

1

Variation in the chemical composition of plant foods and its effect on physiologic variables: The example of selenium

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Background: Nutrition and health, especially in relation to chronic disease, is a major driver of food product selection for many consumers. Putative health benefits often spur the biofortification of foods and crops with nutrients and phytochemicals; however enhancement of a food or crop may result in unexpected variation in other components.

Objective: Selenium biofortification has been attempted by many techniques and studies of selenium-enhanced plant foods illustrate the complexities involved.

Description: The health benefits of selenium-enhanced plants depend on the amount and chemical form of selenium and its interaction with other chemical components. The amount and chemical form of selenium in a food is affected by species, geographical location, year and farming system. Additionally, the selenium content of a plant interacts with and affects the production of other phytochemicals such as phenolic acids and glucosinolates. Moreover the interaction of selenium and glucosinolates in broccoli modifies the activation of important antioxidant genes in the animal that consumes the broccoli.

Conclusion: These interactions illustrate the complexities in predicting nutritive content of a plant food as well as the health benefits derived from consuming such a food. Nutrient databases do not take such interactions and variation into account.

2

Application of flavonoid databases in prospective European and US cardiovascular disease cohorts

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Background: Although in vitro and animal studies support a role for flavonoids in lowering cardiovascular disease risk, epidemiologic data are more limited and are hindered by incomplete databases.

Objective: Review studies of flavonoid intake and risk of coronary heart disease (CHD), stroke, and total cardiovascular disease (CVD) in prospective European and United States (US) cohorts.

Description: Twenty publications from twelve prospective cohorts in four countries on flavonoid intakes and cardiovascular incidence or mortality were published between 1993 and 2008. The most common outcome was CHD mortality. Four of eight cohorts studied reported significant inverse associations for at least one flavonoid class and CHD. The flavonol and flavone classes were most strongly associated with lower CHD mortality. Comparisons between studies were

difficult because the flavonoid classes studied varied. Seventeen articles (11 cohorts) examined flavonols and flavones combined (12 studies) or flavonols as a class or its compounds (11 studies). Intakes of the flavones alone were assessed in four cohorts, flavan-3-ols in three cohorts, flavanones in three cohorts, isoflavones in two cohorts, anthocyanidins in two cohorts, but only one cohort estimated intakes of the proanthocyanidins. Only one study examined all seven flavonoid classes. Difficulties associated with flavonoid databases in the studies will be highlighted.

Conclusion: The hypothesis that flavonoid intakes are associated with lower CVD incidence and mortality requires further study using more complete flavonoid databases and more comprehensive dietary assessment methods.

3

Correlation of Omega-3 Index with Dietary Intake in Kidney Transplant Recipients

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Background: Kidney transplant (KTx) recipients have increased risk for cardiovascular disease. The Omega-3 Index (n-3I, the percentage of total fatty acids from EPA + DHA in RBC membranes) has been suggested as a surrogate biomarker of cardiac omega-3 polyunsaturated fatty acid (n-3PUFA) status. The purpose of this study was to assess n-3PUFA in kidney transplant recipients related to dietary intake, which has not previously been reported.

Methods: KTx recipients completed the Diet History Questionnaire (DHQ) and had blood samples analyzed for red blood cell (RBC) free fatty acids (FFA). The n-3I was determined and correlated to dietary intake using analysis of variance.

Results: Sixteen KTx recipients agreed to participate and 14 completed the DHQ. Median time from transplant surgery was 3.8 months (range, 0.9 to 43.5 months) and subjects were 48 years old (range, 29-65 years). Six (43%) were female and 7 (50%) were Caucasian (2 were African American and 5 were Hispanic). Median BMI was 28.6 kg/m² (range, 16.5-40.1). Median n-3PUFA dietary intake from DHQ was reported as 0.71 g/day (18:3=0.68 g/d, range 0.25-1.78; 20:5=0.01 g/day, range=0-0.03 g/day; 22:6=0.02 g/day, range 0.01-0.09). In RBCs, n-3PUFA was 18:3=6.98 pmol/mL, range=4.37-11.78; 20:5=2.07 pmol/mL, range=1.55-4.05; and 22:6=10.3 pmol/mL, range=10.2-10.6. Median n-3I was 4.25% (range, 2.49-6.16). No correlation between DHQ of n3PUFAs and individual RBC FFA was evident. However, DHQ of n3PUFAs was positively correlated to the n-3I (20:5, $r=0.64$, $p=0.0185$; 22:6, $r=0.50$, $p=0.0804$).

Conclusion: Dietary intake of n-3PUFAs and RBC n-3PUFAs are lower than desired in this group of kidney transplant recipients. The reported intake collected from the DHQ correlated with n-3I.

4

Nubel food planner for professional use and screening on malnutrition

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The Nubel food planner is a software program available on the internet (www.nubel.be) used to calculate the nutrient intake of different user-groups.

This program is mainly developed for use in schools to calculate the nutritional intake and to motivate students to engage in physical activity.

The program includes all daily activities, from sports to leisure activities and calculates the energy expenditure at the end of the day.

Nubel's Food Planner has been coupled to the Belgian database containing more than 5500 product brand names. This gives us the possibility to obtain a detailed diet history, to calculate the energy intake and to compare the results with the daily nutritional recommendations.

The professional version offers all the functionalities of the normal food planner but is enhanced with two important professional tools: a patient management system and screening tests (MNA, NRS, MUST) to reflect the risk of malnutrition in hospitals, nursing homes, etc.

With this computer program, Nubel wishes to inform users about a healthy lifestyle based on well-balanced nutrition, wishes to encourage people to introduce physical activity in their daily lives and wishes to achieve a stable balance between energy intake and energy consumption.

Nubel wants to develop tools on nutrition for several user groups and wants to identify stakeholders and users of the internet-based food composition databank systems. Furthermore, Nubel wants to disseminate this information in Europe and beyond by using proven concepts.

5

Cheese in the American Diet: What foods contribute to cheese intake - WWEIA, NHANES 2001-2002

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Objective: The 2010 Dietary Guidelines Advisory Committee report indicates that cheese is the second highest contributor to calcium intake among the U.S. population. Foods that are major contributors to the intake of cheese as a commodity in the U.S. diet were determined using a new database entitled Food Intakes Converted to Retail Commodities Database (FICRCD) 2001-2002.

Materials and Methods: The FICRCD 2001-2002 provides retail-level commodities for the Food and Nutrient Database for Dietary Studies, 2.0. Cheese is one of 65 commodities in FICRCD.

The FICRCD was linked to day 1 dietary intake data from WWEIA, NHANES 2001-2002. Intakes of the cheese commodity (mean±SE) were estimated for individuals 2 years and over (2-19 years n=4289, 20 years and over n=4744), by gender, race/ethnicity, and income.

Results: Sixty-five percent of individuals 2 years and over reported consuming foods containing cheese, and the mean intake was 31±1.0g per day (children=29±1.2g, adults=32±1.2g). Major food sources of the cheese commodity were: sandwiches, 9±0.4g; pizza, 5±0.3g; other sources, 4±0.3g; Mexican dishes, 4±0.4g; cheese consumed by itself, 3±0.4g; pasta dishes, 3±0.2g; and cheese consumed with bread, crackers or salty snacks, 3±0.2g. Non-Hispanic whites consumed significantly more cheese than non-Hispanic blacks (34±1.3g vs. 22±1.2g); higher income individuals consumed significantly more cheese than lower income individuals (34±1.3g vs. 26±1.2g).

Significance: These findings, which highlight food sources contributing to cheese intake in the diet and thus calcium sources, can be used to tailor nutrition education and dietary interventions aimed to increase calcium intakes. Funded by ARS, USDA.

6

“My fries were the size of an iPhone”: How portion size is reported in the Fuel 2 Fight Study

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Background: Portion size estimation is challenging. Current portion size estimation aids include computers, 3-D models, 2-D models, household measures, pictures, and common non-food objects. Food models and non-food objects are attractive because they have known dimensions or volume. Choices individuals make to use these aids to describe food portions consumed are not well described. We compare the portion size aid choices of career firefighters in 24-hour diet recalls. Firefighters were allowed to use household measures, 2-D models, servings, and common objects (Common Alternatives for Portion Size (CAPS)).

Objective: To characterize reported portion size during face-to-face and telephone 24-hour diet recalls among predominately male career firefighters.

Description: Fuel 2 Fight (F2F) is a longitudinal study of nutrition and obesity in the fire service. Firefighters (n =390) provided at least one face-to-face recall and one telephone recall. Trained nutritionists reviewed every recall, and categorized reported portion size by method used to report quantity consumed. The portion size categories were weights, measures, items, CAPS and food models. The frequency of use of the portion size methods is compared between face-to-face and telephone recalls.

Conclusion: Firefighters utilized 2-D food models most frequently to quantify portions during face-to-face recalls. The 2-D models were not always with the firefighters for telephone recalls, thus the portion size was estimated using cups, measure spoons, fluid ounces and serving units more than weights and common objects. Expanding utilization of common non-food objects with a known volume could be an important portion size alternative for phone recalls.

7

“Call me and we’ll complete it over the phone” — Elderly multiethnic adults’ views on completing a dietary recall via a web application.

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Older adults may be less receptive to technology and its advancements. Researchers in the field of dietary assessment have experienced an increase in the development and use of technology for overcoming some of the limitations of traditional methodologies. The Automated Self Administered 24 (ASA24) is one such web based application which has emerged, enabling researchers to collect self-administered 24-hour dietary recalls. There is a paucity of research on older adults’ perceptions of this web application.

Objective: To explore the perceptions of the ASA24 versus a traditional dietary recall in older, multiethnic adults.

Materials and Methods: Selected individuals from the Multiethnic Cohort Study were contacted to participate in a calibration study (n=305). Respondents who reported ready access to a computer with internet capability were asked their willingness to complete the ASA24 and respond to a questionnaire. The questionnaire was designed to evaluate their experience with using the ASA24. Qualitative responses to the following questions have been used for this analysis: “I did part of the ASA24 online system, but did not finish because” and “What if anything, could have been different to make the recall easier to complete?” A priori, the eFED (electronic food and exercise diaries) Evaluation Model was utilized to evaluate themes which emerged.

Results: Themes which emerged centered mainly on the *Usability, Features and Adoption* tenets of the model. Errors (*usability*) occurred, as participants expressed difficulty with logging into the system. From those that accessed the system and used the application, participants wanted feedback as to whether their information had been received (*features*). Very few of the adult participants stated a preference (*adoption*) for utilizing the electronic food recall over the traditional telephone administered recall.

Significance: Technology has permeated nearly all aspects of daily life. However, older adults who have less experience with technology than their younger counterparts may require extensive training in order to overcome the “digital divide.” As such, training should be provided on using computers, the internet and computer applications. More research should be done to

determine if more extensive training on web applications would improve the experience for older adults.

8

INFOODS advances in standard settings, useful for food composition and dietary assessment

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Dietary assessment requires reliable data on food consumption and food composition. The overall aim of the International Network of Food Data Systems (INFOODS) is to stimulate and coordinate efforts to improve the quality and availability of food composition data worldwide. In this regard INFOODS has provided leadership and administrative framework for the development of standards and guidelines for collection, compilation, and reporting of food composition data. INFOODS' effort is intrinsically interdisciplinary and recent work carried out includes tools to assist in improving dietary assessment, such as 'Guidelines for food matching' and a 'Density Database'. Food matching procedures are critical for obtaining high quality estimations of nutrient intake (dietary assessment) and of dietary exposure (dietary exposure assessments). These guidelines are intended to assist in selecting the most appropriate foods (from food composition databases) in order to match them to the foods reported in food consumption surveys or food supply data. Critical steps are pointed out and selected examples with possible solutions for food matching are given. In addition a Density Database was published to assist food consumption surveys to translate food intake from volume to weight. Guidelines for checking food composition data before publication are being prepared that will assist countries in evaluating their compositional data in a standardized way prior to publication. All these new guidelines are available on the FAO/INFOODS webpage free of charge (http://www.fao.org/infoods/projects_en.stm), and aim to harmonize the individual tools required for dietary assessment.

9

Phytochemicals, components of high interest, reflected in the Food Composition Database on Biodiversity

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Phytochemicals are high on the agenda of recent research in nutrition, health and food science, most probably due to their claimed health benefits. FAO/INFOODS developed a Food Composition Database on Biodiversity with analytical data for different varieties, cultivars and breeds, as well as for underutilized and wild foods (Available at

http://www.fao.org/infoods/biodiversity/index_en.stm). At present the database contains 2417 foods and 280 components. The majority of the components compiled are for phytochemicals (29%) followed by macronutrients and macronutrient fractions (28%), minerals (18%), vitamins and pro-vitamins (14%), fatty acids (4%), amino acids (3%), heavy metals (1%) and others (2%). The food group with the highest percentage of phytochemicals is potatoes, followed by vegetables and fruits. Phytochemicals compiled include flavonoids, anthocyanidins, carotenoids (without pro vitamin A activity), antioxidant capacities (e.g. TEAC, FRAP, ORAC), and individual acids (e.g. caffeic acid, vanillic acid, mallic acid, gallic acid). More data are being compiled for fruits worldwide and again the majority of components found to be analyzed are phytochemicals. For the next version of the Food Composition Database on Biodiversity many new INFOODS component identifiers, also called tagnames, need to be created for phytochemicals. A problem is that standardized methods for analysis, units and data expression are lacking, which results in a challenge for data compilation and use. Harmonization and standardization of data expression and method of analysis are needed in order to include these new components of high interest in food composition tables and database.

10

Functionality of protein fractions from black Crowder cowpea (*Vigna unguiculata*)

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Objective: Pulses are a valuable protein resource in the diets of many population groups. Black Crowder cowpeas (BCC) contribute to the nutrient status of most Africans. This study assessed the efficacy of BCC flour and protein fractions as functional ingredients in food systems.

Methods: Dry BCC seeds were de-hulled, dried and processed into full fat, defatted and protein isolate fractions. Chemical compositions and effects of temperature and pH on the functional properties of de-hulled BCC seeds flour/protein fractions were examined using standard methods.

Results: The protein isolate (87%) had highest protein content compared to the defatted (27%) and full-fat (26%) fractions. Carbohydrate and energy content of the protein isolate (9%; 384 kcal), defatted (62%; 361 kcal) and full-fat fractions (55%; 378 kcal) varied. The ash and ether extract content was 0.2% and 0% for isolate, 5% and 0.5% for defatted, 4% and 6% for full-fat fractions respectively. This indicates that the defatted and full-fat fractions are good sources of minerals. Significant differences ($P < 0.05$) existed in the water absorption capacity (WAC) and emulsion capacity (EC) of fractions treated at 40°-100°C while fractions given the same heat treatment differed in their swelling index (SI) and foaming capacity (FC). Fractions treated at pH 4.5-14 showed some differences ($P < 0.05$) in functional properties (WAC, SI, FC).

Significance: Functional characteristics of BCC protein fractions compared favorably with those of widely available tropical pulses. It can find useful application in food supplementation, baked products and nutrition intervention programs.

11

Awareness and use of MyPlate guidelines in making food choices

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Background/Objective: Over the past decades, USDA created several guidelines to assist the public in making healthful food choices. In June 2011, the popular pyramid symbol (Food Guide Pyramid or MyPyramid) was replaced with MyPlate – a simple and practical guideline for making healthful food choices. This study aims to 1) assess consumer awareness of the replacement of MyPyramid with MyPlate, and 2) determine whether MyPlate influenced people's dietary choices.

Methods: Fifty-one male and female participants, ages 18-34 years, with high school and bachelor's degree diplomas were selected by convenience sampling. Participants manually completed an 11-question survey using yes/no or degree of likeness rating. The relationship between participants' backgrounds, familiarity with MyPlate and MyPyramid guidelines, and the likelihood of use & influence on food selection was compared with participants' demographics.

Results: Eighty percent of the 51 participants were familiar with MyPyramid while 59% had visited the website. Less than 50% of the participants were unaware that MyPlate replaced MyPyramid, and they were unfamiliar with MyPlate guidelines. About 50% of the participants would likely visit ChooseMyPlate website. Half of the participants were unsure if MyPlate would influence their food choices while 43% thought it would.

Significance: Although MyPlate has been available to the public for 4 months (June to October 2011 when study was done), findings of this study show that MyPlate guidelines influenced the food choices of at least 40% of the participants. It could be inferred that longer time will enhance public awareness and use of MyPlate food guidelines.

12

Consumption of raw and unprocessed foods among Indiana State University students

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Background/Objective: The rise of nutrition-related diseases (e.g., heart disease, diabetes, obesity) is at all time high nationwide. Raw food diets typically consist of uncooked vegetables, fruit and grains as well as raw meat and dairy products. These foods could be slightly heated but not above 120oF as to preserve its natural components. College students have the habit of eating processed and fatty foods but diets rich in raw/unprocessed foods may break this pattern. This study aims to examine the popularity of consuming raw and unprocessed foods on Indiana

State University campus.

Methods: Thirty seven participants aged 19 years and older completed questionnaire on frequency, type and reasons for consuming raw/unprocessed foods such as vegetables, fruits, nuts and grains. Data was collated and analyzed using SPSS crosstab analysis.

Results: About 63% of participants consumed raw vegetables and fruits 1-2 times daily. However, fewer participants consumed raw nuts or grains. The reasons for eating raw foods were evenly split. Participants who ate raw foods for enjoyment or health reasons were 33% each while 30% did so for health and enjoyment. When assessed between genders, slightly more males ate raw foods for enjoyment.

Significance: Although many unhealthy food options are eaten on campuses, it is encouraging to find that students incorporate wholesome raw and unprocessed foods into their daily diets – a positive response to this new food trend.

13

ADDENDUM TO THE MYPYRAMID EQUIVALENTS DATABASE 2.0

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Background: The MyPyramid Equivalents Database (MPED) provides amounts of food groups and subgroups in foods consumed in nationwide food consumption surveys. The most recent MPED issued by the Agricultural Research Service (ARS) was Version 2.0, created for use with the National Health and Nutrition Examination Survey (NHANES) 2003-04. Several of the Center for Nutrition Policy and Promotion's (CNPP) projects require food group equivalents data for foods from more recent NHANES.

Objective: To provide a supplementary database of food group equivalents for more recent NHANES foods, for use in CNPP projects.

Description: Additional foods (n=820) reported in NHANES 2005-06 and 2007-08 were identified for inclusion in several CNPP projects, including the new online diet assessment tool, the SuperTracker. Cup and ounce equivalents were calculated for 750 foods by using the approach described in the documentation for the MPED 2.0. The USDA National Nutrient Database for Standard Reference, Release 23 (2010) was used for calculations. ARS provided equivalents data for 70 formulated foods. The addendum to the MPED includes cup or ounce equivalents per 100 grams of food for each USDA food group and subgroup, grams of discretionary solid fats and oils, teaspoons of added sugars, alcoholic beverages, as well as whole fruit and fruit juice equivalents. The addendum database and documentation are available on the CNPP web site at: <http://www.cnpp.usda.gov/OtherProjects.htm>.

Conclusion: The addendum provides useful data for foods from more recent NHANES that are not in MPED 2.0. It will be available until the next equivalents database is released by ARS.

14

USDA Develops a Database for Flavonoids to Assess Dietary Intake

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The Nutrient Data Laboratory (NDL) of ARS/USDA issued “USDA Database for the Flavonoid Content of Selected Foods, Release 3” in 2011. It contains values for 26 monomeric flavonoid compounds for 500 foods. A complementary database for the “Isoflavones Content of Selected Foods, Release 2” was issued in 2008. It contains values for daidzein, genistein, and glycitein for 557 foods. To support the assessment of the intake of monomeric flavonoids and isoflavones, values were imputed for approximately 3000 foods in USDA’s National Nutrient Database for Standard Reference (SR). Many foods, particularly animal products do not contain flavonoids; a value of zero was used for the various flavonoids for these items. Within the five classes of flavonoids, some are found only in particular taxonomic species—the values for the other classes were assumed to be zero. Various estimation techniques, long established for imputing missing values in SR, were used to complete the database. This subset of the SR database will be used as the basis for estimating flavonoid values for foods in the USDA Food and Nutrient Database for Dietary Studies (FNDDS). The expanded FNDDS for flavonoids and isoflavones will be used by the Food Surveys Research Group (FSRG) of ARS to estimate intakes of these compounds in the U.S. population; collaborators will assess the relationship of flavonoid intake to levels of various indicators of health status.

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Glycemic Index Data Base for selected Qatari Foods

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Objective: Diabetes mellitus in the State of Qatar is among the five highest in the world. Glycemic index values of similar foods vary according to the variety, cooking and processing methods. The objective for this study was to determine the GI of some carbohydrate rich foods consumed in Qatar in an effort to compile a more comprehensive data base of foods. This will be used by dietitians dealing with DM in Qatar and other Arabian Gulf countries.

Materials and Methods: Nineteen healthy volunteers were recruited for the study. Each volunteer consumed two reference foods, glucose and white bread and ten test foods. The foods tested for their GI in the study included three different kinds of pastry items (Fatayer; cheese, Zaatar, spinach), tanour white bread, white basmati rice, sweet snacks (Shearia, Muhalabea, Sago) and Qatari deserts (Awama, Qurs Aquili).

Results and Significance: Results of the study indicated that all the foods tested had high GIs (> 70). Shearia was found to have the highest GI (84.0 ± 1.85 , 100.2 ± 1.55), using the glucose scale or the white bread scale, respectively, and Fatayer. Spinach had the lowest GI (77.6 ± 2.00 , 92.4 ± 1.54). There was no significant correlation between the GI of all test foods, using glucose or white bread as standard foods, and the age or the BMI of the volunteers ($p > 0.05$).

The study provides data on the GIs of carbohydrate based foods consumed in Qatar and other Arabian Gulf countries that are not reported before.

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Dietary Assessment of Choline, Choline-Containing Compounds, and Betaine in a Multiethnic Population

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Objective. To update the University of Hawaii Cancer Center's Product Manager Database (PM) for a multiethnic population by adding two critical yet under-studied B-vitamins: choline and betaine.

Materials and Methods. 1,530 food items in the PM were matched with reference data: (1) direct match with USDA Database for the Choline Content of Common Foods for choline, choline compounds, and betaine (n = 308); (2) direct match with the USDA National Nutrient Database for Standard Reference (SR) for choline (n = 878) and betaine (n = 214); and (3) no match for choline (n = 344), choline compounds (n = 1,222), or betaine (n = 1,008). Of 344 unmatched for choline, approximately 45% were assigned a value from the same food with slightly different description, 45% were matched to a similar food, 4% were matched to the closest food in the category, and 6% were not assigned. Unmatched choline compound values were calculated based on ratios in similar foods. The PM data were used to estimate baseline dietary intake of >215,000 men and women in the Multiethnic Cohort Study (MEC) assessed through a 180-item food frequency questionnaire.

Results. Mean choline and betaine intake values were 389 mg/d (STD=293) and 160 mg/d (127) for men and 321 mg/d (252) and 134 mg/d (110) for women, respectively. Age-, sex- and energy-adjusted mean intake levels were significantly different among ethnic groups (p<.0001).

Significance. This novel work will contribute to dietary choline and betaine health impact research in ethnically diverse populations, including African, Latino, Asian, and Native Hawaiian Americans.

17

Food Diversity, Carotenoids, Micronutrient by Race and Diabetes Status

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Objective: The need to assess beneficial dietary components by race and their association with diet-related diseases such as type 2 diabetes has become apparent in the context of health disparities and the obesity epidemic. The aims of this study were to (1) compare the number of foods and carotenoids adults consumed by race and diabetes status and (2) to assess the likelihood of micronutrient insufficiencies across race and diabetes status.

Materials and Methods: Participants were adults aged 21 and over categorized by race: Mexican American (MA), Black, non-Hispanic (BNH) or (WNH) or classified by diabetes status: persons with diabetes (PWD) or no diabetes, from the National Health and Nutrition Examination Survey (NHANES) 2007-2008. The General Linear Model (number of foods) and Logistic regression analyses (daily reference intakes: DRI) for complex samples were conducted using sample weights.

Results: The number of foods increased with higher intakes of beta-carotene, lutein and zeaxanthin, adjusting for age, gender, energy, smoking and body mass index. Lower number of foods was associated with being BNH, male, younger, smoker and having higher BMI. Insufficiency of intakes (below DRI) of calcium, folate, vitamins B-12 and E were more likely for BNH than WNH. Vitamin E insufficiency was more likely for MA than WNH. PWD were more likely to be insufficient in calcium than those with no diabetes.

Significance: The findings suggest that BNH may be consuming foods of less nutritional value as compared to their counterparts. Dietary interventions providing knowledge about access and motivation for foods high in carotenoid and micronutrients are needed for this population.

18

Comparison of Nutrient Composition of Gluten-Containing and Gluten-Free Sliced Breads and Spaghetti Noodles

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Objective: To compare the nutrient composition of gluten-containing and gluten-free foods to determine the need to add specifically formulated gluten-free products to food and nutrient databases.

Methods: We identified the brands of gluten-free sliced breads (n=16) and spaghetti noodles (n=6) available at major grocery store chains and collected nutrition facts panel and ingredient statement information for those products. This information was entered in a spreadsheet, and analyzed for the purpose of examining variability of nutrient composition across brands and in relation to gluten-containing products in the database.

Results: The macronutrient content of gluten-free and gluten-containing sliced bread and spaghetti noodle products was comparable. Micronutrient differences were evident, however. Most notably, the folate, thiamin, and riboflavin content of gluten-free breads and pastas varied greatly across brands. From the ingredient statement information it was clear that some of the gluten-free products were fortified with b-vitamins and iron whereas others were not, thus potentially explaining the variation seen across brands. There was a notable difference between the gluten-free and gluten-containing products possibly because folic acid fortification is not mandatory in the US for the types of flours used in making gluten-free breads and pastas. Most gluten-free products in our sample were made with non-enriched flours that are not fortified with folate and other b-vitamins. Rice flour is the most commonly used substitute for wheat flour.

Significance: These findings suggest that database developers may want to include specific brands of gluten-free breads and pastas in their food and nutrient database.

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Streamlining an Adult Dietary Self-report Tool to Accommodate Children: Impact on Nutrient and Food Group Estimates

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Objective: The National Cancer Institute developed a freely available web-based automated self-administered 24-hour dietary recall (ASA24) for adults. This research explores the effect of making the ASA24 more child-friendly on nutrient and food group estimates.

Materials and Methods: One hundred twenty children, 8-13 years old, were asked to enter their previous day's intake using the beta version of ASA24 followed by an interviewer-administered recall using the Nutrition Data System for Research (NDSR). Based on a goal of adapting ASA24 for children, we manipulated the ASA24 data, post-administration, to simulate a more child-friendly version in which two categories of data collection were removed: 1) foods not likely to be consumed by children (45%) based on previous analyses of national dietary data and, 2) food detail questions to which children are unlikely to know the answers (46%), based on our experience. We then compared the analyses from ASA24 and the simulated child-friendly recall to assess differences.

Results: Mean estimates of select nutrients and MyPyramid Equivalents between ASA24 and the simulated child-friendly recalls showed no significant differences, indicating that the food and probe elimination did not significantly affect the results. A comparison of the ASA24 and simulated child-friendly version to the NDSR interviewer-administered recalls will be presented.

Significance: The child-friendly simulation showed that implementing child-friendly modifications in the database do not significantly affect results and opens the door for further testing of the feasibility and validity of a child-friendly version.

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Southwest Food Frequency Questionnaire and Database for Hispanic American Populations

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Background: The Arizona Diet, Behavior and Quality of Life has developed and maintains a comprehensive Southwest Food Frequency Questionnaire (SWFFQ) and culturally specific food database.

Objective: The development of the Southwest Food Frequency Questionnaire (SWFFQ) and database were undertaken to provide an appropriate means of collecting and analyzing self-reported dietary information for Hispanic populations residing in the Southwest region of the United States.

Description: The SWFFQ is a semi-quantitative dual language 163 item food frequency questionnaire that averages daily intake over the past year based on self-reported intake. Respondents are asked to report frequency of intake as well as average portion size consumed (S,M,L). The SWFFQ was originally developed in 1999 and was recently updated. Food item lists are categorized by food group and specific food listings were updated to reflect current trends in dietary intake with an emphasis on reported intake in Hispanics. Specifically, dietary data from a comprehensive diet recall study with Hispanic women (N=296) was reviewed to determine the more prevalent foods eaten by this population. The form was also updated to include dietary habit questions similar to those used on the standard Arizona Food Frequency Questionnaire as well as dietary supplements. The nutrient values derived from the line item response are calculated from the 2009 USDA National Nutrient Database (Version22) and are weighted by the national consumption of two ethnic groups: "Mexican Americans" and "Other Hispanics".

Conclusion: The SWFFQ is a valuable tool for assessing dietary information for Hispanic populations living in the Southwestern United States.

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Dietary aluminum intake of many U.S. toddlers is excessive based on 1999-2008 NHANES food intake data

Joannie Dobbs, University of Hawaii at Manoa; Jordan Oshiro, University of Hawaii at Manoa; Halina Zaleski, University of Hawaii at Manoa; Alan Titchenal, University of Hawaii at Manoa

Objective: In light of FAO/WHO lowering the provisional tolerable weekly intake (PTWI) for aluminum (Al) from 7 to 1 mg Al per kg body weight, dietary Al intake of U.S. infants and toddlers needs re-evaluation for safety.

Materials and Methods: Dietary, demographic, and body weight data for children (age 0-36 months) were extracted from the 1999-2008 NHANES datasets. The Al content for a limited sample of common high-Al foods (pancakes, waffles, corn bread, cookies, doughnuts, cinnamon rolls, other miscellaneous baked goods, pop tarts, tortillas, processed American cheese, cocoa mix, tea, infant formulas, etc.) was obtained from chemical analysis and from values in scientific publications. Al intake was estimated from the amounts of these foods consumed by NHANES participants based on two 24-hour diet recalls.

Results: Diet and body weight information was available for 4961 children. High Al foods were consumed by 70% of these children. Based on the children with two diet recalls (N = 2747), 82% of the children consumed high Al foods on at least one day. The 2-day Al intake exceeded the PTWI for 2.8% of infants (< 1 yr), 18.6% of 1-2 yr olds, and 22.5% of 2-3 yr olds.

Significance: A conservative estimate of dietary AI intake indicates that one out of five toddlers (age 1-3 yr) exceeded the PTWI for AI with just two days of food intake. Since excessive AI intake can harm the reproductive and nervous systems, a more detailed assessment of AI intake is needed.

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Calculated and potential excess consumption of iron and calcium from RTE breakfast cereals based on NHANES 1999-2008

Joannie Dobbs; University of Hawaii at Manoa; Nobuhisa Morimoto; University of Hawaii at Manoa; Alan Titchenal; University of Hawaii at Manoa; Halina Zaleski; University of Hawaii at Manoa

Objective: NHANES food consumption data were used to determine whether consumers of fortified ready-to-eat (RTE) cereals commonly exceed Tolerable Upper Intake Levels (UL) for iron and calcium.

Materials and Methods: Demographic and cereal consumption data were obtained from NHANES 1999-2008 datasets for all participants who consumed RTE cereals as identified by USDA food codes in participants' 24-hr diet recalls. Nutrient information was obtained from cereal nutrition facts panels and/or company websites. JMP 8 and SAS 9.1.3 were used to identify those who consumed enough fortified cereal to exceed iron and/or calcium UL values for their age/gender group. The weight of RTE cereal commonly consumed (any type) was used to estimate the risk of exceeding UL values should a fortified cereal be chosen.

Results: Of 7136 participants who consumed RTE breakfast cereals, only 0.32% exceeded the UL for iron and/or calcium. However, based on the weight of RTE breakfast cereals consumed by participants, 9.9 % would exceed the UL for iron and 3.5% would exceed the UL for calcium if they selected cereals fortified at 100% of the Daily Value (DV). Male participants 14-18 yr of age consume enough cereal that 15.7% and 11.2% would exceed the UL for iron and calcium respectively if consuming 100% DV fortified cereals.

Significance: Consumption of fortified breakfast cereals can help to meet micronutrient needs. However our data indicate that many individuals would exceed UL values for iron and/or calcium if they select cereals fortified to the 100% DV level.

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USDA updates nutrient values for fast food pizza

Melissa Nickle, USDA-ARS-Nutrient-Data Laboratory; Pamela Pehrsson, USDA-ARS-Nutrient-Data Laboratory

Consumption of quick service pizza has increased as Americans are spending more on food away from home. Pizza is consistently a primary Key Food in the USDA National Food and Nutrient Analysis Program (NFNAP) because it is a contributor of more than 14 nutrients of public health significance to the U.S. diet. The USDA Nutrient Data Laboratory collected samples of the two leading fast food pizza chains to monitor and update changes in this popular food. Both brands of cheese (regular, thick, and thin crust) and pepperoni (regular and thick crust) pizzas were collected in 12 nationwide locations in 2003-04 and again in 2010. Sample units of pizzas were prepared for analysis of proximates, vitamins, minerals and fatty acids

using NFNAP protocols. Analytical samples and quality control materials were analyzed by USDA-qualified laboratories using AOAC approved methods. Nutrient data were statistically evaluated ($p < 0.05$) to compare similar pizzas from different years. Based on these analyses, values for various nutrients changed. For example, both brands of cheese, thin crust pizzas showed a significant increase in sodium ($p < 0.014$). Across all pizza types, brand A pizzas showed a significant increase in iron ($p < 0.0009-0.036$) and potassium ($p < 0.001-0.013$). Total sugars, fiber, cholesterol, and fat values significantly increased or decreased by brand and pizza type. These analyses provide current, accurate, nationally representative data for high consumption foods in the U.S. and are included in the USDA Nutrient Database for Standard Reference 24 as part of an effort to monitor changes in nutrient profiles for popular foods.

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Changes in Nutrient Levels for Three Fresh Pork Loin Cuts between 1992-2010

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Since pork composition has changed between 1992 and 2010, a collaborative study was conducted by scientists at USDA, Texas Tech University and the National Pork Board to determine current nutrient values.

Objective: To compare analytical nutrient data from 1992 to that of 2010 in three raw highly consumed pork products in the USDA National Nutrient Database for Standard Reference (SR).

Methods: Baby back ribs, bone-in (BKR), blade chops, bone-in (BCB), and sirloin roast, boneless (SRB) were purchased from 12 retail outlets using a nationwide sampling plan developed for USDA's National Food and Nutrient Analysis Program (Pehrsson, P. et al, J. Food Comp. Anal 13:379, 2000). Nutrient values for proximates, cholesterol and minerals were determined by commercial laboratories using validated methodology and quality assurance. The 1992 data were derived from analyses of fresh, raw retail cuts from a nation-wide market basket survey of pork cuts from supermarkets in 15 cities across the US. Nutrient values from 1992 and 2010 for equivalent cuts were compared statistically using a paired two-tailed T-test (Critical value $p < 0.05$).

Results: Moisture increased significantly ($p < 0.001$) while total fat and cholesterol decreased ($p < 0.001$) in all three cuts. Sodium values from 2010 were higher in all three cuts by 9-24% but still less than 90 mg/100g. Calcium, potassium and phosphorus were higher ($p < 0.05$) whereas iron and zinc were lower ($p < 0.001$).

Significance: This research updates the values in SR and provides current and accurate data for use in nutrition monitoring and policy.

25

Retooling of USDA Food Patterns Equivalents Database: A new approach

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Objective: The USDA Food Patterns Equivalents Database (FPED), formerly known as the MyPyramid Equivalents Database (MPED), converts foods consumed in What We Eat In America (WWEIA) NHANES into cup equivalents of dairy, fruits, and vegetables; ounce equivalents of protein foods; teaspoon equivalents of added sugar, and grams of discretionary solid fats and oils. The objective of retooling the FPED is to simplify the FPED development methodology and apply consistent decisions across similar foods.

Materials and Methods: The retooling steps include developing a 100-gram FPED for the Food and Nutrient Database for Dietary Studies (FNDDS) ingredients and applying it to compute the final FPED for FNDDS foods; and consolidating the weights of 1 cup of fruits and vegetables such that similar types of fruits and vegetables will have the same weights; estimating added sugar equivalents from the total sugar values of the foods that are defined as added sugars; and the use of 16 grams of flour as the basis for defining one ounce equivalent of grains for grain products made of flour.

Results: A comparison of the FPED and MPED applied to WWEIA, NHANES 2003-04 showed no appreciable differences between intakes (mean \pm SE) of the 32 FPED/MPED components estimated using the two databases. Development of FPEDs for WWEIA, NHANES 2005-2008 is ongoing.

Significance: The retooling simplifies FPED development process and reduces the time requirement without affecting the quality of the database. Funded by ARS, USDA.

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The Classification of Food in the Canadian Nutrient File (CNF) According to « Eating Well with Canada's Food Guide » (EWCFG)

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Background: To assist Health Canada in assessing Canadians' adherence to EWCFG, a classification of foods in the CNF according to EWCFG guidance was developed.

Objectives: Classify foods in the CNF according to guidance in EWCFG and validate the classification.

Description: Classification of foods in the CNF is based on EWCFG guidance to limit fat, sugar and sodium. Using the criteria from regulations and an education campaign, upper and lower

thresholds for three tiers of foods have been established. Tier 1 includes those foods that follow this guidance (i.e. low fat, total sugars and sodium), Tier 2 includes those foods that mostly follow this guidance (i.e. little fat and/or total sugars and/or sodium), and Tier 3 includes those foods that do not follow this guidance (i.e. high in fat, total sugars or sodium). Simulated diets with foods from Tiers 1-2 were created for all Dietary Reference Intake (DRI) population groups based on EWCFG's food intake patterns. The nutrient content of these diets is being assessed against appropriate DRI values. This approach will ensure that nutrient needs can be met without exceeding energy requirements when desirable food intake patterns from EWCFG are met. The results of this validation will ensure that the nutrient profile model developed classifies foods in alignment with EWCFG. The validation process was ongoing at the time this abstract was written.

Conclusion: A nutrient based classification of foods will allow for the assessment of diets against EWCFG and may also be useful in surveillance, research and ongoing consumer education.

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USDA Food and Nutrient Database for Dietary Studies (FNDDS), 5.0

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Background: A new release of the Food and Nutrient Database for Dietary Studies (FNDDS) is prepared to code and analyze dietary intakes for each two-year cycle of the What We Eat in America, National Health and Nutrition Examination Survey (WWEIA, NHANES).

Objective: To create FNDDS 5.0 for WWEIA, NHANES 2009-2010, data on foods, descriptions, portion weights, and nutrients were updated to incorporate changes in the marketplace.

Description: Information reported by survey respondents was monitored for new foods and portion sizes, and comprehensive reviews of database entries (foods, weights, and recipes) were conducted. While attention in review is given to all nutrients, particular attention was given to sodium in response to the initiative of sodium reduction. FNDDS 5.0 includes nearly 100 new foods reported in 2009-2010, including new fast-food sandwiches and brand-name granola bars. More than 2,000 revisions were made to weight data, including increased portion weights for chicken (breast, drumstick, thigh, leg, wing), and top-reported breads and rolls. Linkages to the USDA National Nutrient Database for Standard Reference (SR) were revised for approximately 1,400 recipes including Asian foods, pork items, and many rice dishes. Nutrient values from SR24 were incorporated into all FNDDS foods.

Conclusion: FNDDS 5.0 will be available online by mid-2012 in the What's In the Foods You Eat Search Tool, and for download from <http://www.ars.usda.gov/ba/bhnrc/fsrg>. Used to estimate nutrient intakes for WWEIA, NHANES 2009-2010, FNDDS 5.0 has more than 7,200 foods, with 65 nutrients for each food, and more than 31,000 weights for common portions.

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Effect of Consuming Fortified Breakfast Cereal on Vitamin E and Calcium Status

Jill Killough, Lamar University

Objective: Vitamin E and calcium are two shortfall nutrients that are required in optimal amounts from the diet to perform necessary functions in the body. This study investigated the consumption of a 1-ounce serving of fortified breakfast cereal on vitamin E and calcium dietary intake and serum tocopherol levels among adults, using a six-week randomized, controlled, parallel-arm, open-label design, with a two-week pre-intervention and a four-week post-intervention period.

Materials and Methods: Forty-three participants enrolled in the study with forty-two participants (10= males; 32=females) completing the study. Participants were in self-reported good health, >18 years of age, and not currently taking a vitamin-mineral supplement, lipid altering medication, or hormone replacement therapy. Participants recorded six-weeks of dietary intake and had two fasting blood draws. Dietary intakes were analyzed using the Nutrient Data System for Research version 2010.

Results: Mean compliance for fortified breakfast cereal consumption was 100% for men and ranged from 95.6 to 97.3% for women. There were significant between-group (intervention versus control) differences in total vitamin E (α -tocopherol), synthetic vitamin E (all-rac- α -tocopherol), and calcium intakes at weeks 3 & 4 and at weeks 5 & 6 ($p < .001$) and were all significantly higher as compared to weeks 1 & 2 in the intervention group ($p < .001$). There were no significant between-group differences for either serum alpha-tocopherol or lipid-corrected alpha-tocopherol concentrations.

Significance: Fortified breakfast cereal can be easily incorporated into the diet among healthy adults and is a feasible option for increasing dietary intakes for two shortfall nutrients in the United States.

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Federal monitoring activities related to food: how do they compare?

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Background: Several nutrition monitoring related activities are carried out by the federal government in the United States. These include the What We Eat in America, National Health and Nutrition Examination Survey (WWEIA, NHANES), conducted by the U.S. Department of Health and Human Services and the U.S. Department of Agriculture (USDA), the Total Diet Study (TDS), conducted by the U.S. Food and Drug Administration, and the Nutrient Content of the U.S. Food Supply Data compiled by USDA's Center for Nutrition Policy and Promotion, using USDA's Economic Research Service's Food Availability data.

Objective: To better understand the intent, purpose, and methodology of these monitoring activities, how they are related to each other, and how they differ.

Description: The intent, purpose, and methodology of each listed monitoring activity, and their inter-relationships will be examined. Mean intakes of selected nutrients common to the datasets will be determined and presented. For instance, the mean (SE) calcium intake for all individuals over 2 years of age for 2007-2008 based on WWEIA, NHANES is 946 (20.2) mg/day and based on the TDS is 816 (16.2) mg/day. The mean availability of calcium is 960 mg/day based on the Nutrient Availability data (2006). The reasons for the differences will be discussed.

Conclusion: These nutrition monitoring activities provide useful information to policy makers and researchers for examining nutrient adequacy, dietary trends, and tracking nutrition and health objectives, to name a few. It is important to keep in consideration the intent and purpose of these datasets when comparing results.

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Standard Reference Database: Empowering Consumers via Legislation

Rocky Craig; MenuTrinfo, LLC

BACKGROUND: The Health Care Act passed in 2010 contained several legislative changes that could spark business opportunities. A prime example is Section 4205 governing nutritional analysis of restaurant menus, aimed at franchises of 20 or more locations. **OBJECTIVE:** While larger corporations staff internal R&D to generate their nutritionals, there was a product gap for individual and medium- sized concepts. With nearly 500,000 restaurant locations of this type in the US, a business opportunity was clearly presented. **DESCRIPTION:** MenuTrinfo LLC was founded in 2010 to provide full-service nutritional analysis to small and midsize restaurant chains at a competitive price. Custom software retrieves its core information from the USDA National Nutrient Database. The primary aim was to provide the "Big 13" nutrient breakdown in multiple formats for restaurants to present to their patrons. Custom additions to the SR database and proprietary schema extensions render different points of view. Foremost among these are reverse ingredient lookup and allergen tagging. **CONCLUSION:** While restaurants begrudge most forms of additional administration, our customers have been ecstatic with the process, price, and results. We have moved beyond our original product scope and offer a variety of reports that cater to special needs diners (food allergens and sensitivities.) Recently we have developed a training class for these concerns that is driven by the reports from a nutritional analysis.

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Assessing the feasibility of using a web application among elderly multiethnic adults

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The 24-hour dietary recall is an optimal method for collecting dietary data. The Automated Self Administered 24 (ASA24) is a web application enabling the collection of self-administered recalls. Limited research exists on using web applications with elderly and multiethnic adults.

Objective: To assess the feasibility of using the ASA24 in a cohort of elderly, multiethnic adults.

Materials and Methods: Selected individuals, representing each ethnic group in the Multiethnic Cohort Study (MEC) were contacted to participate in a calibration study (n=305). During the first screening call, participants were asked whether they had access to a computer with internet access, and if so, their willingness to complete an extra web-based recall, i.e., the ASA24.

Results: 59% (181/305) claimed no access to computer/internet, and 32% (99/305) agreed to receive the ASA24 instructions and questionnaire. Lack of access to a computer/internet was significantly different by ethnic group (African Americans, 75%; Latinos, 74%; Native Hawaiians,

57%; Japanese Americans, 51%; Whites, 44% ; $\chi^2=22.6$, $df=8$, $P=.004$). Men were more likely to refuse the extra participation (12% men, 5% women; $\chi^2=6.5$, $df=2$, $P=.038$). Older participants (72-80y) were more likely not to have access to a computer/internet (72%) compared to those 66-71y (59%) and 58-65y (49%) ($\chi^2=12.7$, $df=4$, $P=.013$).

Significance: Web applications are convenient for collecting data from certain segments of the population. However, among the elderly and some ethnic groups, access is a barrier. Further research should be conducted regarding the feasibility of dietary assessment methods and the adoption of new technologies among the elderly and minority groups.

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Evaluation of evening meal recall and digital recording accuracy among adults

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Novel methods for dietary assessment include capturing images of eating occasions using mobile telephones. However, in the event that an individual forgets to take an image, there needs to be a method for a user to recall and digitally record foods and beverages consumed.

Objective: The objective of this study was to evaluate accuracy of foods and beverages digitally recorded among twenty-one spouse pairs.

Materials and Methods: Participants ($n = 42$; ages 47- 82 yr) used a digital camera to take an image of all foods and drinks consumed at their evening meals for 7 days. At the end of the day, they recalled and digitally recorded the evening meal using an application on a HTC mobile telephone that included a search of the FNDDS. Analysts compared the foods in the images to those recorded digitally.

Results: Participants completed 208 image/entry pairs of which 157 (76%) had digital entries containing all foods visible in the coordinating image. The images contained 842 foods, of which 79 were not digitally recorded (9%). The majority of foods not recorded were fruits and vegetables (39%) or beverages (22%). There were 75 foods digitally recorded that were not in coordinating images of which, the majority were also beverages (45%) or fruits and vegetables (15%).

Significance: Given the short gap between dinner and bedtime, adults accurately recall and record a majority of foods using a mobile application. However, for both image-based and digital recording dietary assessment methods, probes for beverages, fruits and vegetables may be necessary.

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SciName Finder™

Anders Møller, Danish Food Information; Jayne Ireland, Danish Food Information

Background: Scientific names are necessary in food composition databases and scientific publications, to precisely identify plants and animals. Food names should always be taken from authoritative sources.

Objective: A new internet site - SciName Finder™ - has been created as tool to search scientific and vernacular/common names of plants and animals - and especially concerning the update of the LanguaL thesaurus.

Description: The SciName Finder™ search interface is very simple, and only a few parameters - scientific or common name - can be chosen. In addition, there is a choice to search on only valid taxons or all taxons (including synonyms).

The SciName Finder search is based on online databases, and the search result will be all records in the connected database(s) that contain the search term in either scientific name or common name. The search results can be sorted by scientific name, kingdom (animalia, plantae, etc.) and originating database.

The SciName Finder™ database currently contains 1,075,981 scientific and common/vernacular names. Current databases connected: Australian Fish Names Standard® AS SSA 5300-2009, CEC 1993, Danish Plant Name List 2003, eBASIS/EuroFIR Nettox Plant List 2007, FAO AFSIS, FishBase 2004, 2010 FDA Seafood List, FDA Regulatory Fish Encyclopedia, ITIS, Mammal Species of the World (3rd Ed.), USDA ARS GRIN, USDA PLANTS.

Conclusion: SciName Finder™ (<http://www.sciname.info/>) is a search tool for scientific/common names of plants and animals, written by Anders Møller, Danish Food Information. As the search tool may have more general uses, DFI provides access free of charge to other users.

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What's New in LanguaL?

Jayne Ireland, Danish Food Information; Anders Møller, Danish Food Information

Background: Systematic food description is essential to the acquisition, processing, and dissemination of food composition data. LanguaL™ (<http://www.langual.org>) is a multilingual, faceted thesaurus created to describe foods in a systematic way. Originally developed in the US more than 30 years ago, LanguaL has been managed by the European LanguaL technical committee since 1999. LanguaL™ is used to systematically describe foods in Europe and in the US.

Objective: The objective of this paper is to present major updates in LanguaL 2010.

Description: Proposals for new terms or clarification of existing terms are submitted by LanguaL users and published on the LanguaL website for discussion. The procedure is that a proposal is published on the LanguaL site for discussion for two months. If accepted by the LanguaL expert

group, the proposals are implemented in the LanguaL Thesaurus. Proposals and their status are available on the LanguaL website under Proposals.

The LanguaL™ thesaurus, currently used only for conventional foods, was adapted this year for indexing dietary supplements. New descriptors were added to index dietary supplements according to different criteria (e.g. type, form, ingredients, dietary use).

New descriptors were also introduced in order to index foods in USDA SR. Other major updates include revision of fish and plant species, with links to authoritative sources of scientific names, and an update of food additive information. Language versions currently include English, Czech, Danish, French, German, Italian, Portuguese and Spanish.

Conclusion: The next version of LanguaL will be published by mid-2012.

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Food reporting patterns in AMPM

Lois Steinfeldt, USDA/ARS/BHNRC; Jaswinder Anand, USDA/ARS/BHNRC

Complete and accurate 24-hour dietary recalls are essential for nutrition monitoring in the United States. The USDA Automated Multiple Pass Method (AMPM) uses a 5-step multiple pass approach. The first step is an unstructured, uninterrupted listing of all foods and beverages consumed. The next 4 steps use a structured approach including memory cues. The objective of this analysis is to describe patterns of food reporting in the AMPM in a nationally representative sample. This analysis uses data from the 2007-2008 What We Eat in America, National Health and Nutrition Examination Survey for males and females ages 12 and older. The order in which foods were reported in AMPM is compared to the order in which the foods were consumed. In the day 1 interview, 66% of respondents began the Quick List with their first eating occasion of that day. However, only about 17% of respondents reported all their eating occasions on the Quick List in the order they were consumed. In the day 2 interview, with respondents now familiar with the AMPM, these percentages increased to 83% and 35% respectively. The percentages show little difference between males and females. Age does make a difference in day 1 interviews with older respondents more likely to begin reporting with their first eating occasion, but there was no difference by age in the day 2 interviews. The patterns described in this analysis demonstrate the importance of the multiple pass method in obtaining complete 24-hour dietary recalls.

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Development of a Dietary Supplement Database for Use in a Study of Pregnant Women

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Objective: Develop a dietary supplement database for assessment of dietary supplement (DS) intake in a study of pregnant women.

Material and Methods: Supplement intake was collected using a food frequency questionnaire (FFQ) over three time periods during pregnancy- periconceptional, first trimester and the remaining two trimesters, respectively. The FFQ had 25 closed DS items and unlimited write-ins. Brand/product name, frequency, amount, and duration of use were collected. We identified the DS reported by the women and a DS database was developed to store nutrient information. Details of the supplement profiles were obtained by one of four methods: 1) a clinical pharmacology website, 2) internet search using the manufacturer's website and other retailers, 3) product label, and 4) phone contact of the manufacturer. Profiles were double entered to ensure accuracy.

Results: The DS database has 674 supplements stratified into 28 categories. Each product was given a unique ID. Information was collected for 665, 594, and 226 women completing FFQ 1, 2, and 3, respectively. Dietary information has been linked to the supplement via the unique ID. The data have been analyzed to assess the most commonly reported DS. For women that reported partial data, a demographic profile based on age, BMI, ethnicity, and recruitment location have been developed to ascertain a default DS for calculation of supplement intake.

Significance: This database of DS consumed prior to and during pregnancy will be useful in more accurately estimating the contribution of DS to total dietary intake rather than standard defaults.

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LanguaL: Controlled Vocabulary for Indexing Dietary Supplements in US Databases

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Jayne Ireland, Danish Food Information; Anders Møller, Danish Food Information; Karen Andrews, USDA/ARS; Regan Bailey, NIH Office of Dietary Supplements; Joseph Betz, NIH Office of Dietary Supplements; Jaime Gahche, Centers for Disease Control and Prevention; Constance Hardy, FDA/CFSAN; Susan Pilch, MEDLINE/PubMed Database, NIH Library

Objective: Develop a controlled vocabulary to describe dietary supplements sold in the US – an extension to LanguaL™.

Background: Foods - including dietary supplements (DS) - can be categorized in numerous ways, making it difficult to compare findings across studies. LanguaL™ (<http://www.languaL.org>) is a controlled vocabulary for harmonizing the descriptions of food products in databases.

Description: The LanguaL™ thesaurus, currently used only for conventional foods, has recently been adapted for indexing dietary supplements. LanguaL consists of a set of standard, controlled terms (descriptors) arranged in facets characteristic of the nutritional and technological characteristics of a product. 12 LanguaL facets were chosen for DS: A - Product Type; B Product Source; C - Part of Source; E - Physical State, Shape or Form; H - Ingredients; J - Preservation Method, K-Packing Medium, M - Packing Container or Wrapping; N - Contact Surface; P - Consumer Group/Dietary Use/Label Claim; R - Geographic Place and Region; and Z - Adjunct Characteristics. New descriptors were proposed for these facets to be consistent with U.S. federal regulations and policies. Codes have been assigned to the new descriptors in the LanguaL thesaurus so that products can be indexed and retrieved from the DS databases.

An example of using the LanguaL™ controlled vocabulary to categorize a common adult multivitamin mineral supplement will be presented.

This system will enhance the accuracy of information retrieval about the use of specific DS across studies, and will also be useful to researchers searching for specific DS products within databases.