical daily energy requirements. There was a significant effect of cultural category on meal energy ($P<.05$), and 8% of meals provided >100% typical daily energy requirements. Within-meal variability was large (271 kcal, average SD), and there was no significant effect of restaurant establishment or size. In addition, meal energy contents averaged 49% greater than those of popular meals from the largest national chain restaurants ($P<.0001$), and in subset analyses contained 19% more energy than national food database information for directly equivalent items ($P=.0002$).

Significance National chain restaurants have been criticized for offering meals with excess dietary energy. This study found that non-chain and small-chain restaurants, which provide no nutrition information, also provide excessive dietary energy, in amounts apparently greater than popular meals from chain restaurants or information in national food databases. Much more information is needed on the nutritional composition of restaurant foods so that consumers can make informed choices about purchasing meals that facilitate overeating. Such information could potentially be provided either by the national databases or by the restaurants themselves.

Key words: restaurants, calories, menu labeling

Categories: Data Quality, Variability, and Bioavailability

Funding disclosure (if applicable): Supported by the US Department of Agriculture under agreement no. 58-1950-0-0014 and 1950-51000-072-02S with Tufts University.

Poster 19: Title: Nutrient Comparison between Enhanced and Non-Enhanced Fresh Whole Turkey

Authors: Juhi R.Williams[1] MS RD; Janet M. Roseland[1] MS RD; Juliette C. Howe[1] PhD (Consultant), Kristine Y. Patterson[1] PhD, Leslie D. Thompson[2] PhD, Anna M. Luna[2], Shelly Fairly[2]; [1]Nutrient Data Laboratory (NDL), BHNRC, ARS, USDA, Beltsville, MD 20705; [2]Animal and Food Sciences, Texas Tech University, Lubbock, TX 79409

Abstract:
Objective: A recent CDC report indicates 90% of Americans consume more sodium than is recommended for a healthy diet and 65% of sodium comes from foods purchased in retail stores. Based on industry estimates, 98% of whole turkeys in the retail market are typically enhanced with solutions of water, salts, and flavorings to improve taste and tenderness. The objectives for this study included evaluating the mineral content of enhanced and non-enhanced raw, whole turkeys available in the retail market and updating nutrient profiles of non-enhanced and enhanced whole raw turkey data in the National Nutrient Database for Standard Reference (SR).

Materials and Methodology: Non-enhanced (n = 4) raw turkeys were purchased from local food outlets and producers, and enhanced (n = 11) turkeys were purchased using a nationwide sampling plan developed for USDA's National Food and Nutrient Analysis Program. Refuse, (bone and connective tissue) was discarded. Light meat, dark meat and skin from each turkey were composited separately and homogenized prior to analysis for nutrient content. Proximate composition and minerals were determined by commercial laboratories using validated methodology (Inductively Coupled Plasma AOAC 985.01 and 984.27). Quality assurance was monitored using commercial reference materials, in-house control materials, and random duplicate samples. Nutrient values for non-enhanced and enhanced cuts were compared using the Mann Whitney U test (Critical value $p < 0.05$).

Results: Sodium values were significantly higher with enhancement ($p = 0.0252$). In enhanced turkey, calcium, iron, phosphorus and magnesium contents were significantly greater than in non-enhanced product ($p < 0.05$).

Significance: Sodium content was 30 to 37% higher in enhanced turkey compared to non-enhanced. These newly released data can be used by dietitians and other health professionals for dietary counseling of individuals with sodium-related health issues, and by researchers and government agencies for nutrition monitoring, consumption surveys, and policy development.

Keywords: Nutrient, enhancement, sodium

Categories: Data Quality, Variability, and Bioavailability; or Analytical Methods and Food Sampling

Funding disclosure (if applicable): USDA and NIH, Agreement No Y1CN5010**.**

Database Technology

Poster 20: Title: *iDIET*: toward an automated, self-sustaining knowledge base to facilitate linking point-of-sale grocery items to nutritional content

Authors: Valliammai Chidambaram**,** MSc**;** Philip J. Brewster, PhD; John F. Hurdle, MD, PhD; Department of Biomedical Informatics, University of Utah, Salt Lake City, UT

Abstract:
Background: Nutritional information linked to grocery item UPCs is not available electronically in a public (open-source) database. An existing data-sharing agreement with a national retail grocery store chain has allowed our previous research (by Brinkerhoff, et al) to establish the feasibility of linking supermarket sales data to relevant nutritional information in the USDA Nutrient Database for Standard Reference. Building on this research, we are developing an automated retail food item classification tool using innovative data mining methods.

Objective: To develop a faceted classification of retail food items by identifying semantically similar concepts in USDA FNDDS records, using it to support an automated, self-sustaining UPC → FNDDS mapping tool.

Description: Leveraging Web crawling technologies to search the World Wide Web for relevant food item descriptions, as well as information retrieval algorithms to classify the results, this informatics tool (*iDIET*) will use semantic similarity to aggregate grocery food items and then associate them with relevant records in FNDDS. *iDIET* can then accurately match point-of-sale food items at the UPC or descriptor level to the nutritional information contained in FNDDS, and from there to the SR or MPED.

Conclusion: If successful, *iDIET* will facilitate dietary pattern analysis at varying scales (e.g., single market basket transactions, longitudinal family transactions, and geospatial levels like city, county, state) with minimal manual input. It could be used to impute diet quality estimates while eliminating the direct involvement of study subjects in FFQs, food diaries, etc. Subjects would only need to 'opt in' to releasing their grocery shopping history for analysis. A primary *design* goal is to engineer *iDIET* to expand gracefully and automatically, both to updates in FNDDS and to the introduction of new UPCs by grocers. A primary *policy* goal is to make the tool and the maps from food items to nutritional content open-source.

Key words: retail food item knowledge base

Category: Database Technology (software including smart phone applications and other handheld devices, Internet, information dissemination)

Funding disclosure (if applicable): Supported by National Library of Medicine Training Grant #T15LM007124, an Innovative Research Grant from the Utah National Children's Study, and a Seed Grant from the VP for Research, University of Utah.

Poster 21: Title: Use of diet tracking websites as a resource for hard to find food label information: an example using specialty grocery store items

Authors: Cheryl Gilhooly, PhD, MPH, RD; Stephanie Movsesian, MS, MPH; Natalie Royal, MS, MPH; Anna Chew, MPH, RD; Ning Qiao, MS; Jean Mayer USDA Human Nutrition Center on Aging at Tufts University, Boston, MA

Abstract:
Background: Many specialty foods cannot be found in research-focused food databases, however brand and store names allows for web searches to find further information on food products that study subjects or the supplier were unable to provide. Popular diet tracking websites contain over 2 million foods, often entered by users, but the reliability of these data to guide dietary data entry decisions are unknown.

Objective: Five popular diet tracking websites were used to compare availability and accuracy of data for food items from a specialty grocery store that are currently unavailable in research-focused food databases.

Description: We compared actual food labels for 87 quick meal food items from a specialty grocery store to the food label information found on five popular diet tracking websites. Number of items found on each site, number of duplicate entries for same product, and discrepancies in serving sizes and calories found on food labels were compared. The percentage of items found on the five diet tracking websites varied from 99%-23%. For those food items with label information listed on the websites, the percentage of inaccurate entries ranged from 6-35%. However, the mean number of entries per food ranged from 1.1-3.2 entries and when alternate entries were included, the percentage of inaccurate entries increased by as much as an additional 23%. Inaccurate entries showed calorie discrepancies ranging from 9 to 400 kcal across the 5 sites.

Conclusion: Currently many grocery store food items are not available in the research-focused food databases. Caution should be used when referencing food label information on popular diet tracking websites for guiding research related data entry decisions. Other considerations include variations in completeness and accuracy of macro and micronutrient information on these websites as well as the inclusion of regulatory checks by the sites.

Key words: Specialty food items, food labels, dietary data entry

Categories: Database technology; Third party databases

Funding disclosure (if applicable): N/A

Poster 22: Title: A Simple, Mobile Display of Omega-3 - Omega-6 Balance in Foods

Author: Bill Lands, Ph.D.; ASN Fellow, retired

Abstract:
Background: Public interest in healthy lifestyles includes knowing the likely impact of a food on their body's omega-3 status. The USDA Nutrient Database displays eleven different essential n-3 and n-6 nutrients in thousands of foods. Those data can be combined in a way that express a food's likely effect on the precursors of bioactive mediators maintained in human tissues (described in Nutrition & Metabolism 2012, 9:46). The estimate is possible because food is the sole origin of all essential fatty acids in the body.

Objective: This project provides user-friendly database technology for easy dissemination of likely nutrient impact information to the public.

Description: The "3-6 Balance Score" is a single number that gives the likely impact of a food on the proportions of n-3 or n-6 acids that will be maintained in the highly unsaturated fatty acids (HUFA) of a person's finger-tip blood sample. Foods with more positive 3–6 Balance Scores will increase the percent of omega-3, whereas those with more negative Scores will increase the percent of omega-6. Calorie-weighted average daily Scores for different ethnic food styles range from +3 to -7.
The 3–6 Balance Scores are in searchable pdf form at the website http://www.fastlearner.org/Omega3-6BalanceApp.htm. They can be downloaded to mobile devices to help guide personal food choices when shopping or preparing meals. Examples of 3-6 Scores are: broccoli, +3; caviar, +166; cauliflower, +3; mackerel, +52; flax oil,+46; flaxmeal, +32; green bean +1; oyster, +59; potato, 0; rice, 0; salmon, +46; spinach,+5; turnip, +1; avocado, -10; french fries, -10; hummus, - 16; peanut butter, -19; potato chips, -22; snack crackers, -18; tofu, -26; vegetable oil (corn, -59; cottonseed, -59; soybean, -50); walnut, -44.

Conclusion: A user-friendly array of 3-6 Balance Scores gives portable and easily understood data from the USDA Nutrient Database.

Key words: Calorie, Essential fatty acids, Food choice, Health maintenance, Highly unsaturated fatty acid, Omega-3, Omega-6

Category: Database technology for information dissemination

Funding disclosure (if applicable): no grant funds were involved

Industry and Other Initiatives Impacting Databases

Poster 23: Title: The Importance of Analyzing Industry Fats for Nutrient Database Development

Authors: Lauren Dougherty, RD; Hilary Wolf, RD; Laura Kent, MS, RD; Department of Nutrition, Harvard School of Public Health

Abstract:
Objective: To compare nutrient profiles of oils and shortenings on food labels with fats found in the USDA Nutrient Database.

Background: Every four years Harvard nutrient databases are updated in order to support the development of year specific food frequency questionnaires (FFQS) used in the Nurses' Health Studies, the Health Professional Follow-Up Study, and the Growing Up Today Study. A key component of database maintenance and update is the collection of current nutrient and ingredient information for the food items ("form foods") on the FFQS that are distributed to the cohorts. Data collection includes researching market share information, collecting current label information, and analyzing fatty acids for foods, as wells as fats and oils used as ingredients in our automated recipe program. One of the challenges in developing accurate databases arises from the lack of current and accurate nutrient information for newly developed fats and oils used as ingredients in food products.

Description: A list of ingredient fats was compiled from food labels used to develop food profiles for the 2010/2011 Harvard database. The USDA Nutrient Database (Standard Release 24) was then consulted to determine if the fats listed as label ingredients were maintained in the current USDA database. In addition, samples of fats and oils listed as label ingredients were requested from food manufacturers for onsite fatty acid analysis.

Results: Sixteen fats and oils listed as label ingredients were not maintained by USDA, and only five samples were obtained from manufacturers for analysis.
Conclusion: It is difficult to develop and maintain year specific nutrient databases without the availability of accurate nutrient profiles for label ingredients. More collaboration with industry is needed to accurately represent the nutrient profiles of ingredient fats and oils.

Key words: database, fats, label

Categories: Industry and Other Initiatives Impacting Databases, Database Issues Involving Food Labeling and Front of Pack Labels

Funding disclosure (if applicable): National Institutes of Health Research Grants: CA87969 Dietary and Hormonal Determinants of Cancer in Women and CA55075 Prospective Studies of Diet and Cancer in Men and Women.

New Data for Foods and Food Components

Poster 24: Title: The development of a caffeine database to assess caffeine intakes from beverages in the U.S. population.

Authors: Diane C. Mitchell, MS, RD[1], Carol A. Knight, PhD[2], Jon Hockenberry[3], Robyn Teplansky[3], and Terryl J. Hartman, PhD, MPH, RD[1]; [1]The Pennsylvania State University, University Park, PA; [2]Knight International, Naples, FL; [3]Kantar Worldpanel, New York, NY

Abstract:
Objective: To estimate beverage caffeine intakes for the US population using the Kantar Worldpanel Beverage Consumption Survey.

Methods: A nationally representative sample of 37,815 consumers of caffeinated beverages (≥ 1 yr. of age) completed 7-day diaries including type, amount, and preparation of each beverage. A database was developed to contain brand specific caffeine values obtained from several resources including company websites, nutrient databases and published literature.

Results: Eight-four percent of the US population consumed at least 1 caffeinated beverage. The mean daily caffeine intake from all caffeinated beverages was 165±1 mg for all ages combined. Caffeine intake was highest in the 50-64 yr. age group (223±2 mg). Intakes were lowest in consumers <6 yrs. of age (36±3 mg). Coffee was the primary contributor to caffeine intakes in all age groups but a more significant contributor in adults (>18 yrs.). Carbonated soft drinks and tea were also significant caffeine sources, particularly in the younger age groups. The percentage of energy drink users was low (≤10%).

Significance: These data reflect current caffeine intake patterns of the US population from beverages.

Key words: caffeine, caffeine intake, beverage

Categories: New Data for Foods and Food Components; Advances in Using Food Composition Data for Dietary Assessment.

Funding disclosure (if applicable): Supported by the International Life Sciences Institute North America; Caffeine Working Group

Poster 25: Title: Development of Recipe Database for Korean Rice-cakes for Processing Dietary Intake Survey Data

Authors: Jiwoon Nam Ph.D[1], Jee-Yeon Lee M.S[1], Yoonna Lee Ph.D[1], Eunmi Koh Ph.D[1], Dohee Kim M.S[1], Miyong Yon Ph.D[1], Hae-Jeung Lee Ph.D[1], Seung-joo Park M.S[1], Miyang Jo M.S[1], Sanghui Kweon Ph.D[2], Kyungwon Oh Ph.D[2], Cho-il Kim Ph.D[1]; [1] Nutrition Policy Team, Korea Health Industry Development Institute, Chungbuk, Republic of Korea; [2]Korea Centers for Disease Control and Prevention, Chungbuk, Republic of Korea

Abstract:
Objective: This study was performed to develop a representative recipe database for Korean rice-cakes as a part of on-going work of building recipe database to be used in processing dietary intake survey results from the Korea National Health and Nutrition Examination Survey (KNHANES).

Materials and Methods: Frequently consumed rice-cakes were sought using dietary intake data from KNHANES 2010 to make a list for recipe collection. Out of the 6,242 rice-cake producing shops & factories located in seven metropolitan cities and Gyeonggi province in Korea, 200 producers were selected by probability proportional to size sampling and systematic sampling.

Results: More than 2,808 recipes for 213 kinds of rice-cakes were collected by trained dietitians from 189 producers responded to the face-to-face interview in 2012. For each rice-cake, ingredient foods reported from different producers were pooled and sorted by appearing frequency and amount used. Ingredients with frequency less than 10% or with weight less than 1% of ingredient sum were excluded and remaining ingredient foods were divided by number of recipes collected to make a preparatory recipe for each rice-cake. We produced a representative recipe database for 75 rice-cakes with 11 or more recipes collected and these were subject to experimental cookery to delineate the relationship between prepared dish volume and amount of ingredients with final adjustment, if necessary.

Significance: This database will be used in estimating ingredient food intake from rice-cake intake reported in volume in KNHANES. In addition, it will be incorporated into the fundamental nutrition database used in the processing dietary intake survey data of KNHANES and consequently enable the more reliable estimation of food and nutrient intake of Koreans.

Key words: Recipe database, rice-cakes

Categories: New Data for Foods and Food Components

Funding disclosure (if applicable): This study was supported by R&D fund of Korea Centers for Disease Control and Prevention (KCDC)

Poster 26: Title: An Observation on processing and flavanone content in 100% orange juice

Authors: Shirley Wasswa-Kintu, Seema Bhagwat, David Haytowitz*; USDA-ARS Nutrient Data Laboratory

Abstract:
Background: Flavanones are a flavonoid subclass common to citrus fruits. Flavonoids including flavanones may be of benefit to human health through their radical scavenging and antioxidative properties. Orange juice is the foremost food that provides flavanones in the diet. The predominant flavanones in pure orange juice are hesperetin and naringenin glycosides. Globally, the total consumption of pure orange juice out of all orange juice products such as fruit juice, nectar, and juice drinks was 40% in 2011.

Objective: The goal of this study was to examine the effects of pasteurization and concentration on hesperetin and naringenin content in 100% juice made from sweet oranges (Citrus sinensis L.).

Methods: Studies from different countries that analyzed pure orange juices processed using different methods were collected through a scientific literature search. Analytical values for hesperetin and naringenin contents in these juices were compared to examine processing effects. Three processing techniques (e.g. domestically-squeezed, pasteurized-not-from-concentrate, and pasteurized-made-from-concentrate) and flavanone content in 100% sweet orange juice were compared.

Results: Twenty-two studies originating from eight countries where researchers analyzed flavanones in 100% orange juice were retrieved. Preliminary results for hesperetin weighted mean values in 100% orange juice pasteurized-made-from-concentrate, pasteurized-not-from-concentrate and domestically-squeezed are19.51, 11.21, and 13.94 mg/100g respectively. For naringenin values are 2.91, 2.94 and 3.16 mg/100g respectively. Pasteurized-not-from-concentrate juice retained the least hesperetin and naringenin of all processing techniques. Pasteurized-made-from-concentrate juice retained the most hesperetin whereas domestically squeezed juice retained the most naringenin.

Significance: Knowing the process that conserves most of the flavanones in orange juice is valuable. These processing techniques have implications when determining appropriate dietary sources of flavonoid compounds in available foods and beverages.

Key words: orange juice, hesperetin, naringenin, processing

Categories: New Data for Foods and Food Components (flavonoids); Data Quality, Variability, and Bioavailability

Funding disclosure (if applicable): Not applicable

Nutrition Monitoring

Poster 27: Title: Familiarizing Students with the U.S. Nutrient Database for Standard Reference Through Online Exercises

Authors: Priscilla Connors, PhD and Ann Afflerbach, MS; Department of Hospitality and Tourism Management, University of North Texas, Denton TX

Abstract: The purpose of this presentation is to describe nutrient analysis lab exercises that were created for students enrolled in an online nutrition class. The exercises were designed to (1) build skills in accurately recording and analyzing personal data on food and beverage intake, and (2) expose students to the U.S. Nutrient Database for Standard Reference. A secondary objective was to encourage interest in monitoring eating habits to promote healthful lifestyle behaviors. Casually exposed to diet tracking programs through their iPhones, iPads, computers, and other electronic devices, most students seldom question the comprehensiveness of results or inquire as to the sources of data used by most applications. In these exercises students use the U.S. Nutrient Database to analyze the nutrient content of assigned food items and aggregate results using an Excel spreadsheet. Subsequently students analyze the same foods using commonly available applications and compare results. During this process students are trained in how to differentiate between descriptor and identifier words, the recognition of portion sizes and how to convert between units, and the selection of similar items when a specific food or drink is missing. Students evaluate the experience of using the U.S. Nutrient Database and popular diet monitoring applications. Of particular interest is the ability to track key nutrients such as sodium or potassium, and the processes used for selecting alternatives when a particular form of a food (such as unsalted versus salted butter) is not in the database. As a result students develop a more sophisticated picture of the capacity of different diet tracking applications and a familiarity with the U.S. Nutrient Database as a comprehensive resource on the foods and drink.

Key words: Diet monitoring, Online education, Nutrient analysis

Categories: (1) Nutrition monitoring (2) Third party databases

Funding disclosure (if applicable): None

Poster 28: Title: Changes in infant formulas and baby foods: USDA'S National Nutrient Database for Standard Reference.

Authors: Monazzaha Khan. M.S and Pamela Pehrsson. Ph.D.; USDA-ARS Nutrient Data Laboratory

Abstract:
Objective: Baby foods (BF) and ready-to-feed (RTF) infant formulas (IF), often a sole source of nutrition, are consumed during a relatively short but critical growth period. Over fifty percent of US infants are formula-fed within six months of age; by two years, many consume commercially-prepared BF. The USDA National Nutrient Database for Standard Reference (SR) includes 94 IF and 154 BF, for up to 146 nutrients. They are routinely reformulated, new nutrients are added, and interest evolves in existing components; diligent updates are necessary. Docosohexanoic and Arachidonic acids (DHA, ARA) are added to most IF to support eye and brain development; added sugar and sodium were removed from BF over the past few decades; and vitamin D and choline have gained new interest as life cycle nutrients. The objective is to look at historical changes in nutrient values for IF and BF in SR.

Materials and Methods: Major brands of select highly-consumed BF (beef, chicken and cereal) and RTF IF were compared (1978 vs. 2012) or reviewed (new nutrients). Manufacturer's data or analytical data generated under the USDA analytical program were used.

Results: Beef (junior) sodium dropped from 402 to 49mg/100g, chicken (junior) from 142 to 41mg/100gm, and oat cereal dry from 33 to 4mg/100gm. New nutrient data include - for the top two brands of RTF IF – 9-12mg/100g DHA, 8-16mg/100g choline, and 29-40IU/100g vitamin D. The mean (±SE) choline in top brands of meat-based BF (n=11 per food) ranged from 38-55mg/100g: beef (junior), 37.6±1.1mg/100g and chicken (junior), 43.2±1.9mg/100g. New choline data for dry cereals (rice, oat, barley) range from 18-45mg/100gm.

Significance: Major changes in IF and baby foods are monitored for inclusion in USDA's SR; researchers, health professionals, nutrition policy makers, the food industry, and consumers benefit from this effort.

Key words: Baby food, Infant Formula, choline and Vitamin D.

Categories: Nutrition Monitoring to meet goals for government projects

Funding disclosure (if applicable): ARS/USDA and NIH Agreement No: Y1CN5010

Poster 29: Title: Monitoring Children's Menu Items in Popular Restaurant Chains

Authors: Melissa Nickle, MPH and Pamela Pehrsson, PhD; USDA-ARS Nutrient Data Laboratory

Abstract:
Increased consumption of food away from home combined with a focus on sodium reduction and rise in child obesity has lead the USDA Nutrient Data Laboratory (NDL) to monitor popular restaurant foods. The objective of this study is to monitor and update changes in highly consumed chicken tenders and macaroni and cheese from the children's menu in two popular national restaurant chains from 2008 to 2012. NDL conducted a nationwide sampling of two popular family-style restaurant chains that served macaroni and cheese and chicken tenders on their children's menu. Twelve restaurant locations for each of the two leading restaurants were statistically indentified using a multistage, stratified sampling plan developed for the National Food and Nutrient Analysis Program (NFNAP). Sample units of each food item were prepared for analysis of proximates, vitamins, minerals and fatty acids using previously developed NFNAP protocols. Analytical samples and quality control materials were analyzed by USDA-qualified laboratories using AOAC approved methods. Nutrient data were statistically evaluated using Mann Whitney U Test ($p<0.05$) to compare the same food from the same restaurant at different years. Sodium in the chicken tenders from both restaurants significantly increased, restaurant A (553 to 767mg/100g, $p<0.017$) and restaurant B (468 to 845mg/100g, $p<0.031$). Total fat and saturated fat significantly increased in restaurant B chicken tenders (13.8 to 20.3g/100g, $p<0.017$ and 2.6 to 3.6g/100g, $p<0.028$). Macaroni and cheese from restaurant A significantly decreased in total fat (6.4 to 4.4g.100g, $p<0.005$), saturated fat (2.4 to 1.3g/100g, $p<0.028$) and sodium (383 to 284mg/100g, $p<0.005$). Restaurant B's macaroni and cheese significantly decreased in total fat (4.5 to 3.5g/100g, $p<0.008$). The results of this research provide current, accurate, nationally representative data for children's menu items in restaurant chains. These highly variable data will be included in the USDA Nutrient Database for Standard Reference 26 which serves as the source for nutrient analysis of dietary monitoring surveys.

Key words: sodium monitoring, U.S. food supply, restaurant, children's menu

Category: Nutrition monitoring to meet goals for government projects such as changing sodium levels in foods and diets in a timely fashion.

Funding disclosure (if applicable): CDC-USDA Agreement 60-1235-0-185

Poster 30: Title: Challenges of monitoring the sodium level of foods consumed in the U.S.

Authors: Robin Thomas, MS, RD; Jaspreet Ahuja, MS; Bethany Showell; Melissa Nickle, MPH; Janet Roseland, MS, RD; David Haytowitz, MS; Pamela Pehrsson, PhD; USDA-ARS Nutrient Data Laboratory

Abstract:
Background: Dietary sodium has been identified as a contributing factor in the development of hypertension. Many companies are reformulating their products in efforts to reduce dietary sodium intake. The USDA-ARS Nutrient Data Laboratory (NDL) began monitoring the sodium level of foods in collaboration with other federal agencies in 2010.

Objective: The objective of this study is to report approaches and challenges encountered during efforts to monitor the sodium content of the U.S. food supply.

Description: Sentinel foods (primary indicators to assess sodium changes in the food supply) were identified. Sodium levels of those 125 foods plus an additional 1200 foods that support the What We Eat in America, NHANES are being monitored through either analysis via the USDA National Food and Nutrient Analysis Program (NFNAP) or industry sources. Several challenges ensued. Market share information for some packaged foods and many restaurant foods was not readily available or up-to-date, making it difficult to determine which brands to examine. Commercial product formulations and restaurant item ingredients were highly variable, and those nutrient data were not easily obtained. When data were not accessible via analyses, industry contacts, or company web sites, companies were contacted or nutrient values were captured from Nutrition Facts Panels (NFP) in local retail stores. Sodium values on company web sites often differed from those listed on actual packages. For example, online saltine crackers NFP had 150 mg/16g serving whereas the in-store NFP had 190 mg/16g serving. Label values were sometimes much higher than recent NFNAP analytical values (e.g., 393 mg/100g mixed nuts label versus 273 mg/100g analytical), possibly an overcompensation due to FDA labeling regulations for sodium.

Conclusion: NDL food specialists met challenges at each step in the process – identifying foods to track, conducting extensive market checks, planning NFNAP sampling, and obtaining reliable label values – but solutions were developed to provide timely, reliable nutrient information to monitor the sodium level of foods.

Keywords: sodium monitoring, U.S. food supply

Category: Nutrition monitoring to meet goals for government projects such as changing sodium levels in foods and diets in a timely fashion.

Funding disclosure: CDC-USDA Agreement 60-1235-0-185