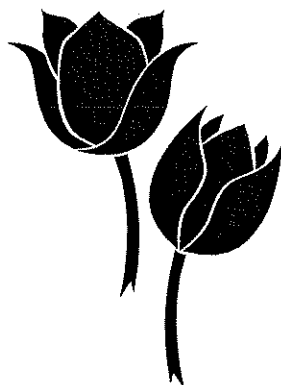32nd NATIONAL NUTRIENT DATABANK CONFERENCE

"Nutrient Databases Without Borders"

PROGRAM AND ABSTRACTS BOOKLET

Edited by Josie Deeks
(with assistance from Maya Villeneuve and Catherine Champagne)

May 12-14, 2008

Marriott Hotel, Ottawa, Canada

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Conference Sponsorship and Support

Government and Academic Sponsorship
- Bureau of Nutritional Sciences, Health Canada

Industry Support and Unrestricted Grants

Canadian Egg Marketing Agency

Dairy Farmers of Canada

General Mills, U.S.A and Canada

Chicken Farmers of Canada

Beef Information Centre

Westat

Unilever

Coca-Cola

Message from the Conference Chair:

Bonjour! Welcome to Ottawa and the National Capital Region. We are proud to be hosting the 32nd National Nutrient Databank Conference, which is being held for the first time outside of the United States.

In a fitting coincidence, our city is celebrating the Canadian Tulip Festival, an event which celebrates international co-operation and friendship. These are the values we will embrace over the next three days as we share experiences and expertise to make our "Nutrient Databases without Borders" truly successful.

Many thanks to the Program Committee, Catherine Champagne, Josie Deeks, Marcia Cooper, Danielle Brulé, Joanne Holden, Chantale Martineau, Jean Pennington, Phyllis Stumbo and Rose Tobelmann for arranging the outstanding schedule for this year's conference. Also, thanks go to the Local Organizing Committee for their hard work: Josie Deeks, Marcia Cooper, Rita Klutka, Margaret Munro, Paula Roach, Isabelle Rondeau, Marie-France Verreault and Peter Fischer.

We look forward to meeting everyone and hope you enjoy your stay in Ottawa.

Message from the Program Co-Chairs:

Bienvenue au Canada!

It is our pleasure to host the 32nd National Nutrient Databank Conference for the first time in Canada. We would like to extend a warm welcome to delegates coming from the US, Canada and various other countries around the world and hope that your stay here is both informative and enjoyable.

Over the next few days we will hear presentations on nutrient data needs or advances in compiling data for key nutrients of current concern to all health professionals and researchers. Moreover, some speakers will present ways in which nutrient data in foods can be linked to genomics, supplements and natural health products. Others will be describing cutting edge methodology, developments for emerging beneficial food components, different approaches to dietary assessment and development of dietary guidelines. Finally, we have developed a session intended to provide some of the means to attempt to keep up with the pace of change in the food marketplace.

Although the food issues and markets in different countries present unique challenges, we have much in common. Over the next few days, we have a wonderful opportunity to share our common experiences, highlight our solutions, and learn from each other.

Enjoy your time in Ottawa and be sure to find opportunities to visit the various tulip beds in bloom across our capital city.

Catherine Champagne and Josie Deeks

Message form the Steering Committee Chair

We are delighted that the 32nd National Nutrient Databank Conference is being held in Ottawa. The United States and Canada have had a long association in developing and using food composition tables, as our national diets share many similarities, and nutritionists from both countries have participated in the National Nutrient Databank Conference since its beginning. However, this is truly a historic meeting, as it is the first NNDC to be held in Canada. We are very appreciative of the tireless efforts of Josie Deeks, Maya Villeneuve, and the rest of the local arrangement committee in meeting all of the challenges inherent in holding this innovative conference. Thanks also to Josie and Cathy Champagne, the Program Co-Chairs, for taking the lead in developing such an exciting program. We look forward to even more collaborative efforts between our two countries in the future.

Suzanne Murphy, NNDC Steering Committee Chair
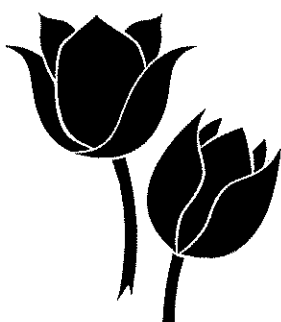
Nutrient Databases Without Borders

32nd National Nutrient Databank Conference
May 12 – 14, 2008

Monday, May 12th – Day 1

Time	Event
8:00 – 4:00 pm	Registration
8:00 – 9:00am	Coffee and Snack
9:00 – 9:10 am	Housekeeping and Introduction of the DG • Maya Villeneuve, Conference Chair, Health Canada, Ottawa, ON, Canada
9:10 – 9:20 am	Welcome to the delegates • Janet Beauvais, Director General (DG), Food Directorate – Health Canada, Ottawa, ON, Canada
9:20 – 9:25 am	Introduction of the Keynote Speaker • Catherine Champagne, Pennington Biomedical Research Center, Baton Rouge, LA, U.S.A.
9:25 - 10:15 am	Keynote Speaker: Conjugated Linoleic Acid: Good or Bad Trans Fat? • Yeonhwa Park, University of Massachusetts, Amherst, MA, U.S.A.
10:15- 10:30 am	Break: Coffee and Snack / Poster Session / Exhibit Viewing
10:30 – 12:10 pm	Session 1: Major Public Health Conditions of Concern: Nutrient Data Needs to Address the Issues • Moderator: Beverly McCabe-Sellers, USDA/ARS, Little Rock, AR, U.S.A.
10:30-11:00 am	How Policy Can Affect Nutrient Data: The Trans Fat story in Canada • Mary L'Abbé, Health Canada, Ottawa, ON, Canada
11:00-11:20 am	Heme and Non-Heme Iron: Data, Gaps and Methods • Kevin Cockell, Health Canada, Ottawa, ON, Canada
11:20-11:40 am	Heme/Non-Heme Iron – The Methodology for the Development of a Food Iron Bioavailability Index (FIBI) • Marcia Cooper, Health Canada, Ottawa, ON, Canada
11:40-12:00 pm	Are Nutrient Databases and Nutrient Analysis Systems Ready for the International Implications of Nutrigenomics? • Beverly McCabe-Sellers, USDA/ARS, Little Rock, AR, U.S.A.
12:00 – 12:10 pm	Wrap up and Questions
12:10 – 1:30 pm	Lunch Break / Poster Session / Exhibit Viewing
1:30 – 4:15 pm	Session 2: Major Public Health Conditions of Concern: Nutrient Data Needs to Address the Issues • Moderator: Josie Deeks, Health Canada, Ottawa, ON, Canada

Time	Content
1:30 – 2:00 pm	Nutrient Data Needs to Address Vitamin D Insufficiency • Susan Whiting, Division Head and Professor of Nutrition, University of Saskatchewan, Saskatoon, SK, Canada
2:00 – 2:20 pm	Analysis of Vitamin D and 25-Hydroxy Vitamin D in food, a challenge • André Fouquet, Health Canada, Longueuil, QC, Canada
2:20 – 2:40 pm	Sodium Intake: Challenges for Researchers Attempting to Assess Consumption Relative to Health Risks • Catherine Champagne, Pennington Biomedical Research Center, Baton Rouge, LA, U.S.A.
2:40 – 2:50 pm	Wrap up and Questions
2:50 – 3:10 pm	**Break: Coffee and Snack/ Poster Session / Exhibit Viewing**
3:10 – 3:30 pm	Quality control of nutrient data for a long term, multi-centre dietary intervention trial • Cary Greenberg, University Health Network, Toronto, ON, Canada
Launch Internet Expl 3:30 – 3:50 pm	Classification criteria for fruits and vegetables • Jean Pennington and Rachel Fisher, National Institute of Health, Bethesda, MD, U.S.A.
3:50 – 4:05 pm	Development and validation of a N-nitroso database for assessing intake in epidemiological studies • Janice E. Stuff, USDA/ARS Children's Nutrition Research Center, Houston, TX, U.S.A.
4:05 – 4:15 pm	Questions and Announcements
4:15 – 5:00 pm	**Poster Session / Exhibit Viewing**
	Optional tour is offered in the evening

Tuesday May 13th – Day 2

Time	Content
8:00 – 8:40	**Registration and Breakfast buffet Sponsored by the Canadian Egg Marketing Agency**
8:40 – 8:45 am	**Housekeeping Remarks** • **Maya Villeneuve, Conference Chair, Health Canada, Ottawa, Canada**
8:45 – 10:20 am	**Session 3: Major Public Health Education Tools Utilizing Nutrient Data and/or Nutrient Databases: Here and Abroad** • **Moderator: Maya Villeneuve, Health Canada, Ottawa, ON, Canada**
8:45 – 9:15 am	South African Approach to Healthy Eating Guidelines and Implications for Nutrient Data • Hettie Schönfeldt, University of Pretoria, Pretoria, South Africa
9:15 – 9:35 am	Development of the New Zealand Key Foods Programme • Lucy Lesperance, New Zealand Institute for Crop & Food Research, Palmerston North, New Zealand

9:35 – 9:55 am		Development of a Food Portion/Weight Database of the Foods & Dishes Commonly Consumed in Korea for National Health and Nutrition Survey • Yoona Lee, Korea Health Industry Development Institute, Seoul, South Korea
9:55 – 10:15 am		Relating Canada's Food Guide to Food Consumption and Nutrition Surveys • Maya Villeneuve, Health Canada, Ottawa, ON, Canada
10:15 – 10:25 am		Wrap up and Questions
10:25 -10:50 am		***Break: Coffee and Snack/Poster Session / Exhibit Viewing***
10:50 –12:00pm		**Session 4: Canadian/US/International Points of Commonality and Divergence: Supplements, Dietary Assessment, and More** • **Moderator: Rachel Fisher, National Institute of Health, Bethesda, MD, U.S.A.**
10:50 – 11:10 am		Phytochemical composition of nuts • Jeffrey B. Blumberg, Tufts University, Boston, MA, U.S.A.
11:10 – 11:30 am		Development of a Supplement Composition Database for the SURE Study • Kim Yonemori, Cancer Research Center of Hawaii, Honolulu, HI, U.S.A.
11:30 – 11:50 am		U.S. Dietary Supplement Ingredient Database (DSID): adult multivitamin/mineral (MVM) study results and implementation strategies for the first data release • Janet Roseland, USDA/ARS Nutrient Data Lab, Belstville, MD, U.S.A.
11:50 – 12:00 pm		Wrap up and questions
12:00 -1:30 pm		***Lunch Break / Poster Session / Exhibit Viewing /Meeting of the NNDC Steering Committee(Alta Vista Room)***
1:30 – 2:40 pm		**Session 5: Canadian/US/International Points of Commonality and Divergence: Supplements, Dietary Assessment, and More** • **Moderator: Sigrid Beer-Borst, Bern University of Applied Sciences, Bern, Switzerland**
1:30 – 1:50 pm		What's new in NHANES dietary supplement collection • Ana L. Chavez, Centers for Disease Control, Hyattsville, MD, U.S.A.
1:50 – 2:10 pm		Euro-FIR Bioactive Databases: tools to assess product health claims and improve regulation of bioactive compounds as functional ingredients in foods • Paul Finglas, Institute of Food Research, Colney, Norwich, U.K.
2:10 – 2:30 pm		The Canadian Natural Health Products Database System • Vikesh Srivastava, Health Canada, Ottawa, ON, Canada
2:30 – 2:40 pm		Wrap up and Questions
2:40 – 3:00 pm		***Break: Coffee and Snack/ Poster Session / Exhibit Viewing***
3:00 – 4:25 pm		**Session 6: Analytical and Assessment Issues: What's New?** • **Moderator: James Harnly, USDA/ARS Food Composition Lab, Beltsville, MD, U.S.A**
3:00 – 3:15 pm		Dietary intake and major food sources of polyphenols in Finnish adults • Marja-Leena Ovaskainen, National Public Health Initiative, Helsinki, Finland

3:15 – 3:30 pm	U.S. Food and Drug Administration Modernization of the Nutrition/Supplements Facts Table • Paula Trumbo, Food and Drug Administration, College Park, MD, U.S.A.
3:30 – 3:45 pm	Expanding data on the nutrient content of Hispanic/Latino foods in the USDA National Nutrient Database for Standard Reference • David B. Haytowitz, USDA/ARS Nutrient Data Lab, Beltsville, MD, U.S.A.
3:45 – 4:00 pm	Can Caco-2 cell technology be adapted to develop a relative iron bioavailability database? • Joannie Dobbs, University of Hawaii at Manoa, Honolulu, HI, U.S.A.
4:00 – 4:15 pm	A profiling method for the identification of glycosylated flavonoids and other phenolic compounds using a standard analytical approach for all plant materials • James Harnly, USDA/ARS Food Composition Lab, Beltsville, MD, U.S.A.
4:15 – 4:25 pm	Questions and Announcements
4:25 – 5:00 pm	**Poster Session / Exhibit Viewing**
6:00 – 10:00pm	**Banquet at Strathmere: buses leave at 6pm, dinner at 7:30pm**

Wednesday, May 14th – Day 3

8:00 – 8:30am	**Breakfast Buffet**
8:30 am	**Housekeeping Remarks** • **Maya Villeneuve, Conference Chair, Health Canada, Ottawa, Canada**
8:35 am – 10:00 am	**Session 7: Keeping Up With the Marketplace** • **Moderator: Rose Tobelmann, General Mills, Minneapolis, MN, U.S.A.**
8:35 – 8:50 am	Database Accuracy in a Changing Marketplace • Rose Tobelmann, General Mills, Minneapolis, MN, U.S.A.
8:50 – 9:10 am	Keeping Up With the Marketplace – Updates to the USDA Food and Nutrient Database for Dietary Studies • Janice Bodner-Montville, USDA/ARS Food Surveys Research Group, Beltsville, MD, U.S.A.
9:10 – 9:30 am	Comprehensive Current Fatty Acid Profiles: Revisions in Fats and Oils in the Standard Reference (SR) USDA Database • Linda Lemar, USDA/ARS Nutrient Data Lab, Beltsville, MD, U.S.A.
9:30 – 9:50 am	Revising fats and oils used in the Food and Nutrient Database for Dietary Studies (FNDDS): approaches and impact • Jaspreet KC Ahuja, USDA/ARS Food Surveys Research Group, Beltsville, MD, U.S.A.
9:50 – 10:00 am	Wrap up and Questions
10:00 – 10:20am	**Break: Coffee and Snack / Poster Session / Exhibit Viewing**

10:20 – 12:00 pm		**Session 8: Dietary Assessment Technologies of the Future: The Interface between Food Composition and What People are Eating, A New Arena** • **Moderator: Catherine Champagne, Pennington Biomedical Research Center, Baton Rouge, LA, U.S.A.**
10:20 – 10:35 am		Dietary Assessment Technologies of the Future • Suzanne McNutt, Westat, Salt Lake City, UT, U.S.A.
10:35 – 11:05 am		New Web-Based Technology: The ASA24 Interview • Stephen Hull, Westat, Rockville, MD, U.S.A.
11:05 – 11:20 am		Issues with the Conversion of an Interviewer-Administered Food Probe Database to Self-Administration in the ASA24 • Thea Palmer Zimmerman, Westat, University Heights, Ohio, U.S.A
11:20 -11:35 am		Visualization and User Modeling in Mobile Dietary Assessment Applications • Phyllis Stumbo, University of Iowa, Iowa City, IA, U.S.A.
11:35 – 11:50 am		Dietary Assessment and Nutrient Database Fields for the Digital Age • Carol Boushey, Purdue University, West Lafayette, Indiana, U.S.A.
11:50 – 12:00 pm		Wrap up and Questions
12:00 – 12:15 pm		***Closing Remarks*** ***Final Announcements (Including the next conference)***
12:15 – 1:30pm		**Delegates Lunch On Their Own**
1:30 – 4:00pm		**Operations Manual Meeting (Alta Vista Room)**
		There is one optional tour offered in the afternoon

Abstracts for Oral Presentations

SESSION 1: MAJOR PUBLIC HEALTH CONDITIONS OF CONCERN: NUTRIENT DATA NEEDS TO ADDRESS THE ISSUES

Conjugated Linoleic Acid: Good or Bad Trans Fat?

Yeonhwa Park
Department of Food Science, University of Massachusetts, Amherst

Objectives: Even though *trans* fatty acids (TFAs) are present in natural sources such as foods from ruminant origins, the development of partially hydrogenated vegetable oil contributed to a significant increase in total TFAs consumption in humans. Currently, TFAs is considered to be a risk factor for coronary heart diseases. However, conjugated linoleic acid (CLA), which also contains *trans* configuration, is considered to have distinctive biological activities.

Methodology and Results: Based on their origins and biological activities, TFAs can be further divided into non-conjugated or conjugated TFAs. Researchers are now starting to discover that not all TFAs behave in a similar manner, that is, isomer specificity may be found. Among non-conjugated TFAs, plant originated TFAs (mainly elaidic and linolelaidic acids) are particularly linked to increased risk for coronary heart diseases, while animal originated TFAs (mainly vaccenic acid) are not. *Trans*-vaccenic acid can be further converted into conjugated TFAs, mainly *cis*-9,*trans*-11 CLA, which is reported to have potentially beneficial effects, including preventing coronary heart diseases. Along with the *cis*-9, *trans*-11 CLA isomer, current CLA research also focuses on the *trans*-10, *cis*-12 CLA isomer, which is a minor isomer present in ruminant products and is also the active isomer with regard to body fat reduction. A number of clinical trials of CLA have been reported, with marginal effects on body composition while inconsistent effects found in coronary heart disease risk factors. Meanwhile, safety concerns over CLA, in particular, isomer specificity, have been also raised.

Significance: Replacing undesirable TFAs or supplementing particular TFAs in the food supply, food industry and restaurants, without compromising food quality, stability, taste that will be accepted by consumers and without further public health issues, is challenging. Thus, it is critical to identify isomer specific effects of TFAs on particular risk factors, to determine their health impact.

How Policy Can Affect Nutrient Data: The Trans Fat Story in Canada

Mary R. L'Abbé, Ph.D
Director, Bureau of Nutritional Sciences, Food Directorate, Health Canada

Objective: In November 2004, fulfilling a commitment made by the Government, Health Canada announced the formation of a multi-stakeholder task force, the Trans Fat Task Force (TFTF), to develop recommendations and strategies for reducing trans fats (TFA) in foods to the lowest level possible. In its final report dated June 2006, the TFTF recommended that the total amount of TFA in vegetable oils and soft margarines be limited to 2% of total fat content and in all other foods to 5% of the total fat content. The following year, Health Canada announced that it would give the industry 2 years to voluntarily meet these limits. In order to assess the industry's progress, Health Canada also committed to monitor the food supply and publish the results of its monitoring efforts.
Material and Methods: From 2005-2008, pre-packaged foods and foods from restaurants and fast food chains were targeted for analyses. The foods that were targeted represented foods that were significant sources of TFA, as indicated by earlier survey data.
Results: The first set of monitoring results was published in December 2007. It included data for foods from 13 different food categories, such as chicken nuggets, donuts, French fries, cookies, crackers, and frozen potato products. The results indicated that most food manufacturers and restaurants have taken the opportunity to reduce the TFA content and, in some cases, also to decrease the saturated fat content.
Significance: As the efforts of Health Canada's monitoring program continue, food manufacturers and restaurants are looking for healthy alternatives for TFA in their products. This represents a continuing change in nutrient data as reformulated products are being developed. Potentially, this could be used as a model to monitor other nutrients, such as sodium, in the Canadian food supply which would result in further changes in nutrient data.

Heme and Non-Heme Iron in Foods: Data, Gaps and Methods

Kevin A. Cockell, Ph.D.
Health Canada, Ottawa, Ontario, Canada

Background: Iron is an essential mineral nutrient which is found in foods in two forms: heme and non-heme iron. Important differences in food sources and bioavailability of these two classes of dietary iron are reasonably well understood, but not always carefully implemented. Heme iron is found in animal-based foods. Its bioavailability, generally ranging from 25-35%, is not much affected by other components of the diet. Non-heme iron is found in plant-based and animal-based foods. Its bioavailability, typically ranging from 2-20%, can be affected to a large degree by other food components that may be categorized as inhibitors (e.g. calcium, phytate, polyphenols) or enhancers (e.g. ascorbate, meat, fish and poultry (MFP) factor). Bioavailability of both forms is strongly influenced by body iron status.

Issue: Food composition databases typically report only the total iron concentration of foods, determined after complete destruction of the organic components. It is generally necessary to estimate the contribution of heme and non-heme to total dietary iron intakes, based on incomplete information.

Methods: In the absence of a single, certified method for accurate characterization of dietary iron speciation, the literature contains a number of methods intended to quantify either the content of heme iron or non-heme iron in foods, based on differential extraction and spectrophotometry. Although it appears more common to measure either heme or non-heme iron in a sample along with total iron, and obtain the remaining fraction by difference, there are clear advantages to analysing both fractions and establishing that the sum of the results matches the total iron content.

Conclusion: Given the diverse factors that contribute to variation in heme iron content of animal-based foods, there is a clear need for consistent analytical effort to provide the data necessary for iron bioavailability models to properly inform nutrition policies and education.

Heme/Non-heme Iron - The Methodology for the Development of a Food Iron Bioavailability Index (FIBI)

Marcia Cooper, PhD, RD
Health Canada, Ottawa, Ontario, Canada

Objective: The amount of iron absorbed from a food or meal is determined by (i) an individual s iron status; (ii) the content of heme and non-heme iron in the food, which is influenced by other dietary factors enhancing and inhibiting the absorption of iron; and (iii) differences in bioavailability of the two kinds of iron. The Canadian Nutrient File (CNF), which is the national food composition database that contains the nutrient content of foods, is similar to databases in other countries, and lists only total iron values. Heme/non-heme levels or bioavailability data have not been included in the database. Our ongoing objective is to estimate heme and non-heme values in order to approximate bioavailable iron of specific foods with consideration for enhancing and inhibiting components to be able to determine bioavailable iron from the Canadian diet for various age and sex groups.
Material and Methods: In order to estimate the bioavailable dietary iron (BDI) from foods, an extensive literature search was conducted to estimate the proportion of heme and non-heme iron content of specific foods/groups of foods. Recent research suggests that the heme content of meat, fish and poultry (MFP) is not consistent for all categories of foods as was originally proposed at 40% by Monsen et al. (1978). We have used more accurate estimates to calculate bioavailable iron for MFP foods contained within the CNF.
Results: The methodology used to determine heme and non-heme values for the CNF will be demonstrated. Using a modified Monsen model, examples of bioavailable iron of specific foods will be presented, specifically MFP foods which provide a range of heme levels.
Significance: This work is significant as it will provide the first national nutrient database with estimated heme and non-heme values that can be used in order to determine bioavailable dietary intake for various age and sex groups.

Are Nutrient Databases and Nutrient Analysis Systems Ready for the International Implications of Nutrigenomics?

Beverly J. McCabe-Sellers[1], PhD, RD, LD, Catherine Chenard, MS, RD, Dalia Lovera, MPH, RD, Margaret L. Bogle, PhD, RD, LD
[1]USDA, Agricultural Research Service, Lower Mississippi Delta NIRI

Objective: To discuss the implications internationally of the increased focus on nutrigenomics as the underlying basis for individualized health promotion and chronic disease prevention and the challenges presented to existing nutrient database and nutrient analysis systems by these trends.

Material and Review: Definitions and research methods of nutrigenomics will be compared to current databases and nutritional assessment methodology. Newer developments for methods and approaches to this research that may help bring the field of human nutrition study closer to matching the advances made in laboratory studies of genetics. Methodology for population-based study will not necessarily suffice for individual-based study of optimal health and disease prevention. Issues to discuss and resolve in order to develop and expand the capacity of nutrient databases and analysis software to meet these challenges will be explored.

Results: Outline of current projects and potential approaches to develop and evaluate more reliable and cost effective methods for the study of nutrigenomics is needed to produce optimal nutrition and health for diverse populations and is a step toward advancing the planning of future research and health care.

Significance: Discussion of the issues involved in meeting these complex research and clinical challenges of individualizing nutrition and health care can lead to the networking of diverse health care professionals and scientists needed to move the world toward optimal health.

SESSION 2: MAJOR PUBLIC HEALTH CONDITIONS OF CONCERN: NUTRIENT DATA NEEDS TO ADDRESS THE ISSUES

Nutrient Data Needs to Address Vitamin D Insufficiency

Susan J Whiting, PhD
College of Pharmacy and Nutrition, University of Saskatchewan

Objective: Vitamin D has many functions beyond its role with calcium in bone health. Vitamin D insufficiency and deficiency is at epidemic proportions for children and adults in the United States, Canada and other countries worldwide. Vitamin D is primarily obtained through skin synthesis but when this is reduced in winter or through sunscreen use, clothing, remaining indoors, then adequate dietary intake is needed to maintain sufficient vitamin D levels.

Material and Methods: Naturally occurring vitamin D3 in foods is limited to fatty ocean fish such as salmon, sardines, mackerel, although other species may contain some. Other animal sources include liver and eggs. Mushrooms and yeast (but not plants) when irradiated with UV light, may form vitamin D2. Initially, only fluid milk was fortified with vitamin D, but now in Canada and the US there are more food categories containing vitamin D including some yogurts and cheeses, bread spreads, some breakfast cereals (USA), and a few orange juice brands.

Results: Manufacturers may declare the vitamin D content using %DV. The DV value for Canada (5 µg) is different from that in the US (10 µg) and neither approach the amount recommended for chronic disease reduction (25 µg). New products are entering the food supply, e.g., bread with irradiation of the yeast used in baking. While there was concern that the D2 and D2 forms were not bioequivalent, new research suggests there is little difference in metabolism of these forms.

Significance: There are challenges to obtaining nutrient intake data. Many of the vitamin D values are old, and modern farming practices have changed, e.g. feeding vitamin D metabolites to finish beef. Aquaculture practices mean that farmed fish, fed plant protein sources, have less vitamin D. On the positive side, adding vitamin D to foods not high in fat has not been a difficult process, so orange juice and bread are feasible staple foods for fortification, as would be low fat dairy products.

Analysis of Vitamin D and 25-Hydroxy Vitamin D in Food, a Challenge.

André Fouquet[1], Louis Bilodeau, Guy Dufresne, André Robichaud
[1]Health Canada, Health Product and Food Branch, Quebec Region, Quebec, Canada

Objective: To develop an analytical method able to do Vitamin D and its metabolite in a single analysis in different type of food. This analytical method is use to generate reliable data to fulfill needs of the Canadian Nutrient File.

Description: The Canadian Nutrient File is Canada s national standard reference food composition database. It requires reliable data to complete missing information on nutrients and follow marketplace evolution with new products and foods. Vitamin D plays an important role in human health notably in development of bone and teeth and in rickets prevention. In human body, Vitamin D is metabolized in the liver to 25-hydroxy-vitamin D, the major metabolite of Vitamin D, and subsequently by kidney in the active form, 1α, 25-hydroxy-vitamin D. Recent studies demonstrate that this compound is 5 times more active than the parent compound Vitamin D. Therefore it becomes very important to identify and quantitate 25-hydroxy-vitamin D along with Vitamin D in food composition. This method is used to produce required data for the Canadian Nutrient File.

Results: Data has been generated on Vitamin D and its metabolite on different commodities to fulfill needs of the Canadian Nutrient File.

Significance: This method is the results of an evolution in Vitamin D analysis. It is time consuming to do the analysis but it gives reliable data. The future goal is to reduce analytical preparation to increase throughput.

Sodium Intake: Challenges for Researchers Attempting to Assess Consumption Relative to Health Risks

Catherine M. Champagne[1], PhD, RD, Katherine Lastor, RD, Camille Broome
[1]Pennington Biomedical Research Center, Baton Rouge, Louisiana, U.S.A.

Objective: To create awareness of the variability of sodium levels in food products. This variability challenges researchers to accurately assess dietary sodium intake of individuals. Considering the plethora of food products in supermarkets, it is not possible to capture the sodium content of every product.

Methodology: For years, food manufacturers have focused on reducing fat in the marketplace, reformulating products to create healthier versions acceptable to the consumer in fat content and flavor. Often sodium content increased to replace the flavor of the missing fat. But excess sodium intake contributes to the development of hypertension, increasing cardiovascular risk. Processed and restaurant foods contribute approximately 77% of the dietary sodium for Americans.

Results: Current data collected from the marketplace confirms the variability of sodium content in food products. When comparing the USDA datasets to actual food products, the variability is evident. For some frozen meals, the sodium may be approximately on target or may vary by as much as 20-25% (653 mg vs. 660 mg; 1863 mg vs. 2263 mg). Variations were also noted in fast food meals, where foods identified in the database may have values different from the ones available from the producer. Sodium may be either underestimated or overestimated; it is not always on target. Depending upon your objective, knowing the differences is critical.

Significance: Awareness of the variability among food products is key. It is not feasible to capture the sodium differences of every food in the marketplace but being aware of these differences and updating databases are necessary steps to assessing actual sodium consumption. Intended use of the data will drive the decision regarding the need for sodium specificity.

Quality Control of Nutrient Data for a Long Term, Multi-Centre Dietary Intervention Trial

Cary Greenberg[1], BSc, RD, Lisa Martin, PhD, Norman Boyd, MD, DSc
[1]University Health Network, Division of Epidemiology and Statistics

Objective: The Diet and Breast Cancer Prevention Study is a multi-centre, randomized intervention trial to determine if a low fat, high carbohydrate diet would reduce the incidence of breast cancer in women at increased risk for the disease. The study began in 1988 and was completed in December 2005. We recruited 4,690 women from 5 cities across Canada and asked them to provide 3-day food records at each clinic visit. We have analyzed about 82,000 food records using Nutrient Data System from the Nutrition Coordinating Centre, University of Minnesota. Throughout this long-term trial, our quality control program needed to maximize accuracy and consistency despite a large staff in various locations, changes to the NDS that excluded Canadian foods and an astounding number of new food products.

Material and Methods:
Our quality control program included:
1. Using a food knowledge test to hire dietitians with strong food knowledge.
2. Providing an extensive training program.
3. Implementing an electronic system (missing food book) to compile new food product information and data entry rules.
4. Review of all food records with energy and fat intakes beyond usual thresholds.
We assessed inter-dietitian variation in nutrient data entry by re-entering 500 food records.

Results: The re-entry experiment demonstrated that our team of 15 highly trained dietitians were able to achieve a correlation of greater than 0.9 for all macronutrients. The missing food book was instrumental in achieving accurate and consistent results.

Significance: This is the study in the world of diet and breast cancer prevention to collect detailed food records and blood samples over a prolonged period. High quality nutrient data will allow us to examine specific dietary data and anthropometric, demographic and genetic data along with biological markers to find associations between diet and breast cancer risk.

Classification Criteria for Fruits and Vegetables

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Objective: To determine if groupings of fruits and vegetables based on compositional components can be predicted by classification criteria that include botanical family, color, part of plant, and total antioxidant capacity (TAC).

Material and Methods: A database of 104 commonly-consumed US fruits and vegetables was created that contained SR20 data for 23 food components that are provided primarily by fruits and vegetables. Additional fields were created and populated for botanical family, color, part of plant, and TAC. Associations among the compositional data and classification criteria were explored to determine groupings of fruits and vegetables that might be useful for dietary assessment, food guides, and nutrition education.

Results: Analyses of variance (ANOVA), through generalized linear model procedures, indicated associations between some of the classification variables and each of the 23 food components. Subsets of botanic families (e.g., amaryllis, rue, legume, cruciferous), colors (e.g., dark green, blue/black, orange), and plant parts (e.g., leaves, seeds, berries), and TAC were found to be most predictive of nutrient composition. Further empirical analyses substantiated these findings.

Significance: Classification of fruits and vegetables are most helpful for dietary assessment and guidance if the grouped foods have similar composition. Current information on the composition of fruits and vegetable suggests that groupings based on various combinations of botanical family, color, part of plant, and TAC may be predictive for some food components, but also indicates that some fruits and vegetables are unique in their composition and do not fit into neat groups. Groupings that include TAC may offer a way to help consumers identify fruits and vegetables rich in antioxidants.

Development and Validation of a N-Nitroso Database for Assessing Intake in Epidemiological Studies

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Background: N-nitroso compounds (NOC) are important dietary carcinogens. Previous studies have not used a quantitative database to estimate NOC intake. To address this gap, we developed a NOC database in conjunction with an existing food frequency questionnaire (FFQ).

Objectives: To create a database of NOC and link to a commonly used FFQ; to assess agreement of NOC between the modified FFQ and seven day food records (7DFR).

Material and Methods: NOC values were identified from Medline, search engines and references, including food sources with low to high NOC concentrations. We linked the NOC database with an existing FFQ. A random subgroup of 100 healthy controls in MD Anderson Cancer Center Epidemiology studies completed a FFQ, and then recorded foods and beverages consumed for seven days (7DFR). NOC values from the database were assigned to foods in the FFQ using direct match, imputation, ratio or calculated values; similar procedures assigned NOC values to foods in 7DFR.

Results: N-nitroso content of food items ranged from $<0.01 \mu g/100$ g. to 142 $\mu g/100$ g and the richest sources were sausage, smoked meats, bacon, and luncheon meats. FFQ estimates ranged from 30 $\mu g/day$ (NHMTCA), 20 $\mu g/day$ (NTCA) to 0.4 $\mu g/day$ (NPIP). Crude and energy-adjusted NOC intakes were significantly higher in the FFQ than the 7DFR than the FFQ ($P = 0.001$). Pearson correlation coefficients and Spearman correlations for crude and energy-adjusted NOC intakes ranged from -0.03 to 0.72. Bland-Altman regression had wide levels of agreement for most NOC. Higher estimates of NOC by FFQ could be explained by the episodic nature of eating high sources of NOC, not shown in 7DFR.

Significance: The database quantifies NOC intake for epidemiological studies conducted in the U.S. The FFQ questionnaire is able to capture information on NOC food item intake which are eaten in episodes and infrequently compared to that captured by 7DFR.

SESSION 3: MAJOR PUBLIC HEALTH EDUCATION TOOLS UTILIZING NUTRIENT DATA AND/OR NUTRIENT DATABASES: HERE AND ABROAD

South African Approach to Healthy Eating Guidelines and Implications for Nutrient Data

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Most developing countries, such as South Africa, is faced with the consequences of both nutritional deficiencies and excesses and is subjected to the double burden of persisting undernutrition in the midst of the growing epidemic of obesity and non communicable diseases. Increasingly children can now be classified as overweight or obese.

With food and nutrition regarded today as being of fundamental importance to public health, there is a general consensus that obtaining and maintaining a desirable nutritional state demand concerted holistic and multisectorial approaches. Recent developments in South Africa include: Development of food based dietary guidelines (FBDG), updating the Food Composition tables of South Africa, the introduction of the Food fortification program and a comprehensive new Food Law currently under review for public comment.

The eleven South African FBDGs, are qualitative statements that express dietary goals in terms of foods, and are based on the relationship between diet and disease. These guidelines are aimed to aid as educational tools for promoting the importance of nutrition to combat the growing burden of over- as well as under nutrition. For many years South Africans had to rely on the nutritional composition data of American and European food products to evaluate and plan diets. Since 1991 the compositional data based on locally analysed foods in the South African Food Composition Tables has doubled - from 18% to more than 43%, towards gaining more accurate and complete national food composition tables. The proposed new food law aims to improve the health of the South African consumer, through improving the quality of information supplied and preventing misleading information and abuse of current regulations, towards becoming a world leader in innovative food labelling.

With the aim of moving public health towards balanced nutrition, it seems that a developing country is now taking on the giants.

Development of the New Zealand Key Foods Programme

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Objective: The New Zealand Food Composition Database (NZFCD) is a joint programme between the Ministry of Health and Crop & Food Research (CFR). Due to resource constraints it is impractical to analyse the nutrient levels in every food available for consumption. The USDA Nutrient Data Laboratory and Food Standards Australia New Zealand (FSANZ) employ key food methods that utilize existing nutrient profiles and nationally representative food consumption survey data. With the upcoming 2008 New Zealand Adult Nutrition Survey (NZANS), the key food approach can assist with identifying foods that are likely to be major contributors to the population s nutrient intakes and, thus, ensure there is up-to-date analytical nutrient data for these foods in the NZFCD.

Material and methods: FSANZ s Dietary Modeling of Nutritional Data computer program (DIAMOND) contains a list of the foods consumed in the NZANS 1997 and their corresponding values for 21 nutrients. For each nutrient, foods were ranked in order of nutrient contribution from highest to lowest. The nutrient scores for each food were summed to create a score representing the overall nutrient contribution of that food to the diets of adult New Zealanders.

Results: The top ten key foods or food groupings, identified by the cumulative contribution of all nutrients, were: beef, homogenised milk, white bread, chicken, wholemeal bread, fries, butter, margarine, boiled and baked potatoes, and lamb.

Significance: The aim of our key foods approach is to collect and analyse more samples of foods that provide important amounts of nutrients of public health significance to the diet. Our initial focus was on dairy, starting with milks and butter, where existing records date from 1990. The outcomes will be reported in this paper, with the future aim of creating an improved NZFCD to guide intake estimates.

Development of Food Portion/Weight Database of the Foods & Dishes Commonly Consumed in Korea for National Health and Nutrition Survey

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Objectives: With the increase in the prevalence of obesity and chronic diseases in Korean populations, the information on the food portions has become more important to practice healthy diet. Also to provide reliable database in estimating food and nutrient intakes of the population at the National Health and Nutrition Survey (NHNS) in Korea, food weight database of portions for individual foods & dishes commonly consumed by Korean population was developed.

Material and Methods: A food/dish list representing the usual diet of Koreans was developed based on the results of the 2005 National Health and Nutrition Survey and the 2005 Seasonal Nutrition Survey. With dietary intake data from over 16,000 subjects, 300 foods and 200 dishes frequently consumed by Korean population were selected for developing food portion/weight database. Foods and dishes were prepared and/or cooked based on the recipe database from the previous NHNS, and measured for volumes and weights of the portions commonly cited in the NHNS.

Results: Food portion/weight database for 1,918 food portions and 669 dish portions were developed. Among these 2,587 portions, pictures were taken for 1,340 portions.

Significance: This database will enable the estimation and assessment of food and nutrient intake of Korean population with increased reliability and credibility. It will also facilitate the link between intake and health outcomes. Furthermore, it will also contribute toward achieving health goals stated in the Health Plan 2010 by allowing informed-consumers make healthy food choices.

Relating Canada's Food Guide to Food Consumption and Nutrition Surveys

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Objectives: Canada s Food Guide (CFG) is a key document for guiding food choices. The Canadian Nutrient File (CNF) is an exhaustive food composition database. Relating the CNF foods to CFG provides extended information on food groups and serving sizes. It permits the application of the Food Guide in a standardized fashion and the opportunity to link food intake data, within group assignments, to the nutrient database. The objectives were to: 1) Standardize data reporting within food groups particularly for nutrition assessment and monitoring purposes 2) Allow for computer-assisted breakdown of diets into Food Guide servings.

Material and Methods: The four CFG basic food groupings were expanded into over 40 additional subgroups. This expansion allowed for the development of thresholds facilitating subgroup assignment and portion size calculation which translated one of the Food Guide's directional statements such as "Choose foods that are lower in fat" into objective guidance. Common sense eating patterns were also taken into account in developing portion sizes (e.g. 1 medium apple). In addition, 8 subgroups termed 'Other' foods reflect foods with limited nutrient density. The Office of Nutrition Policy and Promotion of Health Canada has released a revised version of CFG in 2007. We are currently in the process of updating our groupings and servings sizes to reflect these modifications.

Results: Clients may access the information online by doing individual food searches using an interactive web-based interface. Alternatively, one can download and manipulate the entire database or access Excel subgroup files. The assignments were also used to assess Canadian eating patterns from two provincial nutrition surveys and the latest national nutrition survey, the Canadian Community Health Survey Nutrition.

Significance: This project merges Canada's computerized comprehensive food composition database with the practical, printed guide outlining a pattern of food choices to facilitate ease of using nutrition surveillance to track these patterns as well as the ability to link food choice to nutrient contribution.

SESSION 4: CANADIAN/ US/ INTERNATIONAL POINTS OF COMMONALITY AND DIVERGENCE: SUPPLEMENTS, DIETARY ASSESSMENT, AND MORE

Phytochemical Composition of Nuts

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Objective: The phytochemical content of nuts may contribute to the inverse association observed between nut intake and risk for cardiovascular disease. Nuts are now incorporated into dietary guidelines in the USA, Canada, and Spain. However, information on the phytochemical content of nuts is limited and there are challenges to creating a suitable databank.

Material and Methods: In addition to being a rich source of several vitamins and minerals, mono- and polyunsaturated fatty acids, and fiber, tree nuts and peanuts contain an array of phytochemicals. Data on these compounds were reviewed and additional data from LC-MS/MS and HPLC-ECD analysis of almonds evaluated.

Results: Phytosterols in nuts range from 95-280 mg/100 g. Carotenoids, specifically alpha- and beta-carotene, beta-cryptoxanthin, lutein, and zeaxanthin, are found in mcg/100 g amounts in selected nuts but at 1-3 mg/100 g in pistachios. Plant phenols, including phenolic acids, flavonoids, and stilbenes, are present in nuts. Walnuts are particularly rich in total phenols with 1625 mg gallic acid equivalents/100 g. The stilbene resveratrol is found in peanuts and pistachios at 84 and 115 mcg/100 g, respectively. The USDA Database for the Flavonoid Content of Selected Foods indicates total flavonoids in pecans at 34, almonds at 15, and pistachios and hazelnuts at 12 mg/100g. Proanthocyanidins are found in almonds, cashews, hazelnuts, pecans, pistachios, peanuts, and walnuts, with concentrations varying from 9-494 mg/100 g. However, processing of nuts by blanching, bleaching, roasting, and gamma-irradiation can substantially alter their phytochemical profile.

Significance: Complete phytochemical profiles are lacking for most nuts. Few data are available that describe the impact of cultivation, variety, storage, and processing on nut phytochemicals. While some data has been published on the bioavailability of these compounds from other foods, little direct information has been obtained using nuts.

Development of a Supplement Composition Database for the SURE Study

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Objective: The Supplement Reporting (SURE) Study is one of the first to systematically examine the accuracy of collection of dietary supplement use data for studies of diet and cancer. Considerable effort was put into developing an extensive supplement composition database for this study.

Material and Methods: In 2005-2007, the SURE Study collected dietary supplement use data from approximately 400 participants in Hawaii and Los Angeles. Several methods of collecting these data were compared, including an inventory, a recall, and a daily record. To quantify intakes, we extended the existing supplement composition table (SCT) used at the Cancer Research Center of Hawaii. We included additional multivitamin/multimineral, single nutrient, and herbal/non-nutrient supplements (including existing products with formulation changes) that were reported by the SURE participants. Composition data were taken from the supplement labels, primarily using digital photos of the labels. The original SCT contained default codes for multivitamin/multimineral products, which could be used when insufficient detail was available to assign an existing code. However, the default concept needed to be expanded for the SURE Study to include single nutrient and herbal/non-nutrient supplements.

Results: During the two years of data collection, approximately 1600 new codes were created for the SURE Study, including 245 new default codes. Roughly 130 nutrients and 650 other components were carried on the SCT at the conclusion of the SURE study.

Significance: Dietary supplement use is of increasing interest in studies of diet and health. To accurately quantify intakes from supplements, it is crucial to maintain a comprehensive supplement composition database. Future improvements to our SCT will include incorporation of analytic values from the US Department of Agriculture to replace composition data taken from supplement labels.

U.S. Dietary Supplement Ingredient Database (DSID): Adult Multivitamin/mineral (MVM) Study Results and Implementation Strategies for the First Data Release

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Objectives: The objectives of this study were to provide nationally representative estimates for 19 nutrients in adult MVM products based upon chemical analysis, and to assess variability in specific products.

Material and Methods: USDA's NDL obtained data from market research and national surveys to develop a statistical sampling plan for purchasing representative dietary supplement (DS) products in specific market channels in 6 geographic regions. Nutrient contents in these products were determined using validated laboratory methods. Statistical analysis using regression techniques identified nutrient-based patterns of variance.

Results: Results from the analysis of 6 representative lots of 35 high market share products indicated that for 12 nutrients (calcium, copper, iron, magnesium, manganese, niacin, phosphorus, potassium, riboflavin, vitamin C, alpha-tocopherol, and zinc), mean percent (%) differences from label were <12% and standard deviations were <12%.   For six nutrients (iodine, thiamin, folic acid, selenium, vitamin B12, and chromium), mean % differences from label were >12% and standard deviations were >12%.   Vitamin B6 averaged 30% above label with a standard deviation of 9%.

Significance: The Nutrient Data Laboratory, ARS, USDA, is collaborating with the Office of Dietary Supplements at NIH to develop the DSID. Final results will be compiled using an integrated relational database system.   The data release format will include estimates of individual nutrient values with indicators of variability, nutrient estimates for default and generic products, and documentation of data sources. It is important to monitor actual composition of DS products because of their prevalent use, since >50% of American adults report using a DS within the past thirty days. DSID will support surveys estimating nutrient intake contributed by dietary supplement products. Analytically-based estimates from DSID combined with intake records can be used to more accurately evaluate the nutritional status of Americans.

SESSION 5: CANADIAN/ US/ INTERNATIONAL POINTS OF COMMONALITY AND DIVERGENCE: SUPPLEMENTS, DIETARY ASSESSMENT, AND MORE

What's New in NHANES Dietary Supplement Collection

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Objective: To describe the new dietary supplement collection in the National Health and Nutrition Examination Survey (NHANES) which will provide a more complete picture of nutrient intake as well as to report supplement use among U.S. adults in the current 1999-2004 NHANES data.

Material and Methods: The NHANES is a continuous survey conducted to monitor the health and nutritional status of the U.S. population. The survey consists of interviews conducted in participants homes, standardized physical examinations performed in a mobile exam center (MEC), and telephone administered dietary interviews. Two dietary recalls are conducted, day 1 in the MEC and day 2 via telephone. Since 1999, supplement use for the previous 30 days has been collected during the home interview. In addition, NHANES now collects dietary supplement and antacid data for the same 24 hour recall period as both dietary recalls.

Results: From a total of 15,332 adults 18 years and older interviewed in 1999-2004, approximately 53% took a supplement in the past 30 days (males 47% and women 58%).

Significance: With over half of American adults taking supplements and because nutritional health is related to chronic disease, it s important to examine the impact of supplement use on total nutrient intake. The concurrent collection of dietary supplement and antacid use with a 24 hour dietary recall will allow researchers to combine food data with supplement and antacid data for the assessment of total nutrient intake. The estimates will increase researchers' ability to examine nutrient-disease or nutrient-health associations and to estimate percentages of the population with intakes over or under various nutrient standards.

EuroFIR Bioactive Databases: Tools to Assess Product Health Claims and Improve Regulation of Bioactive Compounds as Functional Ingredients in Foods

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Objectives: To establish and populate a web-based database on critically assessed composition and biological effects data on bioactive constituents in major European plant-based foods.

Material and Methods: EuroFIR Bioactive Database is a unique database that collates international research on the composition and biological effects of plant-based bioactive compounds into a single, comprehensive reference resource.

Results: The database covers multiple bioactive compound classes and 330 major European food plants, with data sourced from quality-assessed, peer-reviewed primary publications. Over 7000 inputs of validated compositional data have been completed representing 99 of the 108 prioritized plants. Data from processed foods (ca 1200 entries) have been included as well as non-processed plant foods. Using a priority setting approach, key papers on biological effects are identified and critically evaluated. More than 500 input forms have been completed and checked originating from more than 250 references. Over 400 references have been searched for, collected and coded into the database resulting in biological data on 139 different compounds and 65 different food plants. The database is internet-deployed to ensure widespread accessibility and outputs are user-defined and easily downloaded. The database is aimed at expert users: scientists, epidemiologists, food regulatory authorities and food industry professionals. Data from the composition component of the database may be applied to the estimation of exposure levels for bioactive compounds and is a valuable resource for the investigation of food and health relationships.

Significance: Composition and biological effects data may be used by food regulatory authorities in the assessment of genetically modified food plants and health claims of plant-based food products and by the food industry in the development of new products. In order to remain abreast of current research, the EuroFIR-BASIS platform accommodates continual expansion and the inclusion of additional compound classes, plants and processed plant-based foods is expected as research progresses.

The Canadian Natural Health Products Database System

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In 2006, the Natural Health Products Directorate (NHPD) of Health Canada launched the NHP On-line Solution project to address the current application backlog and to provide more consistent and timely adjudication of licence applications. The NHP On-line Solution consists of two key initiatives:

Ingredients Database System to capture and provide access to a scientific repository of approved information regarding the safety and efficacy of a medicinal ingredient and non-medicinal ingredient information in order to validate incoming electronic product licence applications. It also serves as a reference standard for internal assessment and for the natural health product industry when made available for the public over the Internet; The Information which is stored in the Ingredients Database is information which could otherwise be found in the public domain. Therefore the information is considered to be unclassified.

On-line System to capture and validate licence applications against the Ingredients database and to securely submit them electronically along with appropriate attachments. Once received at NHPD, the system applies business rules for the electronic handling of received submissions (electronic and paper-based) in a streamlined process to manage service delivery times and to ensure consistency along with a strong audit trail.

The NHPD is currently piloting various functional components of the NHP On-line Solution initiative as it moves forward towards a fully integrated end-to-end product. The purpose of the presentation is to share some of the accomplishments and findings to date and future innovations as they relate to industry and academic partners.

Funding Disclosure: None

SESSION 6: ANALYTICAL AND ASSESSMENT ISSUES: WHAT'S NEW?

Dietary Intake and Major Food Sources of Polyphenols in Finnish Adults

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Objectives: To collect the analytical values of polyphenol compounds for most commonly consumed food items in Finland and enter them into the national FCDB, Fineli® (www.fineli.fi). To convert food intake into the quantitative intakes of polyphenol compounds by a comprehensive FCDB.

Methods: For 143 food items, the analysed values of 37 polyphenol compounds were derived from the recent publications of AgriFood Finland and University of Kuopio. Intakes of phenolic acids, proanthocyanidins (PA), anthocyanidins and other flavonoids, ellagitannins, lignans and isoflavonoids were calculated. The individual food consumption data was interviewed by 48-h recalls in 2007 Finnish adults (FINDIET2002).

Results: The mean total intake of polyphenols was 863 ± 415 mg/d. Phenolic acids comprised the dominant group of polyphenols (75% of total intake), followed by proanthocyanidins (14%), and anthocyanidins and other flavonoids (10%). Men had higher absolute intakes of total polyphenols and phenolic acids than women, but women had higher intakes of the other polyphenol groups. Phenolic acids were mainly derived from coffee and cereals. Berries and berry products were the main contributors of anthocyanidins, ellagitannins and proanthocyanidins, and fruits for flavonols, flavones, and flavanones.

Significance: This study combined complete polyphenol concentrations in the Finnish FCDB with individual food consumption data for accurate intake estimation. The results of this study give additional support to the recommendations for a varied diet with fruits, berries, cereals, and vegetables. The FCDB serves as a valuable resource for epidemiological studies of chronic diseases in the future.

U.S. Food and Drug Administration Modernization of the Nutrition/Supplements Facts Label

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U.S. Food and Drug Administration

Objective: The U.S. Food and Drug Administration (FDA) intends to update the Nutrition and Supplements Facts Labels.

Material and Methods: FDA issued an Advanced Notice of Proposed Rulemaking (ANPRM) for obtaining public comments on modernizing the Nutrition and Supplements Facts labels. Public comments to specific questions asked in the ANPRM will be considered by FDA for future rule-making. There are numerous issues that FDA will consider during the rule-making process including 1) which dietary reference intakes (DRIs) to use for setting the Daily Values (DV), 2) the approach to setting a single nutrient DV for adults and children over the age of 4 years, 3) which vitamins and minerals are of public health concern in the United States and therefore required to be declared in the Nutrition Facts label, 4) how to define certain nutrients, such as total carbohydrate and fiber, 5) the labeling of *trans* fat, and 6) the use of International Units (IU) for providing the amount of a vitamin.

Results: After reviewing the public comments, as well as any other new relevant information, FDA will publish a proposed-rule in the Federal Register that provides the agency's proposed decisions for modernizing the Nutrition and Supplements Facts label.

Significance: The Nutrition and Supplements Facts labels are available to millions of U.S. consumers. The current labels are based on evidence that was available up to the early 1990s. It will be significant to update the labels based on new information so that the consumer is using the most current information for making informed food choices.

Expanding Data on the Nutrient Content of Hispanic/Latino Foods in the USDA National Nutrient Database for Standard Reference

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Objective: Hispanic-Americans have become the largest minority group in the United States, increasing the need for accurate and current data on nutrient composition of Hispanic/Latino foods. These data will also support NIH s Hispanic Communities Health Study (HCHS).

Material and Methods: A pilot study of local Maryland samples, e.g., horchata, plantain chips, and various breads and rolls, was initially conducted. This was followed by the development of a list of foods based on frequency of use as identified by focus groups conducted in several U.S. cities with first generation immigrants from Cuba, Mexico, the Dominican Republic, and Puerto Rico. Suggestions were also provided from the HCHS diet committee. Foods were selected to include restaurant foods as well as processed foods and ingredients procured from local markets located in the HCHS regional centers (New York, Miami, Chicago, San Diego, and Minneapolis). Foods collected included empanadas, fried plantains, and arroz con pollo, among others, and were shipped to Virginia Tech and composited according to protocols developed for USDA s National Food and Nutrient Analysis Program. Aliquots of composites, with quality control materials, were sent to USDA-approved laboratories for the analysis of a full set of over 100 nutrients. Additional foods will be sampled in the future.

Results: Fat values in empanadas ranged from 17.6-19.6 g/100g, and in fried plantains from 5.2-10.8 g/100g. Green fried plantains had more starch (41 g/100g) than yellow plantains (8-17 g/100g), while the total sugar in green plantains was 4 g/100g compared to a range of 14-33 g/100g in yellow plantains. Sodium values in empanadas ranged from 402-503 mg/100g; the values in arroz con pollo ranged from 414 632 mg/100g.

Significance: These results provide current and accurate data on Hispanic/Latino foods for USDA databases, permitting improved diet assessment in the HCHS as well as in What We Eat in America: NHANE.

Can Caco-2 Cell Technology be Adapted to Develop a Relative Iron Bioavailability Database?

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Objective: There is growing concern over iron deficiency and iron overload. Reliable consumer information on dietary iron sources that incorporates iron bioavailability is limited. Our objective was to determine if the in-vitro digestion Caco-2 cell culture system used to measure food iron bioavailability could be adapted to generate a Relative Iron Bioavailability Database that could improve consumer iron recommendations.

Material and Methods: We used the Caco-2 cell technique developed at USDA labs at Cornell by Dr. Glahn to measure relative iron bioavailability of liver and molasses. We evaluated techniques previously reported to determine what standardization is necessary to adapt bioavailability data to a systematic approach to making food iron recommendations.

Results: Evaluation of Caco-2 cell literature indicated four aspects of technique inconsistency that presently prevent the incorporation of results into a relative iron bioavailability database. These include: 1) variability in the form of iron used as a reference standard 2) amount of food per sample 3) amount of iron per sample, and 4) the physical form of the food assayed (edible portion or dried). Translational factors needed to make these data user-friendly for consumers include ability to compare foods based on food weight, serving sizes, energy content, and food combinations. Bioavailability assays comparing equal weights (0.5 g) of molasses and raw beef liver indicated similar iron content and efficiencies of absorption. However, when normalized to NLEA reference serving amounts; six servings of molasses were required to equal 1 serving of liver. It therefore becomes important to add this type of reality check to the formula for ranking foods to assure that recommendations are reasonable.

Significance: With standardization, the Caco-2 system can be adapted to provide reliable consumer recommendations on food iron sources that include bioavailability. The technique is non-invasive, cost-effective and time-efficient. This database can be developed to include foods with and/or without enhancers and inhibitors.

A profiling Method for the Identification of Glycosylated Flavonoids and Other Phenolic Compounds Using a Standard Analytical Approach for all Plant Materials

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Objectives: A screening method was developed for the systematic identification of glycosylated flavonoids and other phenolic compounds in plant food materials based on an initial, standard analytical method.

Material and Methods: Samples were frozen, lyophilized, powdered, extracted with methanol-water (60:40, v/v), and analyzed by reverse phase liquid chromatography with tandem diode array and electrospray ionization/mass spectrometric detection (LC-DAD-ESI/MS). The DAD acquired spectra from 200-600 nm and the MS acquired positive and negative spectra with high and low fragmentation energies. Each chromatographic peak was characterized by retention time, full UV/Vis spectrum, and 4 mass spectra.

Results: This profiling method applies the same analytical scheme to every sample and standard as an initial protocol. This standardized approach allows the cross comparison of compounds in samples, standards, and plant materials previously identified in the published literature. Thus, every analysis contributes to a growing library of data for retention times and UV/Vis and mass spectra. Without authentic standards, this method provides provisional identification of the phenolic compounds; identification of flavonoid backbones, phenolic acids, saccharides, and alkyls, but not the positions of the linkages between these subgroups. With standards, this method provides positive identification of the full compound; identification of subgroups and linkages. In cases of unidentified compounds, the profiling method can be followed by more extensive analyses if there is sufficient interest. The utility of the screening method has been demonstrated by the identification of 78 phenolic compounds in cranberry, elder flower, Fuji apple peel, navel orange peel, and soybean seed.

Significance: The standardized profiling method allows the rapid detection and identification of phenolic compounds in foods. This method will enhance our capability to produce analytical data.

SESSION 7: KEEPING UP WITH THE MARKETPLACE

Database Accuracy in a Changing Marketplace

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Objective: Determine the differences in AOCS and AOAAC methods for fat analysis and the affect on nutrient database values for total fat, saturated fat and trans fat.

Methods: Review ingredient supplier data for fat raw materials using the AOCS method. Compare the values with those obtained by analysis of the same fat raw materials using the AOAC method.

Results: The AOCS method for fat analysis assumes 100% of the sample is fat and thus normalizes the peaks to 100%. Conversely the AOAC method which is the method FDA uses for label value compliance results in quantitative values that are lower. The AOAC method does not yield total recovery thus the total fat and fatty acid values vary by as much as 3-5%. Further the sample yields a carbohydrate values by difference. Both sets of results are entered into the database to learn of the affect on finished product fatty acid label values.

Significance: In the early stage of product development, supplier submitted nutrient values are the single source of nutrient information available for early formula calculations. Marketing decisions are made based on the products developed for testing. Understanding the differences between supplier submitted fat data using AOCS method versus those yielded from AOAC method leads to more appropriate database values to be used for nutrient calculations during product development.

Keeping up with the Marketplace: Updates to the USDA Food and Nutrient Database for Dietary Studies

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Objective: USDA s Food Surveys Research Group develops the Food and Nutrient Database for Dietary Studies (FNDDS) to provide a database of nutrients in current foods for analyzing dietary intakes collected in the What We Eat in America, National Health and Nutrition Examination Survey (WWEIA, NHANES).

Material and Methods: A new version of FNDDS is prepared for each two-year survey release. To keep FNDDS current, information reported by survey respondents is monitored for new foods and portion sizes. In addition, to prepare FNDDS 3.0 for the 2005-2006 collection, comprehensive reviews of database entries (foods, weights, and recipes) were conducted for selected food categories including fruit juice beverages, fast foods, and some Hispanic foods. Updated nutrient values from the USDA National Nutrient Database for Standard Reference, Release 20 (SR20) were incorporated into FNDDS.

Results: More than 100 food items were added to FNDDS for new foods reported. Other food items (n>100) were discontinued for products no longer available. Food descriptions were revised for manufacturer name changes and new market terminology (e.g., ground beef labeling). A review of Puerto Rican foods led to the addition of Spanish terms for many foods. Approximately 2,000 revisions were made to weight data resulting from new package sizes, larger-sized ground beef patties, and changes in fast foods. With the inclusion of choline in SR20, values for total choline were added for all foods in FNDDS, bringing the total number of nutrients in the database to 64. Linkages to SR were updated, including changes in fats/oils used in various commercial and Home / restaurant-prepared foods.

Significance: FNDDS 3.0 contains approximately 7,000 foods and 30,000 weights, and was used to estimate nutrient intakes for WWEIA, NHANES 2005-2006. By mid-2008 it will be available on-line via the 'What's In The Foods You Eat Search Tool', and for download from http://www.ars.usda.gov/ba/bhnrc/fsrg.

Fatty Acid Data in the USDA National Nutrient Databank: Data handling and currency issues

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Modifications in the USDA National Nutrient Databank System have facilitated the Nutrient Data Laboratory (NDL) in upgrading fatty acid handling. High priority was given to enabling fatty acid data to be entered in units as received (e.g. percent methyl esters, percent fatty acid of total fat) and then converted to g fatty acid per 100 g food for dissemination in the USDA National Nutrient Database for Standard Reference (SR). Other enhancements have included the ability to disseminate data on additional fatty acid isomers, including trans-fatty acids, and to perform a variety of normalization procedures on fatty acid data. These normalizations are essential to allow fatty acids from one source to be adjusted to total fat values and/or fatty acid class data from other sources. In the past 10 years a variety of foods, including margarines and spreads, snack foods, and industrial oils and shortenings, have been sampled and analyzed for a variety of nutrients including fatty acids. NDL nutritionists review food label ingredient listings and Nutrition Facts panels regularly to ensure that SR fatty acid data are current with respect to oil source (e.g. soybean, canola, palm), treatment (e.g., hydrogenation), and form (e.g., pourable oil or solid). As formulations change, fatty acid data are replaced with current data from USDA contract analyses, industry-provided data, or, in some cases, with data calculated by a formulation estimation process. These updates not only are critical to maintaining currency of the SR database, they are critical to food intake assessments which use data from the Food and Nutrient Database for Dietary Studies (FNDDS). The underlying food composition data in the FNDDS come from a subset of foods and ingredients in SR.

Revising Fats and Oils Used in the Food and Nutrient Database for Dietary Studies (FNDDS): Approaches and Impact

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Objective: To describe changes made in the fats/oils ingredients used for determining nutrient values in the FNDDS, Releases 2.0 and 3.0, and to determine the impact of these changes on nutrient intake estimates in the U.S.

Material and Methods: Major changes in the fatty acid composition of industrial oils, margarines, and shortenings occurred in the USDA National Nutrient Database for Standard Reference (SR), Releases 17, 18, and 20 from 2003-2007. New items were added and values for existing items updated. These data were incorporated into the FNDDS, 2.0 and 3.0 through cooperation between the Food Surveys Research Group (FSRG), where the FNDDS is prepared for analysis of the What We Eat in America (WWEIA), National Health and Nutrition Examination Survey (NHANES) and the Nutrient Data Laboratory (NDL), where SR is produced and which serves as the basis for FNDDS. To determine the changes needed in FNDDS, recipes and ingredient lists were reviewed for types of fats/oils used for several food categories. The types of fat/oils in commercially prepared foods such as crackers and in home/restaurant prepared food such as fried fish were updated based on product formulation changes, availability of data in SR, review of information from industry and the WWEIA, NHANES. Also, updated data from SR reflecting major industry changes in existing fats/oils were incorporated into the FNDDS. Using national data from the WWEIA, NHANES 2001-2004, a study to evaluate the impact of these changes on nutrient intake estimates was conducted.

Results: The nutrient profile of over 2000 foods changed for fat/oil ingredients. The impact of these changes on national nutrient intakes will be presented and discussed.

Significance: The task of updating the FNDDS requires synergistic efforts by specialists at both NDL and FSRG as well as extensive communication with industry.

SESSION 8: DIETARY ASSESSMENT TECHNOLOGIES OF THE FUTURE: THE INTERFACE BETWEEN FOOD COMPOSITION AND WHAT PEOPLE ARE EATING, A NEW ARENA

Dietary Assessment Technologies of the Future

Suzanne W. McNutt[1], Stephen G. Hull, Thea Palmer Zimmerman, Jill Reedy, Catherine Loria, Amy F. Subar
[1] Senior Study Director, Westat

Background: This session explores new technologies being applied to dietary assessment and database management to advance the field of nutrition research. Scientists working in nutrition research face daunting problems in trying to collect and code dietary data that represent what respondents consume. Yet, there is a vision that with new technologies, accuracy in reporting and coding will be improved, and respondent burden lessened. The projects presented in this session are examples of progress in moving toward this vision.

Objective: The session includes five presentations on the status of three technologies funded by the National Cancer Institute (NCI) and the National Heart Lung and Blood Institute (NHLBI). The first is an overview of the session; the next two demonstrate the NCI <u>A</u>utomated <u>S</u>elf-<u>A</u>dministered <u>24</u>-Hour Dietary Recall (ASA24) software and describe database development; and the last two introduce two dietary assessment technologies being developed through the National Institutes of Health (NIH) Genes, Environment, and Health Initiative (GEI).

Description: The ASA24 is a web-based application based on the interviewer-administered USDA Automated Multiple Pass Method (AMPM), used in the National Health and Nutrition Examination Survey (NHANES). ASA24 includes an extensive food list, detailed food probes, search and browse features for finding foods, a character agent to direct respondents, and digital photos to aid portion size estimation. The GEI, established to facilitate a foundation for large-scale gene-environment interaction studies, includes a program to advance a new generation of tools that will improve measures for diet. The projects under this program are using current technology to develop dietary assessment methods that are valid, have low respondent burden, and are feasible for application in large studies. The two GEI projects presented in this session will develop and evaluate the use of mobile phone technology with food pictures and associated databases to capture real time dietary consumption data.

New Web-Based Technology: the ASA24 Interview

Stephen G. Hull[1], Thea Palmer Zimmerman, Suzanne McNutt, Beth Mittl, Richard Buday, Ramsey Tapia, Patricia M. Guenther, Tom Baranowski, Noemi Islam, Frances E. Thompson, Nancy Potischman, Meredith Morrissette, Amy F. Subar
[1] Westat

Background: The National Cancer Institute (NCI) is developing an Automated Self-Administered 24-hour dietary Recall (ASA24) designed as an engaging and easy-to-use instrument that can immediately compute nutrient and food group estimates.

Objective: This presentation will demonstrate the main features of the ASA24 interview.

Description: After a respondent logs on to the web-based ASA24, the first step is to create a list of all foods consumed during the previous day, organized by meal. Foods are chosen from a list of over 10,000 food terms by browsing or searching.   The Browse method provides 23 food groups that each contain sub-groups to find a food; while the Search method allows a free text search of all foods in the database.   When a meal is added to the list, the respondent is prompted to assign the time the meal was consumed. If respondents cannot find a food on the food list, they are prompted to type the food name into an "Unfound Foods" box.   Once a list of meals and foods is built, respondents are asked about details of each food and the amount consumed, in chronological order by meal.   For some foods, extra questions collect information on "Additions" to foods.   For "Unfound Foods", however, only general information is collected. For each food reported, respondents choose the amount consumed based on pictures of up to 8 portion sizes. In the final step respondents review and modify foods reported for the day, as necessary. Ultimately, each food in the recall is assigned an FNDDS food code.

Conclusion: ASA24 has the potential to provide an affordable, state-of–the-art data collection system for administering multiple days of recalls in large-scale population nutrition research, thereby enhancing the ability of investigators to assess usual dietary intakes.

Issues with the Conversion of an Interviewer-Administered Food Probe Database to Self-Administration in the ASA24

Thea Palmer Zimmerman[1], Stephen G. Hull, Suzanne McNutt, Beth Mittl, Noemi Islam, Patricia M. Guenther, Frances E. Thompson, Nancy A. Potischman, Amy F. Subar
[1]Westat

Background: The NCI has adapted the AMPM approach for the ASA24 to accommodate a self-administered computer-based environment. The ASA24 food probe database contains over 750 food probes that result in more than 300,000 food pathways. It is expected to include more than 10,000 pictures of individual foods depicting up to eight portion sizes per food which respondents can use to estimate amount consumed.

Objective: To develop a food probe database that allows a respondent to choose a food, answer a series of questions about that food that results in a food code, and choose a portion size from a list of pictures.

Description: The food list, detail questions, and portion questions/pictures were drawn from the USDA AMPM instrument and a collection of portion size pictures provided by Baylor College of Medicine. The food code/portion code assignments were based on the USDA FNDDS database. Guidelines developed by Westat and NCI were used to determine which AMPM food list terms, and question/answer sets were retained. Criteria included ensuring that: 1) food list terms were recognizable, standardized, and detailed enough so that follow-up questions could be minimized; 2) question text was understandable and concise; 3) answer sets were comprehensive and easily understood; 4) portions offered logical and recognizable choices for the food. Portion size pictures were linked to the appropriate answer for each portion question. This presentation will discuss issues encountered when applying these criteria to each food list term and its associated detail question pathways for purposes of assigning a unique FNDDS food and portion code.

Significance/Conclusion: The food probe database underlying the ASA24 software facilitates a respondent's ability to complete a standardized self-administered 24HR with resulting nutrients. The ASA24 will make feasible the administration of multiple days of recalls in large-scale studies and enhance investigators' ability to assess usual dietary intakes.

Visualization and User Modeling in Mobile Dietary Assessment Applications

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Background: Obvious errors in reported dietary intake have perplexed researchers for years. Errors in food composition values were among the first factors examined, but further vigilance in pursuing food composition errors is required. Errors in correctly identifying and quantifying intake are also assessment problems. Characteristics that enable a person to identify foods include color, shape, conformation, volume, texture, density, surface reflectance, temperature, environment, taste and smell. Several of these factors can be utilized to enhance the identification of foods from electronically captured images.

Objective: To develop techniques for translating images and voice recorded information captured on a cellular phone into valid dietary intake data. Development will encompass advanced visualization technology and user modeling. Visualization will assist in interpreting the oral intake report and user modeling will assist in selecting the appropriate database entry when more than one entry would satisfy the image and voice description.

Material and Methods: A project called "Mobile Food Intake Visualization and Voice Recognizer (FIVR)" is one of 7 individual grants funded within the "GEI Improved Measures of Diet and Physical Activity" funding opportunity. Cellular phones with picture-taking capability will be used to record food before and after eating, thereby imaging food type and amount consumed. Images and oral descriptions of food consumed during meal time will be transmitted to a back-end server for interpretation by trained personnel.

Results: Validation will be assessed by comparing the FIVR results to known intakes. Usability will be determined by qualitative assessment of research respondent's experience reporting ad libitum intakes.

Significance: Electronic identification techniques have potential to improve the objectivity and accuracy of dietary assessment and simplify the task of reporting intake for research respondents.

Dietary Assessment and Nutrient Database Fields for the Digital Age

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Background: Accurate assessment of diet is problematic. Immerging technology in mobile telephones with higher resolution pictures, improved memory capacity, and faster processors, allow these devices to process information not previously possible.

Objective: Our goal is to develop, implement, and evaluate a mobile phone food record (mpFR) that will translate to an accurate account of daily food and nutrient intake among adults.

Material and Methods: Our first steps include development of imaging software for use with digital photographs that will automatically identify and estimate quantities of foods consumed, modification of the FNDDS nutrient database, and development of user-friendly interfaces. The volume estimates from the segmentation and imaging analysis is reported in cubic centimetres. Current databases do not contain the fields to translate this information to nutrients/100 grams or energy/100 grams of food. The procedures also include development of digital identifiers that can be incorporated into nutrient databases as additional food identifiers beyond food names. Pictures of food can be marked with a variety of input methods that link the item for image processing and analysis for identification and quantification of food consumed.

Results: The nutrient databases for digital approaches to dietary assessment are being developed to include the additional fields needed to calculate estimates of consumption. The mpFR will be field tested among adults under controlled conditions prior to testing among free-living adults. Mobile telephones are widely used throughout the world and can provide a unique mechanism for collecting dietary information that reduces burden on record keepers.

Significance: It is anticipated that an innovative tool will be developed that can be used in population and clinical based studies to provide accurate dietary intake data. As digital methods evolve, the nutrient databases to support these modern methods will also expand to accommodate the technology.

DATA QUALITY, VARIABILITY AND BIOAVAILABILITY

Establishing Quality Systems for Food Composition Databases in Europe

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Objective: To establish a fit-for-purpose common Quality Management System (QMS) for national food composition database compilers, analysts and users in Europe.

Material and Methods: A series of consensus meetings between national compilers, analysts, and quality experts has helped to develop and define the overall QMS according to the requirements of ISO/IEC/ILAC guidelines. Various consultations with key users and stakeholders across Europe have helped to shape and refine quality requirements.

Results: The EuroFIR Quality Policy is guided by two flexible approaches to ensure adherence of all partners to quality standards, and transparency on data quality to users of food composition data. In particular, to meet the quality needs of various users and stakeholders. The quality system is structured around three modules: quality management, project management and technical and scientific competence, which have been adapted from ISO 9001, ISO 10006, ISO 17025 and ILAC 11. Key elements of quality system have been identified including: harmonization of the compilation/data evaluation process; creation of a consistent system of documentation through establishment of standard operating procedures (SOPs); compatible sampling protocols; use of validated evaluation methods of analysis in accordance with international standards; qualification/certification of national compilers through an on-going programme of professional development and monitoring; and better appreciation of key user needs for food composition data covering research, industry and regulators.

Significance: EuroFIR's QMS can be extended to the international arena to further build on previous initiatives by INFOODS in order to improve harmonization of global food composition data. These advances will have a considerable impact in improving the comparability and reliability of food composition data, and increase the exchange of validated data across European countries, and beyond.

Methods of Imputation Used in the USDA National Nutrient Database for Standard Reference

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Objective: To present the predominate methods of imputing used to estimate nutrient values for foods in the USDA National Nutrient Database for Standard Reference (SR20).

Material and Methods: The USDA Nutrient Data Laboratory developed standard methods for imputing nutrient values for foods where analytical data were not available. Beginning with SR14, a field for data derivation codes was included in the Nutrient Data File. There are 54 derivation codes. Derivation Code A indicates analytical data, whereas most codes are used to identify imputation methods. As data for more foods are processed through the new Nutrient Data Bank System this field is being populated. Currently about 60% of the nutrient values in SR20 have derivation codes. This field was queried to determine the most commonly used imputing methods for different types of foods and nutrients.

Results: There are about 200,000 nutrient values in SR20 that have data derivation codes indicating that the value is calculated (not analytical). About 20% of these are derivation code Z, meaning an assumed zero. Code Z is used for nutrients such as retinol and cholesterol that do not occur naturally in plant foods. About 17% are BF codes meaning the value is based on analytical data for a similar food. These procedures are mainly used for commodity foods such as fruits, vegetables, and grains. About 16% have FL codes indicating calculations based on the use of a formulation. Formulations are used for multi-ingredient foods such as baked products. Code NC indicates a nutrient that is always calculated rather than analyzed, accounting for about 15% of the imputed values. These are nutrients such as carbohydrate by difference and calories.

Significance: Users of the database want to know the source of the nutrient values. This is particularly useful to other database developers who may have to use imputation for their database applications.

Development of Estimates of Nitrates, Nitrites, and Nitrosamines in Commonly Eaten Foods

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Objective: Studies have suggested that nitrates, nitrites, and nitrosamines have an etiologic role in adverse pregnancy outcomes and other diseases. Although an extensive body of literature exists on estimates of these compounds in foods, the extant data varies in quality, quantified estimates, and relevance. With meta-analysis, we developed estimates of these compounds for food items in the short Willet Food Frequency Questionnaire (WFFQ) as adapted for the National Birth Defects Prevention Study.

Material and Methods: We searched multiple databases for published literature reflecting nitrate, nitrite, and nitrosamine values in foods. All relevant literature was reviewed but only those reporting results for items listed on the WFFQ were selected for inclusion. The references and respective estimates were prioritized according to relevance to the U.S. population.

Results: Highest priority was given to literature published in 1980 or later and to countries with traditionally western diets. Thirty-three articles and four government reports were selected for inclusion. Thirty-one articles were based on data from 1980 or later; only nine of those were based on US or Canadian data, and none of these were published after 1990. The results were compiled by nitrate, nitrite, and nitrosamine content for each of the food items. The process was straightforward for single food items but required weighted estimates for items that contained combinations of several foods. Estimates of these compounds varied widely among the items on the food frequency questionnaire.

Significance: Our findings demonstrate that more primary research and analysis of these compounds in food are necessary to better estimate dietary exposures. Food preservation methods, dietary exposures, and cultural attitudes are likely to change over time and may not be adequately captured in the current literature. Updated analytical estimates may more accurately reflect current levels of these compounds in foods.

Comparison of Almond Nutrient Data Between Select National European, North American and Asian Food Composition Databases

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Objective: Almond nutrition research has driven the need for fully representative almond nutrient data. In FY 2006-07, California harvested over 506,500 MT of almonds, or 80% of the world supply, of which about 316,500 MT was exported to over 80 markets, primarily in Western Europe and Asia. Worldwide shipments of California almonds grew 17% in 2006-07 in response to expanding global consumer demand, attaining a new record. In 1998 ABC and the International Treenut Council first collaborated with USDA to update macro and micronutrient treenut nutrient data and to revise the USDA nutrient database. In 2006 -07 ABC submitted 84 more nutrient data sets for whole natural almonds from 8 varieties, and production statistics from the past decade, to USDA for incorporation into the Standardized Reference (SR20) nutrient database. Researchers and legislators require internationally compatible data that is comparable across boundaries. US, Canadian and EU Health Claim and Labeling legislation prioritize accurate nutrient data.

Material and Methods: Almond nutrient composition of 100 g whole natural almonds from 7 European and 2 Asian National Food Composition Databases were compared to the USDA SR20 nutrient data and to the CNF nutrient data. The ABC/USDA export data for each country was also tabulated and will be presented.

Results: In comparison with SR20 data protein and total lipid and vary from 19g-28.5g and 39.10g-55.80g respectively. Carbohydrate values are not uniformly reported and represent a larger range while total fiber ranges from 7.2g - 14.3g. Key nutrients such as Vitamin E and magnesium also range from 20 mg - 31.2mg and 232mg - 275mg respectively. Most national databases have gaps in the data provided.

Significance: SR 20 represents 85% of the world supply of almonds. Collaboration between ABC, USDA and other food composition data bases is necessary to ensure that almond food composition data reflects the country of origin.

Clams Illustrate Food Iron Source Tower of Babel

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Objective: Iron deficiency (ID) is the most prevalent and widespread micronutrient problem worldwide. Most commonly, ID is due to inadequate dietary intake and/or low iron bioavailability. Therefore, it is important for consumers to be provided with reliable information regarding good food choices of iron. The objectives of this study were: to obtain consumer-oriented food iron information, to review recommended food lists and identify the most recommended foods with respect to iron content, and to evaluate the variability and quality of data regarding iron content and potential bioavailability.
Material and Methods: A review of consumer-oriented websites related to iron and anemia identified five governmental websites as the main sources of food iron data. Because clams were ranked as the top iron source in four of the five websites, iron content from nutrition labels of different brands of clams were reviewed and compared against values found in journal literature, as well as multiple nutrient databases. Reported literature values were applied to a theoretical formula to estimate potential bioavailability.
Results: Iron values from nutrition labels, journal literature and nutrient databases ranged from 0.24 to12.0 mg, 0 to11.52 mg and 0.84 to 4.44 mg iron respectively, per 2oz reference amount. After applying a formula to estimate bioavailability to these same values, available iron values decreased to 0.01 to 0.60 mg for nutrition labels, 0 to 0.57 mg for journal literature and 0.04 to 0.22 mg iron for nutrient databases respectively, per 2 oz reference amount.
Significance: Considerable differences in clam iron content exist between and within different iron information sources and are greatly reduced when bioavailability is considered. It is imperative that these sources provide consistent reliable information that considers both iron content and bioavailability.

The Impact of Six Months Storage at 100°F on Vitamin Levels in Meal-Ready-To-Eat (MRE) Components

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Objective: To meet military needs, operational rations are designed to achieve a storage shelf-life of 3 years at 80°F and 6 months at 100°F, at the end of which all ration components must retain sensory and nutrition quality. This study compared the content of vitamins A, B6, B12, C, D, E, folic acid, niacin, thiamin, and riboflavin before and after 6 months of storage at 100°F.

Material and Methods: Twelve different Meal-Ready-to-Eat (MRE) components were sampled from the 2006 production year. A total of 17 samples (>1 manufacturer per component) were collected from 6 different lots (1 day s production of a food type). For each component 2 samples were pulled from production lines by United States Department of Agriculture inspectors and sent to USARIEM. A composite of 1 sample from each of the 6 lots was sent for chemical analysis to an outside lab (Covance Laboratories Inc, Madison, WI). Six identical samples (same lot codes) were stored at 100°F for 6 months, for a post-storage composite. Data are represented as the mean of paired samples t-test on 17 samples.

Results: Overall storage losses (p<0.05) for riboflavin were 17% (0.235 mg/sample vs. 0.196 mg/sample) and 53% for folic acid (74.6 µg/sample vs. 34.7 µg/sample). No difference (p>0.05) was detected in losses for vitamins A, B6, B12, C, D, E, niacin or thiamin. Although vitamin C analysis showed a tendency toward statistical significance loss, there was no statistical difference because the number of samples with detectable vitamin C content was low (6/17).

Significance: Although these data, representing 12 MRE components, suggest vitamin losses under heated storage, the losses do not reflect an overall deficiency in the MRE nutritional requirements (Nutritional Standards of Operational Rations). Acknowledgment of storage tendencies may influence future menu planning and fortification guidelines.

ANALYTICAL METHODS AND FOOD SAMPLING

Study on the Re-evaluation of Functional Components, Analytical Methods in Health/Functional Foods - Glucosamine, Fractooligosaccharide and Phosphatidylchloine

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Analytical methods for functional components in health/functional food (HFF) have being developed as increasing of the public interest and growing of market in recent years. The analytical methods on the various HFF are described in the code of HFF (CHFF) in Korea. However, the methods are not supported by convincing evidence and sufficient data, therefore, they should be thoroughly re-evaluated. We modified the CHFF methods for high efficiency and accuracy. In the CHFF, the analytical methods for the components of glucosamine and fractooligossacaride have been suggesting HPLC/RI method which is impossible to separate by the gradient system on account of a specific character of RI detector. For that reason, they are too hard to separate because of the food matrix interference. Therefore, this study suggest that modified the CHFF method, HPLC/evaporative light scattering detection (ELSD) method, have high efficiency and accuracy to analyze of glucosamine and fractooligosaccharide . And three methods in CHFF were compared in order to find out the most effective method to analyze phosphatidylcholine (PC). First, the method in the CHFF was very complicated although expensive equipments were not necessary. Secondly the modified CHFF method using inductively coupled plasma (ICP) was more simple and took less time than CHFF method. Finally, the main advantages in HPLC/ELSD method were very easy pre-treatment method and short-time (just only one hour) requirement. HPLC/ELSD method as determining of the (LOD) and limit of quantify (LOQ) had the lowest values each 5 and 6 µg/mL, respectively. These results suggested that HPLC/ELSD method was the most effective method among these even if the method needed the expensive detector.

Variability in the Vitamin D Content of 2% Milk from a Nationwide United States Department of Agriculture (USDA) Sampling

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Objective: The objective of the study was to assess the vitamin D content of retail 2% milk and its variability. Milk contains little natural vitamin D but is usually supplemented with vitamin D3 for retail sale in the United States. The fortification target is 400 IU per quart (25% DV per 8 oz serving or 42 IU/100g).

Material and Methods: In 2001, the USDA sampled and analyzed vitamin D in 2% milk from 12 statistically selected supermarkets in the United States. In 2007, sampling was repeated, obtaining milk from 24 different supermarkets. Analyses were done on the 2007 samples and repeated for the 2001 samples by HPLC with UV detection using an improved method specifically validated for vitamin D in milk.

Results: Of the 12 samples obtained in 2001, 7 samples were below label value, 4 within 100-150% of label, and 1 above 150% of label. Three of the 24 samples from 2007 were below label value with 1 of the 3, despite the label claim, with no detectable vitamin D; 20 had values within100-150% of label, and 1 above 150% of label. Analyses are ongoing of other types of fluid milk samples also obtained.

Significance: Regulations from the US FDA require that the amount of vitamin D in milk be at least equal to the nutrient value declared on the label. The acceptable range within limits of good manufacturing practices is 100 150% of label claims. The amount of vitamin D on the label for 2% milk was met by less than half of the 2001 samples but about 83% of those from 2007. Due to the high levels of consumption, milk is an important source of vitamin D for many North Americans, and current and accurate data are important to the assessment of intake.

Spectral Fingerprinting and Analysis of Variance-Principal Component Analysis (ANOVA-PCA): A Rapid and Inexpensive Tool for Differentiating Plant Materials and Characterizing Sources of Variance

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Objectives: UV and mass spectral fingerprints, in combination with ANOVA-PCA was used to differentiate between cultivars and growing conditions and to quantify the variance arising from each variable.

Material and Methods: Broccoli samples consisting of two cultivars grown under seven different conditions (irrigation with 0, 5, 100, and 1000 ppm Se, organically grown, and conventionally grown with 100% and 80% irrigation). Freeze dried powdered samples were extracted with methanol-water (60:40, v/v) and analyzed with no prior separation. Spectral fingerprints were acquired using a UV spectrophotometer (220 to 380 nm) and a mass spectrometer with direct infusion. Spectral data files were pre-processed in a spreadsheet (constructing matrix subsets for each of the experimental factors) and then analyzed using pattern recognition software (i.e. principal component analysis).

Results: ANOVA-PCA made it possible to use either the UV or MS data to distinguish between cultivars and each of the 7 growing conditions. Organically grown broccoli could be distinguished from conventionally grown broccoli. These results confirmed our working hypothesis that the cultivar and growing conditions contribute to differences in chemical expression that can be detected without elaborate separation schemes. The high resolution of MS detection (compared to UV detection) allowed specific compounds to be identified that contributed most to the chemical differences. In both cases, the sums of the squares of the matrices used for PCA, allowed us to determine the chemical variance attributable to cultivar, growing conditions, and analytical uncertainty: 33%, 66%, and 1%, respectively, for the UV data and 34%, 58%, and 8%, respectively, for the MS data.

Significance: This methodology can be used to rapidly determine if there are chemical differences in plant materials induced by the cultivar and growing conditions and possibly growing location and season.

Comparison of Chemical Analysis of Operational Ration Components to their Nutrition Facts Labels

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Objective: Determine the accuracy of nutrition information provided on the nutrition facts label (NFL) compared to chemically analyzed (CA) data of operational ration components.
Material and Methods: Twelve Meal-Ready-to-Eat (MRE) components were sampled from MRE XXVI. Seventeen samples (>1 manufacturer produced some components) were collected from 6 varied (not consecutive) lots. Six newly procured samples were combined to form a composite. The NFL, printed on each component, was used for comparison. CA was conducted by an outside source (Covance Laboratories Inc, Madison, WI). Analysis included all macronutrients and most commonly provided vitamin and mineral contents.
Results: Nutrients compared in this evaluation included: calories, protein, carbohydrate, total fat, saturated fat, trans fat, vitamin C, vitamin A, calcium, sodium, iron, and dietary fiber. The NFL was considered to be within an acceptable range of difference if the value was not greater or less than 20% of CA. Only 6% of the components were not within the allowable 20% range for calories. Whereas 18% protein, 24% carbohydrate, 29% total fat, 35% saturated fat, 41% vitamin C and 47% vitamin A components were not within the allowable range. Calcium, sodium, iron, trans fat and dietary fiber were misrepresented > 50% of the time on the NFL.
Significance: Misrepresentation of the data on NFL can be caused by: user error when component formulations are entered into nutritional software programs, incomplete nutritional information on component ingredients, lack of follow through on component formulation changes and updates to the NFL, and incomplete micronutrient data available on components ingredients in the USDA database (ex. trans fat). The discrepancies described do not pose any nutritional health issues to Soldiers consuming these rations. Data from this study and future studies will aid in more accurate menu planning for our Soldiers in the field.

Changes in Trans Fatty Acid Profiles for Selected Snack Foods in the USDA National Nutrient Database for Standard Reference

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Objective: Historically, many snack foods had been formulated with partially hydrogenated vegetable oils, the primary contributor of trans fatty acids (TFA) in the US diet. Health concerns about TFA and saturated fat intake and increased risk for chronic health disorders have prompted some manufacturers to reformulate their products. In response to these changes and the new food labelling mandate for declaration of TFA, nutrient composition data are being updated and expanded in the USDA National Nutrient Database for Standard Reference (SR). The SR, a repository of information for about 7,500 foods on up to 140 nutrients, is the foundation for most nutrient databases and supports nutrition monitoring research and policy development.

Material and Methods: The USDA National Food and Nutrient Analysis Program (NFNAP) generated new analytical data for fatty acids and other nutrients through a rigorous, nationally-representative sampling approach. Under NFNAP, fatty acids for 12 snack foods were determined by gas chromatographic quantification of fatty acid methyl esters. The resulting data, along with analytical industry fatty acid data, were compiled for selected high consumption snacks. Total fat and TFA data were compared to values obtained prior to reformulation for nine snacks previously containing partially hydrogenated oils and for which analytical TFA data were available.

Results: TFA were determined in regular, ranch and nacho tortilla chips, microwave popcorn (regular and low fat), cheese puffs/twists, potato chips, Pringles (regular and low fat), Chex Snack mix, and two popular meal replacement bars. TFA decreased in the nine historically matched snacks to less than 0.5 g/100 g (well below the labeling cutoff of 0.5 mg/serving) except for cheese puffs/twists (10.8g to 0.9g/100g). Overall, the total fat values did not change for the reformulated products.

Significance: These data reflect current trends in TFA reduction in the US food supply of use to consumers and researchers.

NEW DATA FOR FOODS AND FOOD COMPONENTS

The Mineral Content of U.S. Drinking and Municipal Water

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Objective: The mineral composition of tap water may contribute significant amounts of some minerals to dietary intake. The USDA s Nutrient Data Laboratory (NDL) conducted a study of the mineral content of residential tap water, to generate new current data for the USDA National Nutrient Database. Sodium, potassium, calcium, magnesium, iron, copper, manganese, phosphorus, and zinc were determined in a nationally representative sampling of drinking water.

Material and Methods: The sampling method involved: serpentine ordering of the US population by census region, division, state and county; division of the population into 72 equal size zones; and random selection of one county per zone and two residences per county (144 locations). Chromy s probability-proportional-to-size (population density), probability of minimum replacement method was used. Participants collected samples in HDPE bottles at two points in time (winter and spring, n=288) and provided information on water source (municipal, well), pipes and use of water softeners and treatments. Samples were analyzed by inductively coupled plasma atomic emission spectrometry; resulting data were analyzed using a mixed model approach.

Results: Assuming two liters of tap water are consumed daily, only four minerals provided more than 1% of the U.S. Daily Value (DV): copper, 10%; calcium, 6%; magnesium, 5%; and sodium, 3%. Significant decreases in calcium were observed with chemical water softeners (mean 3.2 v. 2.0; median 2.73 v. 0.44 mg/100g), and between pickups for Mg and Ca ($p<0.05$). The variance of sodium was significantly different among regions ($p<0.05$); no differences were observed as a result of collection time, water source or treatment. Based on the weighted mixed model results, there were no significant differences in overall mineral content between municipal and well water.

Significance: These results, the first nationally representative dataset of mineral values for municipal drinking water, will provide valuable information for assessment of dietary mineral intake, including from water.

Availability and Nutrient Content of Spices in the U.S. Food Supply and Their Health Implications

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Objective: This abstract outlines how the functionality of spices could be considered, providing direction for future research and developing an appreciation of the potential contributions of spices to nutrition, health, and well-being.

Material and Methods: Data were obtained from the 2005 nutrient content of the U.S. Food Supply and scientific literature.

Results: Rising domestic use of spices reflects increased ethnic diversity in the U.S., the world s largest spice importer. Retail sale of spices and seasonings in the United States were $2.9 billion in 2005 and are forecast to reach $3.8 billion in 2010. The amount of spices available for consumption in the U.S. food supply increased by 41 percent from 1995 to 2005. Between those years, carotene and vitamin A, iron, calcium, magnesium, copper, potassium and carbohydrates were the top nutrient contributors from spices. The role of spices in chronic disease is associated with their antioxidant properties. Evidence supports that garlic may improve heart health by lowering blood cholesterol and triglyceride levels, as well as modest reductions in blood pressure. Research showed that cinnamon lowered blood glucose, cholesterol, and triglyceride levels. Chili peppers and ginger may ease arthritic swelling and pain, while some spices may reduce cell damage associated with chronic diseases. Total antioxidant intake may inhibit cognitive decline with age. Additionally, spices can be used in recipes to replace ingredients such as salt, sugar, and added fats.

Significance: Because several metabolic diseases and age-related degenerative disorders are associated with oxidative processes in the body, nutrition knowledge about spices and dietary practice of spices as a source of antioxidants to combat oxidation warrants further attention.

Indigenous Food Composition Tables for North Cameroon

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Objective: This work aims at considering the dietary and nutritional quality of some available and locally consumed wild foods in order to build up an indigenous food composition database for North Cameroon.

Material and Methods: A combination method and procedures for compiling food composition data as describes by Southgate (1974) and suggested by INFOODS (Rand et al., 1991) were used.

Results: Wild foods that are most commonly consumed in terms of both frequency and amounts provide a list of core foods. 47 food items were recorded. Among them, 10 cereal and cereal products, 7 tubers, roots and products, 12 meats, birds, and insects, 18 vegetable, fruits and their products. The developed indigenous food composition database includes: 25% of original analytical values taken from national and international published literature or unpublished laboratory reports; 10% of imputed values derived from analytical values obtained for similar food or for another form of the same food and also derived by calculation from incomplete or partial analyses; 55% Calculated values from recipes, from the nutrient contents of the ingredients and corrected for preparation factors: yields and retention factors; 5% Borrowed values, taken from other tables and databases; 5% Presumed values as being at a certain level or as zero, according to regulations.

Significance: This very first draft of indigenous food composition database of north Cameroon is for a great significance as it s a culturally competent and acceptable nutrition education material which can be use by professionals, by deciders, by community leader, and be integrated in on-going community based projects in North Cameroon.

Assigning Mixed Dishes and Recipes to Appropriate Food Groups in the Nutrient Databank for the UK National Diet and Nutrition Survey (NDNS) Rolling Programme.

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Objective: Mixed dishes are, by their nature, a mixture of components with varying proportions. Basic foods listed within a nutrient databank can be classified easily into specific food groups, but with mixed dishes (purchased or homemade), such groupings prove problematic. There has been tremendous growth in the UK of ready meals, where consumers buy a ready-to-cook mixture of ingredients placed together as a complete meal. It is advantageous to have a consistent method to assign these and other mixed dishes to appropriate food groups, while retaining continuity with previous NDNS surveys to enable investigation of trends over time.

Material and Methods: Two main methods were used to classify mixed dishes in the NDNS databank to decide a process for the start of the main survey of the new NDNS rolling programme in 2008: Method a: grouping by meat/fish content, where the percentage of meat or fish was used to categorize the dish, even if only present in small amounts, or Method b: grouping by main food component, where mixed dishes were classified according to the ingredient present in the highest proportion.

Results: With Method a., many dishes were classified as meat/fish dishes even though the meat or fish content was considerably lower than the main food component, whereas with Method b. very few dishes were classified as meat or fish dishes because this rarely represented the main component of the dish. Neither method provided a satisfactory system for determining the grouping of mixed dishes in the NDNS nutrient databank. For consistency and continuity it was decided to take into account themes from both methods and place similar types of dish together in the same food groups.

Significance: An approach that includes the dish name and proportions of ingredients, alongside case-by-case judgement, is the most appropriate way to classify mixed food dishes in a nutrient databank.

ADVANCES IN USING FOOD COMPOSITION DATA FOR DIETARY ASSESSMENT

Household Food Inventories Indicate Home Food Supplies Are Nutrient Dense but Quantities Vary by Maternal BMI

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Objective: The purpose of this study was to describe home food environments by inventorying household food supplies of 100 families with children $\leq$12 years and describe its calorie and nutrient content.

Material and Methods: Trained researchers took inventories using nutrient analysis software (FoodWorks) modified to use barcode scanners and access databases linking Universal Product Codes with nutrient data (Gladson Interactive; FoodFacts.com). Calorie, protein, fat, saturated fat, carbohydrate, cholesterol, sodium, fiber, vitamin A, vitamin C, calcium, and iron content of foods in each household were summed. Totals were divided by their respective Daily Value (DV) to standardize the expression of quantities to days available at 100%DV. Nutrient adequacy ratios (NARs) were calculated for each nutrient by dividing days available at 100%DV by days of calories available at 100%DV.

Results: Dietary fiber, total fat, saturated fat, carbohydrate, calcium, and iron NARs ranged from 0.9-1.1 indicating, per 2000 calories, these nutrients paralleled DVs. Protein, vitamin A, vitamin C, and sodium NARs were $\geq$1.27, greatly exceeding DVs. Cholesterol NAR was 0.6, well below its DV. Per 2000 calories, household food stores tend to supply nutrients in quantities recommended by DVs, and thus, are nutrient dense. A comparison of mothers in the highest and lowest BMI quartiles revealed no significant difference in number of family members >2 years or days until their next shopping trip, however the highest quartile's food supply included significantly ($p<0.05$) more days available at 100%DV of calorie, total fat, saturated fat, and cholesterol. The quantity of food in the home appears to be related to maternal BMI.

Significance: This study adds to the limited research related to home food environments and suggests that home food supplies and maternal BMI are related. Interventions focusing on food shopping practices may help family food gatekeepers stock foods in quantities that support healthier body weights.

Food Sources of Sodium in Diets of U.S. Children: NHANES, 1999-2004

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Objective: To assess the contribution of food groups to sodium intakes in diets of U.S. children aged 2-18 years (n=11,093).

Material and Methods: The sodium content of foods in NHANES, 1999-2004, 24-h recalls were adjusted if the preparer only occasionally, rarely, or never used salt in cooking. Food groups defined by the USDA Food Survey Research Group (FSRG) classify foods by their main ingredient. Food mixtures were disaggregated using the USDA Dietary Sources Database. Sodium intakes (mean ± SE) from FSRG food groups and dietary sources were estimated using SUDAAN.

Results: Children 2-8 and 9-18 years consumed 2710±35 and 3417±34 mg/day sodium, respectively. FSRG-defined food groups contributing to sodium intakes of two age groups of children, respectively, were bread/rolls/biscuits/tortillas (10.5, 10.4%); RTE cereal (4.9, 3.7%); grain-based mixtures (18.9, 21.0%); vegetables (8.7, 8.5%); dairy products (11.1, 8.6%), meat/poultry/fish not contained in mixtures (15.0, 14.2%); mixtures mostly meat/poultry/fish (7.6, 10.0%); eggs/legumes/nuts (3.6, 3.4%); fats/oils (2.4, 3.3%); sweets such as cake, cookies, milk desserts, candy (5.6, 5.4%); and salty snacks (7.3, 6.4%). Contributions from RTE cereal, sweets, and salty snacks were unchanged after mixtures were disaggregated, but contributions from ingredients of mixtures were added to other food groups. Contributions from read/rolls/biscuits/tortillas increased to 15.5 and 10.4% for children 2-8 and 9-18 years, respectively. Contributions from meat/poultry/fish (16.5, 17.4%) increased slightly, while vegetables (5.9, 6.0%) and eggs/legumes/nuts (1.6, 1.5%) decreased. Contributions from fats and oils (4.4, 5.3%) were increased due to their use in cooking, and salt (13.8, 13.3%) was separated from mixtures.

Significance: Mixtures are a significant dietary source of sodium for children, and disaggregating recipes separates salt used in cooking from other ingredients of mixtures.

Food Composition Tables of Individual Food Groups as a Tool to Encourage the Use of Canada's Food Guide

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Objective: It is a widely held belief in the field of adult education that adults learn best through dialogue. It was the objective of this study (1) to develop food composition tables for each of the food groups, derived from the Canadian Nutrient File (CNF) and (2) to use the tables in facilitated nutrition workshops to encourage dialogue and to share knowledge in nutrition, particularly knowledge of the Food Guide.

Material and Methods: Two workshops were conducted, each consisting of two 90-minute sessions and attended by five women. The workshops were framed around activities chosen to engage participants in learning and stimulate dialogue. The main activity was an analysis by participants of their own diets using food composition tables of the food groups prepared from the CNF, followed by a comparison of their results to the Dietary Reference Intakes. Participants reflected, as a group, on which nutrients were contributed by each of the food groups and discussed how they might use the food grouping system to improve the nutritional quality of their diets. The workshops were evaluated qualitatively using two questionnaires, a follow-up interview and the observations of the facilitator.

Results: The food group tables were critical to actively engaging participants in their learning, by informing the diet analysis activity and discussions of the food groups. The tables also stimulated exchange of information among participants as they tabulated their results. Participants learned through their own efforts, freeing the facilitator to guide discussion and give individual attention. They reported a gain in knowledge and improved eating habits.

Significance: Participants gained experience in applying the Food Guide to their own unique dietary habits. As part of a facilitative strategy, the tables provided information on foods, served as an interface to relate their diets to the food groups of the Food Guide and enabled group interaction.

Antioxidant Intakes Reduce the Serum C-Reactive Protein Concentrations in the U.S.

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Objective: No literature has documented a direct link between serum concentration of C-reactive protein (CRP) and intake of antioxidants after adjusting for environmental factor, food intake and their interactions. We aimed to estimate total antioxidant intakes from both diets and supplements in US population and its subgroups.

Material and Methods: We used the USDA flavonoid database, dietary supplement file, and food consumption data of 8,335 US adults aged 19+ yrs in NHANES 1999-2002.

Results: Energy-adjusted mean serum CRP concentration was higher among women, older adults, Blacks, and those with high BMI, taking NSAID, and having low exercise level, and smokers than their counterparts ($p<0.01$). Serum CRP concentration was inversely associated with energy-adjusted intakes of vit C, vit E, and carotene when the covariates were controlled ($p<0.05$) and with intakes of apples and vegetables after adjusting for other confounding factors ($p<0.05$). After additional adjustment of antioxidant vitamin intakes, serum CRP concentration was inversely associated with total intakes of flavonoid and also its subcompopunds: flavonol, anthocyanidin, isoflavone, quercetin, kaempferol, malvidin, peonidin, daidzein, and genistein ($p<0.05$).

Significance: These inverse associations remained unchanged even after further adjustment for fruit and vegetable consumption. Our findings demonstrate that intake of antioxidant vitamins and flavonoids has beneficial effect on serum CRP concentrations and thus in reducing inflammation-mediated chronic diseases through dietary interventions in the US adults.

Adjusting a Nutrient Database to Improve Calculation of Percent Calories from Macronutrients

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Objective: The sum of percent calories from protein, fat, carbohydrate, and alcohol often does not total 100% for dietary recalls or food records entered into the Nutrition Data System for Research (NDSR). This occurs because the calorie content of individual foods in the software s food and nutrient database are based on values calculated using either specific or general Atwater factors. Thus, daily total calorie intake estimates are based on calorie data derived from two different methods. In contrast, only general Atwater factors are applied when calculating the number of calories derived from each macronutrient in a daily diet.

Methods and Results: Two solutions to the macronutrient calculation problem just described were identified and evaluated. One approach was to create total daily calorie intake estimates based on general factors only. Using this approach, the same method to estimate energy is applied for both total calories and calories from each macronutrient calculation, thus ensuring that the sum of percent calories from each macronutrient totals 100%. The other solution was to incorporate energy factors specific to each core food into the NDSR nutrient database. Using these factors, calories contributed by each macronutrient are calculated for each food, and the calories/macronutrient summed for a daily total. The total calories/macronutrient divided by total calories per day X 100 provides the daily percent of calories from each energy macronutrient. The latter approach is preferable for a number of reasons. Most notably, we believe this approach will yield more accurate percent calories from macronutrient estimates, especially for diets rich in foods for which the general factors sub-optimally estimate energy composition.

Significance: These approaches to improving calculation of percent energy from individual macronutrients may be useful to others maintaining databases that rely on energy composition information derived from varying methods.

DATA FOR SPECIAL POPULATION GROUPS

Nutrient Composition Information is Incomplete for Some Nutrients in Label-Based Dietary Supplement Databases

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Objective: Analytic information on the nutrient composition of dietary supplements is not available for most products in the marketplace. Consequently, those constructing dietary supplement databases must rely on composition information available in the supplement facts portion of the product label. Unfortunately this information source provides incomplete information for some nutrients and food components.

Material and Methods: A dietary supplement assessment module was recently added to Nutrition Data System for Research (NDSR) software so that nutrient intake from both food and supplemental sources may be assessed when conducting dietary recalls. A database was assembled to support this module, with the National Health and Nutrition Examination Survey (NHANES) Dietary Supplement Database serving as its source of supplement information. Out of necessity the ingredient and amount information for products in the database are based on information available on the product label or from the product manufacturer.

Results: In reviewing the supplement database, completeness was identified as a concern for a number of its nutrients and food components. For example, individual fatty acid and amino acid information is inconsistently available for supplements that are labeled as containing fat or protein. It appears that the degree of incompleteness varies by product type. For example, individual fatty acid information is available for most products that are advertised as containing fish oils. In contrast, individual fatty acid information is generally lacking for protein supplements containing fat. FDA labeling requirements and guidelines for dietary supplements place strict requirements on labeling for some nutrients and more flexible requirements for others, which may explain the inconsistencies observed.

Significance: For some nutrients and food components, intake estimates derived from label-based dietary supplement databases must be used with caution.

Nutrient Intake Status of the Korean Population: 2005 National Health and Nutrition Survey

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Objective: The 3rd National Health and Nutrition Survey was conducted in 2005. Nutrition survey included dietary intake survey to monitor nutritional status of the population.

Material and Methods: With a stratified multistage probability sampling, 4,000 households were selected from 200 primary sampling units nationwide using the Year 2000 Population Census data. Trained dietitians visited each household and performed individual interviews using questionnaires on dietary behavior and food frequency. Food and nutrient intake of persons 1 year and older in each household was monitored by 1 day 24 hr recall method using measuring guides including the 2-dimensional model of actual size traditional bowels/pots and food shapes as reported before. Based on the recipes collected from each household, the weight of each ingredient was estimated from the volume of food ingested for homemade dishes. For foods taken away from home, pre-developed recipe database sets were used to estimate food intake from restaurants, schools, worksites, etc. Then nutrient intake was calculated using Korean Food Composition Table and our own nutrient database.

Results: Mean energy intake of the Korean population was 2,016.3 cal/capita/day, which was about 40 kcal higher than that of 2001 survey. Along with this, fat intake was increased to 46.0g/capita/day from 1.8g/capita/day of 2001 in compensation of carbohydrates. For the whole population, calcium was the nutrient of the lowest intake adequacy (76.3 % of RI) and 63.1 % of the population showed calcium intake lower than EAR. Although mean intake of riboflavin corresponded to 95.8 % of RI, more than half (50.6%) of the population showed intake less than EAR. In general, female population showed lower intake adequacy than male population, and the elderly was the group with the lowest adequacy.

Significance: This result clearly delineates the nutrient of concern and the target population for nutrition intervention in Korea.

Development of a Dietary Exposure Assessment System Using Food & Nutrient Database for Koreans: FANTASY FINDS DREAMS

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Objective: In an effort to build a system forecasting and preparing for food safety & nutrition related problems, we attempted to develop a system which allows a scientific and evidence-based dietary exposure assessment of nutrients and hazardous substances for eventual harmonious risk communication.

Material and Methods; First, based on the standardized model developed previously for dietary exposure assessment of Koreans, intake data sets derived from 1998 National Health and Nutrition Survey (NHNS), 1999 Seasonal Nutrition Survey (SNS), 2001 NHNS, 2002 SNS, 2005 NHNS, and 2005 SNS were formatted. This formatting was done to share standardized information and food code to be interconnected with following food & nutrient database to operate and result in dietary exposure assessment.

In the second part, individual foods were described systematically to enhance the compatibility/comparability among different food databases. Standardized codes were assigned for food items and food description file was created after a scientific identification (including the taxonomic nomenclature). Other food information files were created according to the 'entity relationship diagram' drawn from conceptualized algorithm of the dietary exposure assessment program. In the third part, the real dietary exposure assessment system was developed by combining and inter-relating aforementioned databases. The Monte-Carlo Simulation technique was adopted in estimating exposure distribution using chemical content/food intake distribution.

Results; A customized statistical program was developed and embedded in the system to be used under open-licensing and each system developed was named for easy understanding and clear representation as follows: FANTASY for Food And Nutrient daTA SYstem, FINDS for Food Intake by iNdividuals Data System, and DREAMS for DietaRy Exposure AssessMent System. The entire system and names are under process of patent/registration.

Significance; This system is expected to enable not only a scientific and/or representative dietary exposure assessment but also the estimation of impacts following any change in food related standards and/or fortification.

Can We Collect Useful Dietary Data from Older Adults with Memory Problems?

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Objective: Assess quality of dietary data collected in a population with cognitive deficits.
Material and Methods: The Nutrition Intervention Study (NIS) offers targeted nutrition intervention to community-dwelling patients in early stages of Alzheimer dementia (AD) to prevent weight loss. AD patients aged 70+y and their caregivers (n=70 dyads) are being recruited from six hospital-based memory clinics (3 intervention and 3 control sites). Participants are interviewed at baseline (T1) and after 6 months (T2). Data collection documents weight stability, diet, appetite, nutrition risk, anthropometric, clinical and other parameters. Biological data are abstracted from patient charts. Usual diet is assessed by interviewer-administered semi-quantitative food frequency questionnaire (FFQ) and current diet by two non-consecutive food records (FR) collected by telephone. Data are examined for congruence with physical measurements. Intervention participants receive a tailored dietary intervention and are contacted regularly to follow their progress. Research dietitians use a flexible approach and complementary dietary data collection methods considering the patient s ability to report and caregiver input.
Results: To date, some 50 patients have been recruited and interviewed at T1; 22 have completed T2. Mean energy intakes at T1 (from FFQ and FR, respectively) were
1902 ± 396kcal and 1679 ± 423kcal, reported protein intakes were 74 ± 17g and 69 ± 22g. At T1, correlations between nutrients (energy and protein) derived using the two methods were positive (Pearson r=0.35) and weakly significant (p<.05). No clear pattern of association has yet emerged between nutrient intakes and nutrition risk or body mass index.
Significance: At this time, preliminary analyses show neither dietary assessment method appears related to less subjective measures of nutrition status. Further analyses will shed light on the contribution of cognitive problems to accurate dietary reporting.

Attributing Portion Sizes to Foods in Order to Determine their Contribution to Canada's Food Guide Food Groups

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Introduction: A growing body of research has emphasised the importance of characterising dietary patterns to determine global diet quality and its relation to health outcomes. While this requires the ability to analyse food intakes in terms of the number of servings eaten from the basic food categories, such as in Canada s Food Guide (CFG), as well as nutrient intakes, dietary analysis software (DAS) is rarely equipped to furnish output data as food groups. Recently, files were provided for linking foods in the 2007b Canadian Nutrient File (CNF) to CFG food groups and subgroups; however not all foods have associated portion sizes, and there is little guidance on assigning standard serving sizes for added foods and mixed dishes.
Objective and Methodology: To permit assessment of dietary patterns and derive a global diet quality score among participants in the Québec longitudinal study on nutrition and successful aging (NuAge) cohort of men and women aged 68 to 84y at recruitment (n=1,793), a utility based in Microsoft AccessTM was developed. Results: This tool translates grams of foods eaten as output from CANDAT DAS (v.10, © Godin London Inc), based on the 2007b CNF, into the number of servings of CFG food groups, and also identifies them as CFG subgroups. Several data sources were accessed to ascertain serving sizes. We describe a process for augmenting the available portion size data furnished by these supplementary CFG food group files, and our decision-tree for attributing portion sizes to mixed dishes (recipes) and foods not listed in the files.
Significance: The ability to furnish output data on the number of servings eaten in each food group is essential for calculation of global diet quality scores and assessment of adherence to national dietary guidance.

The Use of Market Research Data to Assess Nutrient Intakes of the Canadian Population

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Objective: Dietary collection using 24-hour recall does not reflect a pattern of "usual" food intake behavior for a population group. In order to determine the impact of food consumption patterns on nutrient intake a unique methodology utilizing 7-day food diary was developed at General Mills, Inc.

Material and Methods: The food industry has traditionally used detailed food records to track the consumption of specific branded food items and monitor the growth of food categories. One supplier of this data is Nielsen Panel data National Eating Trends (NPD/NET). Food consumption data is collected from 2,000 households annually. This data is collected throughout the year from a population group that is demographically matched to Canadian Census classifications. Panellist's record food consumed at-home and away-from-home during a 7-day period. Quantities of foods consumed are not recorded. This is typical procedure for panel surveys to minimize the amount of information recorded and thus increase reliability. The 1999-04 NHANES data were processed to determine mean age and sex specific serving weights of more than 2,000 foods. These weights were then matched to each food listed in the NPD/NET Survey. Complete nutrient profiles were assigned to each food in the Survey using the NDS-R version 6 software from the University of Minnesota Nutrition Coordinating Center.

Results: The information from these three data sets was combined in SAS database. Nutrient intake reports are processed using a SAS interface.

Significance: This flexible system allows the user to categorize the population based on "usual" consumption of food categories, specific foods and/or specific brands of foods and determine dietary differences versus their "non-using" counter parts.

Synergistical Nutraceutical and Functional Effect of Fish Oil and Kavun Rice on Type 2 Dyslipidemic Diabetics

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Objective: To assess the effect of dietary supplementation of fish oil and kavun rice on the biochemical profile of urban Type 2 dyslipidemic diabetics.

Material and Methods: As there is a growing incidence of Type 2 diabetes in the country, across all sections of the population, it is necessary to look for compatible methods in the management of the disease. Rice being a staple food in the South Indian diet is preferred and accepted in therapeutic diets as well. Therefore this variety of rice which is popular among a particular community in Tamil Nadu was used to establish its functional qualities in the present study. Kavun rice was assessed for its crude fibre and fat content. Hence 100g of Kavun rice preparation was given spread over two meals. Fish oil was also given in the form of capsules-4 per day providing 720mg of EPA and 480mg of DHA. A feeding trial was conducted on 21 dyslipidemic type2 diabetics. Biochemical assessments were made before and after the feeding trial, which was carried for a period of 60 days. A control group (n=49) taking lipotropic drugs was assessed simultaneously.

Results: There was a significant reduction in the blood lipid and lipo-protein levels. The most encouraging result was an increase in the HDL levels (t=8.35). TGL was reduced (t=9.911). The control group witnessed a marked reduction in all the blood lipid and lipoproteins, remarkably a high reduction in TGL and VLDL (p<0.001). With respect to the experimental group a distinct reduction in TGL and a marked gain in HDL (p<0.001) concentrations were seen. The percentage reduction in the control group with respect to both TGL and VLDL was 31.7 percent, and in the experimental group TGL was reduced up to 37.6 percent and a marked gain was noted in the HDL concentration (25 percent).

Significance: Thus, this variety of rice could be popularized instead of consuming the widely available milled rice. A diet regimen emphasizing the functional effect of this variety of rice and the nutraceutical effect of fish oil is the need of the hour.

Food Composition Database Harmonization for Between Country Comparisons of Dietary Data in the TEDDY Study (The Environmental Determinants of Diabetes in the Young)

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Objective: To estimate the comparability of the nutrients across four food composition databases (FCDB) within TEDDY countries.

Material and Methods: The Environmental Determinants of Diabetes in the Young (TEDDY) -study is a prospective multi-center, multi-national study, in which approximately 7800 children with increased genetic susceptibility to type 1 diabetes will be followed across six study centers worldwide (Finland, Germany, Sweden and three in the US). The participants are monitored for islet autoantibodies until the age of 15. The study aims at examining the associations between islet autoimmunity and various environmental exposures, e.g. diet. The first dietary assessment is carried out by 24-hr recall at the age of 3 months and after that by 3-day food record every 3 months until the child is 12 months old and then every six months. In order to produce comparable results on diet the FCDBs have to contain mutually comparable food composition data. Systematic comparison (definition, unit of measurement, method of analysis) of energy, protein, fats, carbohydrates, cholesterol, fiber, 12 vitamins and 9 minerals was carried out between the FCDBs.

Results: Total fat, cholesterol, vitamin A (retinol equivalents and beta-carotene), thiamin, riboflavin, niacin, pyridoxine, vitamin B12, calcium, phosphorus, iron, potassium, magnesium, and zinc are comparable between the databases. Vitamin D, vitamin K, vitamin C, pantothenic acid, manganese, copper, and fiber are comparable only across three databases. Vitamin E is comparable after Finland and Germany have subtracted tocotrienols from their values. After recalculation of protein from nitrogen (Sweden and USA), and recalculation of carbohydrates and energy (USA) these values will be comparable across the countries. Selenium and folate are not comparable.

Significance: Between-country comparison of diet sets special requirements and challenges on FCDBs used for national dietary analyses. According to this review most of the nutrients are comparable or can be converted to be comparable between the four FCDBs.

A Cross-Border Nutrition Research Study in the US and Australia: so Close, yet so Far Apart

Suzanne S. Summer

Objective: Two institutions, one in the US and one in Australia, are collaborating on a soy research study. Nutrition intake analysis of subjects from both countries is a vital component of this research. Our challenge was to determine how to analyze intakes from both countries using a single database, so that we may combine these data to produce meaningful results reflecting the entire study population.

Our objective is to ensure the accuracy of nutrient intake analysis of Australian subjects when analyzing their food records using US-based nutrient databases and software.

Material and Methods: The study employed both food frequency questionnaires (FFQs) and three-day diet records. The investigators include two registered dietitians, one from each country. To meet our objective, we focused on three initiatives:

1. Modification of a validated US FFQ for use in the Australian market.
2. Development of a list of foods consumed in both countries but which go by different names in each locale.
3. Establishment of parameters for defining acceptable US foods as substitutes for Australian foods not available in US databases.

Results: Modified FFQs were successfully administered to 70 Australian subjects and analyzed. We also developed a list of over 30 Australian food names and their equivalent names in the US. Finally, we identified acceptable US substitutes for Australian foods using a set of parameters defined by the researchers, so that Australian foods not available in the US database could be included in the analysis.

Significance: Health research conducted across national borders is becoming more commonplace. Nutrition research must keep pace with this trend so that we may produce accurate, reliable results for multi-country studies. This project, in which we combine nutrient analysis of foods consumed by Australians and Americans, explores ways that we can accomplish this, and illustrates the need for more cooperation on nutrient database development across borders.

Weekend versus Weekday Eating in HANDLS (Healthy Aging in Neighborhoods of Diversity Across the Life Span) Study Participants

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Objectives: To compare weekend and weekday eating patterns and nutrient intakes in a preliminary sample of the HANDLS baseline population.

Material and Methods: HANDLS is a 20-year longitudinal study, investigating the influence of race and socioeconomic status on health. The recruitment goal for the baseline sample is 4,000 African-American and white adults ages 30-64, from 12 pre-determined census tracks in Baltimore. This analysis includes 697 subjects of whom 71% are African-American and 29% are white. Two 24-hour in-person dietary recalls are collected on these subjects using USDA's automated Multiple Pass Method. The first recall is collected in the home along with information on health status, psychosocial factors, and demographics. The second recall is collected in the medical research vehicle, at which time a medical examination, cognitive evaluation, assessments of body composition, muscle strength and bone density, and laboratory measurements are done.

Results: Sixty-two percent of this group is below 125% of the poverty level. Fifty-one percent of white and 69% of African-American women are classified as overweight or obese based on their body mass index (BMI) > 25. Among the male population, 71% of white and 50% of African-American men are classified as overweight or obese using BMI. The mean estimated energy intake for men and women was 2372 ± 938 and 1780 ± 795 kcal, respectively. This analysis compared weekend (Friday through Sunday) versus weekday (Monday through Thursday) eating patterns by gender, race/ethnicity, obesity status, source of the food, and whether or not the food was eaten at home or away.

Significance: Persistent and significant disparities in morbidity and mortality continue to exist between African-Americans and whites and for people of different socio-economic levels. Knowledge of eating patterns associated with low income obese populations can assist health care professionals in the development of effective intervention programs.

The 2006-2007 Food Label and Package Survey (FLAPS)

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Objective: The United States (U.S.) Food and Drug Administration (FDA) is responsible for protecting the public health by ensuring that foods are safe, wholesome, sanitary, and properly labeled. The Center for Food Safety and Applied Nutrition at FDA studies product labels from the U.S. food supply through the Food Label and Package Survey (FLAPS). FLAPS 2006-2007, the thirteenth survey since the project began in 1976, captures information on all aspects of the food labels of processed, packaged foods.

Material and Methods: The sampling frame for FLAPS 2006-2007 was the ACNielsen Strategic Planner food sales database. For this survey, FDA used a new probability-based sample design to draw a list of food products: a two-stage, stratified design with selection probabilities proportional to size and where each unit in the survey population had a known, positive probability of selection. Products were purchased from retail stores across the U.S. Contract staff recorded product label information from all foods and created the FLAPS database. FDA calculated item weights based on sales data so that FLAPS estimates will generalize to the survey population.

Results: The final FLAPS database consists of label information for 1227 foods in 57 product groups. FDA defined many variables that are representative of the information presented on food labels, such as Nutrition Facts information, ingredients, serving size, health and nutrient content claims, dietary guidance statements, allergen information, and food safety statements.

Significance: FDA uses the FLAPS database as a tracking mechanism to keep abreast of the market response to food label regulations. The agency also uses FLAPS data to support policy, regulatory, and food safety decisions, as well as economic impact assessments.

The 2006-2007 Food Label and Package Survey (FLAPS): Trans fat

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Objective: Beginning in 2006, the U.S. FDA (FDA) requires the amount of *trans* fat present in foods to be included on the nutrition label. While claims have not been established, certain information about *trans* fat is acceptable on the food label. As part of the Food Label and Package Survey (FLAPS) 2006-2007, information about *trans* fat on the food labels of processed, packaged foods was captured.

Material and Methods: The FLAPS 2006-2007 database provides product label information for a sample of 1227 foods in 57 product groups. FDA used the ACNielsen Strategic Planner food sales database as the sampling frame for the survey and the basis of item weights calculated to allow FLAPS estimates to generalize to the survey population. Each product was evaluated for the presence of label statements for *trans* fat, and data were weighted to estimate the prevalence of *trans* fat information on the food label.

Results: Information about *trans* fat was found on the food label of 148 products in 33 product groups. A larger proportion of products with *trans* fat statements fell under two groups: 1) Fresh and Shelf Stable Breads and Baked Goods and 2) Snacks (popcorn, pretzels and chips). Of the products that had information about *trans* fat on their label, approximately three-fourths included a "0 g *trans* fat" statement.

Significance: To keep abreast of the market response to recent *trans* fat labeling requirements, FDA uses FLAPS as a tracking mechanism. The agency may use FLAPS data to support additional labeling policy about *trans* fat.

DATABASE TECHNOLOGY (Software, Internet, Information Dissemination)

Using the World Wide Web to Update Brand Name Foods in the NCC Food and Nutrient Database

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Objective: Many companies now have their brand name food products and accompanying nutrition and ingredient information available on the World Wide Web. In utilizing this resource to update the Nutrition Coordinating Center (NCC) Food and Nutrient Database a number of strengths and weaknesses of this expanding information source have been identified.

Material and Methods: The NCC Food and Nutrient database includes over 8,000 brand name products. To maintain and update these products a variety of information is needed for each including the household serving size and weight of that serving (i.e., ½ cup of cereal (57G)), complete Nutrition Facts panel information, and an ingredient statement. Food company websites often contain much of this needed information, and thus have becomes NCC s primary information resource. Information needed but not found on company websites must be obtained by contacting the manufacturer or going to a supermarket to obtain information directly from product packaging.

Results: The benefits of information available on the web are numerous. Most notably, in general less staff time is required to obtain information via this avenue in comparison with collecting the information by contacting manufacturers or conducting supermarket checks. There are also a number of limitations of food product information available on the web. One significant downside is that Nutrition Facts panel information is often incomplete, with information provided for select nutrients only. Also, often serving size information is provided in household units only. Generally information is not available regarding when the website information was last updated. Other issues include difficulty printing information and navigating the website.

Significance: The World Wide Web may be useful in maintaining brand name products in food and nutrient databases. It would be helpful if manufacturers more consistently provided complete Nutrition Facts panel information and dated each website update.

Nubel Food Planner

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Objective: The Nubel food planner is a software programme on the internet (www.nubel.be) based on the Belgian food composition database to calculate the nutrient intake of different user-groups.

Material and Methods: This programme is developed for the use in schools to calculate the nutritional intake and to motivate the students to do some physical activity. The programme includes all daily activities, from sport activities to leisure activities. The programme calculates the energy expenditure at the end of the day. NUBEL's Food Planner has been coupled to the Belgian database containing more than 4500 product brand names. This gives you the possibility to obtain a detailed diet history, to calculate the energy intake and to compare the results with the daily nutritional recommendations". The tip of the day informs the users about a healthy lifestyle, well-balanced nutrition, physical activity, how to use a food composition database.

Results: With this computer programme, NUBEL wishes to encourage people – young and seniors – to introduce physical activity in their daily lives and to achieve a good balance between energy intake and energy consumption. It is very important that the population and in particular the children have a stable energy-balance.

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

An Ethnographic Report on the Collaborative Design of an Interface for Student Nutrient Database Users

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University of North Texas

Purpose: This presentation describes my experiences as a participant-observer engaged in the development of a user interface for a software product utilizing a nutrient database. Drawn from the perspective of an educator experienced with nutrient analysis software, observations describe a dynamic partnership replete with issues of power and authority that ultimately shaped the design of the final product.

Methods: Observations were recorded in a series of memos that serve as a natural history of my experiences as a member of the project team. Writings were analyzed in a systematic manner that conceptualized the experience and charted my dual roles as an ethnographer conducting a field study and as a consultant immersed in the culture of a publishing house team.

Results and Implications: The development of a user interface for nutrient analysis software takes place within a cultural context that is expressed both directly and indirectly in the final design. Memo analysis revealed the tension between team member position and perceived expertise as group decisions were made ranging from the ordering of nutrients on printouts to critical issues of units of measurement and level of accuracy. Team acceptance of an educator-consultant as a member of importance impacted willingness to consider recommendations and modify design to improve utility for students. In this regard, impression management contributed to the quality of the final design.

Development of Downloadable and Printable Posters for Nutrition Information of Raw Fruits, Vegetables, and Fish

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Objective: In the United States, nutrition labeling for raw fruits, vegetables, and fish is voluntary. In order to encourage retail stores that sell these foods to participate in the voluntary nutrition labeling program, FDA has developed downloadable and printable posters containing nutrition information of the 20 most frequently consumed raw fruits, vegetables, and fish in the United States.

Material and Methods: The guidelines for voluntary nutrition labeling (21 CFR 101.45) were followed. The names and nutrition labeling values for the raw fruits, vegetables and fish are based on the updated nutrition labeling information published in the Federal Register on August 17, 2006 (which corrected the July 25, 2006 final rule). Adobe Illustrator was used to create poster files. To make the posters accessible to retail stores and the general public through FDA's website, PDF files were created from the Illustrator files. In addition to PDF files, HTML versions of the posters were created for accessibility and ease of online viewing.

Results: Downloadable and printable posters are now available on the FDA webpage: http://www.cfsan.fda.gov/~dms/nutinfo.html. Retail store operators can download the posters and print them for display to consumers in proximity to the relevant foods in the stores and for dissemination to consumers. FDA sent an electronic constituent update and newsletter, and contacted trade associations representing retail food stores to inform about the posters. FDA also encourages consumers to view the posters online and in retail stores.

Significance: Availability of downloadable and printable posters has made it easier for retail stores to participate in the voluntary nutrition labeling program. These posters will assist consumers plan a healthy diet and learn about the important nutrients contained in raw fruits, vegetables, and fish.

Building the MyPyramid Menu Planner Database

Kristin Marcoe, MBA, RD; Patricia Britten, PhD; Kellie O Connell, PhD, RD

Objective: To streamline a large database into a representative, easy-to-use subset of foods to support the usability of a new Web-based tool, MyPyramid Menu Planner. The Planner can be used to make food choices for 1 to 7 days; it provides feedback that compares choices to MyPyramid goals and limits.

Material and Methods: The National Health and Nutrition Examination Survey 2001-2002 (NHANES) database of approximately 7,000 foods was analyzed to identify a subset of the most commonly consumed foods within each food group, including condiments for these foods. Several new foods reported in the NHANES 2003-2004 and some from the USDA National Nutrient Database for Standard Reference, Release 19 were included. A consumer-friendly display name and one or more portion descriptions were chosen for each food. Search terms were added for foods known by more than one name. Portion gram weights and increments for varying portion sizes were chosen for each food or condiment. Pyramid cup or ounce equivalents for grains, vegetables, fruit, milk, meat and beans; teaspoons of oils; and total calories, grams of saturated fat, and calories from extras (solid fats, added sugars, alcohol), were calculated for each food portion using the MyPyramid Equivalents Database for USDA Survey Food Codes version 1.0 and the Food and Nutrient Database for Dietary Studies 1.0 and 2.0. The preliminary database, including display names, portion size names, increments, and food group and nutrient values, was reviewed by staff for completeness, reasonableness, and accuracy of calculated values.

Results: The database includes 1010 foods, with 61 used as condiments, their food description(s), portion sizes, incremental portion options, food group equivalents and selected nutrient data that support the primary function of the Planner.

Significance: The MyPyramid Menu Planner food database is integral in the consumer-focused functionality of the Planner and will permit users to plan menus to meet their MyPyramid recommendations.

Updating the DietAdvice Website with New Australian Food Composition Data

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Background: DietAdvice is an Australian self-administered dietary assessment website initially developed between 2003-2005 using 1995 food composition data. The website allows patients to enter their dietary information and dietitians to remotely access and interpret the data. DietAdvice is presently being updated.

Objective: To describe the update process for moving from 1995 to 2006 food composition data.

Material and Methods: The DietAdvice database was developed using grouped food data from NUTTAB 1995. All foods groups from the 1995 database were cross-matched with the food from NUTTAB 2006 data using ID codes. Rules were applied to all groups to determine the suitability of the food. New, ungrouped foods were considered individually and added to existing groups or grouped together on their own. Foods within each group were statistically weighted to determine the nutrient profile for each group.

Results: Using 1995 data, 19, 103 and 422 first, second and third levels groups were formed respectively. From the 2006 data an additional 623 foods needed to be individually considered and the final database contained 25, 126 and 439 first, second and third levels groups, respectively.

Significance: Ensuring the most recently food composition data is incorporated into the database will maximise the accuracy of the dietary advice provided by the dietitians who interpret the results.

FoodIMS: New Zealand's Web-Based Food Information Management System

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Objective: The New Zealand Food Composition Database (NZFCD) is managed by Crop & Food Research (CFR). When commissioning a new software system CFR's objectives were to ensure that the new system allowed data to be managed, stored, documented and evaluated and was suitably flexible to meet the rapidly evolving needs of users. Food Information Management Systems (FoodIMS) meets these objectives. With the upcoming 2008 Ministry of Health New Zealand Adult Nutrition Survey, it is vital to be able to report on up-to-date analytical nutrient data for foods in the NZFCD.

Material and Methods: CFR identified the required functionalities and Infinity Solutions * one of New Zealand's largest IT and consulting businesses * wrote the software code. The application is an n-tier J2EE application. As such, there is great flexibility in the deployment environment. The application can run under any standard J2EE application server. It has been tested under both WebSphere and JBoss, under Linux and Windows. The back end database can be hosted on any SQL compliant RDBMS, and has been tested with a Microsoft SQL Server and an Oracle 10g.

Results: The features of FoodIMS include: document details of sampling and analytical processes, view foods using an image library, generate customised reports, capture input and output details for reports, perform quality tests and define parameters for those tests, and perform recipe calculations.

Significance: The capabilities that differentiate FoodIMS from other food composition database software systems include: user-input data (`raw' data) is separately stored, the unit of measure conversions are automatically calculated, and `provisional' data is stored separately from `assigned' data. New kinds of information can be stored without having to change the software, i.e. users can define numeric attributes (e.g. a new fatty acid) and calculate formulas for numeric attributes and non-numeric attributes.

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