

Poster Abstracts

Poster 1

BEYOND THE FOOD EXCHANGE SYSTEM LISTS: A NEXT GENERATION DIET MANAGEMENT SYSTEM

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This poster will present the programmatic organization and preliminary findings of a new quantification system for use by nutrition professionals for dietary counseling and management of consumers' diets. The purpose was to develop a quantified, nutrient-based, food guidance system and database designed to reduce the nutritional risk profile. Current food guidance procedures, including the American Dietetic Association and American Diabetic Association's Food Exchange Lists, USDA/HHS Food Guide Pyramid, and other systems have practical and empirical limitations. The proposed quantification system compares what is eaten with the meal plan and provides an analysis which makes the complexities of diet and energy balance much easier to understand and apply. The system is adaptable to varying energy and nutrient needs and can be used in both individual and group counseling settings. Formative and process evaluation data will be presented as well as the results of focus study data.

Poster 2

TIMELY FEEDBACK FOR DIET INTERVENTION SUPPORT: A UNIQUE FEATURE OF THE MDRD STUDY.

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Large diet intervention trials, particularly multi-centered, long-term studies, typically collect dietary data solely for research purposes. A few have provided interventionists with periodic but infrequent (1/yr) information on study group intakes only. In contrast, the Modification of Diet in Renal Disease (MDRD) Study¹ regularly provided Study dietitians with reports from individual patient's bimonthly 3-day food records. This data provided important feedback for patient counseling. In fact, based on an MDRD participant survey, 94% rated nutrient intake reports as useful to very useful in meeting their Study goals. Food-nutrient intake reports from "priority" food records could be provided in as little as two-weeks if the Nutrition Coordinating Center (NCC) received the food record at least 16 days before the patient's next visit. Intake reports for the quarterly adherence assessment visits were automatically tagged as "priority". However, a dietitian could declare other reports as "priority" by noting this on the food record and providing answers to NCC data questions within three days. In exceptional, limited cases, "emergency" intake reports could be provided within a few days.

To facilitate the "priority" report process, several elements were installed. All data queries and intake reports were transmitted to dietitians via electronic mail. A "Query" phone hotline, staffed by trained food coding specialists, received answers for the NCC data queries and fielded dietary data questions. To flag and track upcoming priority records, internal data flow systems and reports were created. Over the course of follow-up, a total of 10,567 intake reports were generated. Of the 6889 (65% of total) follow-up records

that were received at least 16 days before the next visit, 3677 (35% of total) were tagged as "priority" and expedited for intervention support.

¹ The MDRD Study tested the effects of diet and blood pressure interventions in patients with chronic renal disease.

Poster 3

COMPARISON OF THE DIETARY GUIDELINES AND THE QUALITY OF MENUS PLANNED IN MISSISSIPPI CHILD CARE CENTERS

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Healthy People 2000: National Health Promotion and Disease Prevention Objectives identifies children as a high priority group on the agenda of health care concerns for this decade and states that little is known about the nutritional status of children enrolled in child care facilities, and little research has been conducted on the foodservice operations of child care facilities in general. The purposes of this study were to collect information from Mississippi's licensed child care centers on their foodservice operations relative to: 1) participation in the United States Department of Agriculture (USDA) sponsored Child Nutrition Program and 2) the nutrient content of the planned menus. Licensed child care centers in Mississippi were surveyed using a questionnaire. Approximately 10% of the licensed child care centers in Mississippi were randomly selected for study. Each center selected was sent a questionnaire which included a request for cycle menus currently being used in the facility. One hundred eighteen child care centers responded and were divided into groups based on participation in the USDA-sponsored child care food program. Nutritionist III nutrient analysis software version 7.0 was used for the menu analysis. Mean values of the nutrients were tested for differences using the analysis of variance procedure with Statistical Analysis Systems software. Percent calories from carbohydrates, protein, and fat were calculated for comparison to Dietary Guidelines' recommendation concerning these nutrients. Seventy-five percent of the facilities reported participation in the USDA-sponsored child nutrition program. Eighty-seven percent of the centers reported following the Dietary Guidelines when planning menus. Results of this study supported the claim that nutrient quality of menus may be inconsistent in licensed child care facilities. The mean amounts of energy, protein, total carbohydrates, polyunsaturated fats, cholesterol, vitamin A, thiamin, niacin, vitamin B6, pantothenic acid, vitamin E, potassium, and zinc were significantly lower ($P < .05$) for facilities that reported participating in the child care food program. However, mean values for vitamin D and calcium were higher. Percent calories from protein was 19.2% for menus from the participating group of facilities compared to 17.8% for the facilities not enrolled in the program, although the mean amount of protein in the menu was not higher. Percent calories from fat (40.8%) was also higher in the participating facilities' menus while total energy and saturated fats were not higher, and the cholesterol content of the lunches was lower. The mean fat levels for all centers exceeded the recommendation of no more than 30% of total kcalories from fat over time with 40.8% for centers that participated in the program and 38% for those that did not. Similarly, both groups were higher in protein and lower in carbohydrate than recommended by the Dietary Guidelines.

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TIME REQUIREMENTS FOR DOCUMENTING DIETARY DATA FOR RESEARCH APPLICATIONS: THE MDRD STUDY EXPERIENCE

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Data documentation is standardly used in research for data verification and critical detail retrieval. The Modification of Diet in Renal Disease (MDRD) Study, a 15 center diet and blood pressure interventions trial, collected time required for Study dietitians' activities including dietary data documentation procedures "with" and without the participant (post-contact). This latter time included second documentation by a trained colleague, food information retrieval, and responses to MDRD-NCC data queries. Recorded documentation times and differences by participant characteristics were examined.

Overall, documentation time for 3-day food records declined 22% (41 to 32 minutes) from baseline to 3 years. "With participant" time fell 35% (26 to 17 minutes) while post-contact time remained unchanged (18.8 to 18.5 minutes). Documentation times were remarkably consistent by diagnosis, diet group and marital status. However, significant differences by age, race, gender, education and visit were noted. At baseline, data for the oldest (60+ y/o) needed the most post-contact time. After year one, the youngest (<40 y/o), who required the shortest "with participant" time, needed the most post-contact time to complete documentation of their food record data. Data for whites (vs. blacks) in year one and women (vs. men) in the first and last year needed more post-contact time while dietary data for those in the lowest educational level (<9 yrs.) consistently required more post-contact time.

Time required for dietary data documentation has been used as a rationale for eliminating dietary data for studies. Our findings show time (and, therefore, cost) reductions for dietary data documentation over the course of follow-up. Additional time reductions may be possible with further intake report training and support of the subgroups identified.

Poster 5

USING THE NUTRIENT RETENTION METHOD IN RECIPE CALCULATIONS FOR TRADITIONAL NEW MEXICAN FOODS

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Nutrient values were needed for traditional New Mexican foods for use in the New Mexico Aging Process Study and the NM Survey of Health in Elderly Hispanics. Recipe calculations using the nutrient retention method were performed using the Food Intake Analysis System (FIAS), version 2.0 (Univ. of Texas Health Science Center, Houston). FIAS provides the user with access to the USDA Recipe Program, and its accompanying USDA databases: Primary Nutrient Database, Survey Database and Nutrient Retention Factor Database. Recipes were calculated for: chile sauce (red and green), enchiladas (beef, chicken and cheese), burritos (beef, bean and chicken), chile rellenos, chile stew (red and green), tacos (beef and chicken) and tamales. These foods either were not in the Survey Database, or the Survey Database version was not typical of New Mexico preparation and consumption. For example, the USDA red chile sauce contains tomatoes, while New Mexican sauce does not. Traditional New Mexican chile sauces contain fat and flour, the USDA versions do not; using the Survey Database codes would omit an important local

source of dietary fat. The chile sauces were kitchen-tested for taste and traditional representation. The chile sauces, chile stews and rellenos were kitchen-tested for yield, portion size and fat and moisture retention. Nutrient values for the chile sauces were added to the FIAS database for use as ingredients in other recipes. The recipe calculations used the nutrient retention method to simulate steps in actual food preparation. The resulting recipe files were used in coding and analyzing 24-hr recalls and 3-d diet records for the aging studies. Nutrient composites were created and seven items were added to the Block/NCI food frequency questionnaire. The nutrient retention method gives a practical approach to the development of nutrient values for regional foods for use in dietary assessment research. (Supported by NIH AG-02049 and AG-10941)

Poster 6

ANALYSIS OF VITAMIN K₁ (PHYLLOQUINONE) IN CORE FOODS FROM THE US TOTAL DIET STUDY.

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In addition to its well-established role in the hemostatic system, vitamin K serves an important function in bone and cartilage metabolism. This has led to a renewed interest in expanding the limited food composition data for vitamin K₁ (phyloquinone). Food samples obtained from the FDA-US Total Diet Study were analyzed by an HPLC method that incorporates postcolumn reduction of the quinone followed by fluorescence detection of the hydroquinone form of the vitamin. Green and leafy vegetables still appear to be the predominant dietary source of this vitamin, followed by certain vegetable oils that are derived from vegetables or seeds containing large concentrations of vitamin K₁. The reduced form of vitamin K₁ (saturated side chain) is observed in significant quantities in foods that have been subjected to partial hydrogenation or that contain ingredients that have been partially hydrogenated. However, these data derived from wet, chemical analysis do not indicate the relative biological availability of vitamin K and the reduced form of vitamin K from these sources. Certain foods are low in vitamin K₁ content, including butter and tomato-based dishes, but may make significant contributions to total dietary intake if consumed in large quantities in the American diet. Other food sources have been shown to contain negligible amounts of vitamin K₁ (such as certain meats, brewed beverages, soft drinks and alcoholic beverages). These data expand and improve the quality and the quantity of the vitamin K Provisional Table and will be used to prioritize future analysis for this vitamin. Applications of these data will include estimates of the vitamin K intake at the national level using the National Food Consumption Survey. The validity of the 3-day diet records and a FFQ for estimates of dietary intake for this vitamin are now feasible and should result in a better understanding of this vitamin at the nutritional level.

Poster 7

MODIFYING A CURRENT NUTRIENT DATABASE FOR USE WITH DIETARY ASSESSMENT DATA FROM 1971-75.

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Longitudinal nutrition studies often require baseline estimates of nutrient intakes using dietary data collected many years ago. Such is the case for the NHANES I Epidemiologic Followup Study, with baseline 24-hour recall data collected in 1971-75. Although nutrient analyses were performed using a

nutrient database that was appropriate at the time, the quantity and quality of food composition data have improved significantly over the intervening 20 years. Thus, in order to (1) extend the number of nutrient intake estimates (from 18 to 35), (2) fill in the large number of missing nutrient values, and (3) use data from more accurate analytic methods, we modified a current nutrient database (the UCB Minilist) for use with dietary data from the early 1970's. Necessary modifications included: adjusting enrichment standards to those in use at the time of the dietary data collection; extending the number of entries for unenriched grain products; adjusting fortification levels; and changing the types of fat used in processed and home-made food items. Comparisons of dietary nutrient totals (using data for 6337 persons 45 years of age and older) for 18 nutrients in common on the original NHANES I nutrient database and the UCB Minilist, indicated lower values using the Minilist nutrient data for iron (due primarily to lower analytical data for meats), and higher values for thiamin (due in part to revised values for pork products, and in part to missing data on the NHANES I database). Correlation coefficients ranged from 0.86 (for thiamin) to 0.99 (for energy). Mean values for estimates of other nutrient intakes were similar to those reported from more recent surveys. We conclude that the quantity and quality of nutrient intake estimates from previously-collected dietary data can be increased by modifying current nutrient databases to reflect standards and practices in use at the time of the data collection. Supported by NHLBI Grant HL48530.

Poster 8

NUTRIENT LOSSES AND GAINS IN THE PREPARATION OF FOODS. NLG-PROJECT.

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The objective of the FLAIR Eurofoods-Enfant Project, funded by the Food Linked Agro-Industrial Research (FLAIR) Programme of the Commission of the European Communities, Directorate-General XII, is to improve the quality and compatibility of food consumption and food composition data in Europe. One of the activities of the Project was to support the work on nutrient losses and gains factors.

The Nutrient Losses and Gains Project (NLG) was established in Wageningen in 1983. The aim of the project was to collect data related to nutrient losses and gains in the preparation of foods with a view to recommend factors for use with the calculation of the nutrient content of foods and recipes.

This work has resulted in three papers: Nutrient losses and gains in the preparation of foods (an overview report), Nutrient losses and gains references, and Yields for foods and dishes in Europe, which are combined in one report in The National Administration report series, Rapport 32/94.

NLG-factors were suggested for 11 vitamins on recipe level. These were related to 3 cooking methods and to 2 food groups (one general and one for meat and poultry). The factors were based on available nationally used factors. Three different computer programs were used in the calculation of nutrients for 6 dishes. The calculated results were compared with analyzed results. The result of this limited test is rather mixed. Further differentiation of the NLG factors is required.

Poster 9

THE USE OF STANDARDIZED CODE RULES AT TUFTS NUTRIENT DATA CENTER

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Standardized data collection and coding are critical components of dietary assessment. At Tufts Nutrient Data Center (TNDC) dietary data collectors complete a thorough training and certification program before interviewing study participants. To insure consistency and reproducibility in data entry, dietary data coders at TNDC also complete a detailed training program, which focuses on the use of the Tufts Nutrient Database, coding brand name items, using additional sources of nutrient data, and math formulae for calculating portion sizes. Even with these detailed efforts, we are often presented with food records and 24-hour recalls that contain insufficient information about food items, details that the participant does not know.

Nutrient data centers use defaults when specific information is missing from a food record. TNDC has termed these defaults "Code Rules", which appear on line as part of the interactive coding program. The Code Rules are also printed and are organized by food group. Each Code Rule is documented with a date and bibliographic reference. Code Rules are reevaluated annually and new Code Rules are developed as needed. Since Code Rules may be study specific they must be researched for individual studies and populations.

While the quality of nutrient data is researched and discussed extensively, there has been little discussion on specific coding practices such as Code Rules. A small study comparing food records coded by TNDC and the NCC-Minnesota (Poster Eleventh National Nutrient Databank Conference) showed that nutrient calculation discrepancies were primarily due to code rule differences and interpretation of ambiguous data rather than actual nutrient database differences. Because coding practices can dramatically affect dietary data results, database users must work together to develop and standardize Code Rules in an effort to improve the quality of dietary data.

The purpose of this poster presentation is to increase awareness of the use of Code Rules among researchers and database users. This presentation will demonstrate how code rules appear in our interactive database and will explain the development of study specific code rules. The TNDC Code Rule Manual will be offered at a nominal cost in order to make public one set of code rules in an effort to generate discussion about these coding issues and reevaluate this important aspect of dietary assessment, with the ultimate goals of 1) developing a standardized approach to making code rules and 2) publishing a standardized Code Rule Manual to be used by all databases to insure reproducibility and consistency of dietary data in research studies.

Poster 10

NUTRITION ATTITUDES, DAIRY INTAKE AND DIETARY QUALITY MEASURED BY BRIEF QUESTIONNAIRES

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This study describes two new questionnaires: 1) a 51 item dairy questionnaire (DQ) which assesses dairy product preference, use and knowledge and health and nutrition beliefs and; 2) a self-scored 49 item food habits questionnaire (FHQ) which assesses dietary quality. The food pyramid was used for overall organization of FHQ with the addition of an 'other' category (alcohol, fast foods, high calorie desserts, drinks and snacks). Three hypotheses were examined: first, that attitudes and knowledge about the relationship of nutrition to health (DQ) items would be reflected in healthy food choices; second, that high dairy product preference (DQ items) would relate to overall dietary quality (FHQ scores); and third, that self-reported dietary quality (FHQ scores) would predict healthier nutrient amounts measured by one day food records (IDFR). The DQ, FHQ and IDFR were completed by 247 normal weight and obese women and men (\bar{x} age=54) in the ongoing RENO Diet Heart Study. Within each pyramid category foods were grouped by health related nutrients which they had in common. The internal reliabilities (Cronbach's) were .86 for FHA and .70 for DQ. Correlation coefficients computed between FHQ dietary quality scores and selected IDFR nutrients indicated strongest relationships (r 's=-.22 to -.56) between low total dietary quality, use of fats and oils and high fat dairy with percent of calories from fat in the diet. High total fat in the IDFR was most strongly related to a low score in the 'other' category of FHQ (r =-.37). Factor scores from the DQ (nutrition concern, dietary efficacy and butter substitute) explained 44% of the variance in overall dietary quality. The DQ factor termed 'nutrition concern' uniquely explained significant variance (approx. 10% each) in IDFR total calories, total fat and percent fat after subject variables were accounted for. The DQ factors termed 'high dairy use' and 'foods prevent disease' predicted higher IDFR calcium levels. Low fat dairy preference from the DQ correlated with lower kcal ($p<.05$) and fat ($p<.01$) intake on the IDFR and higher dietary quality on the FHQ ($p<.01$) whereas high fat dairy preference had the opposite effects. The results indicate that health attitudes and dietary quality assessed by questionnaire can predict selected food choices and may provide a simple, reliable approach to measuring certain health related nutrients.