42nd National Nutrient Databank Conference

125 Years of Food Composition: Where We've Been and How We're Evolving Globally

Virtual Meeting May 16 to 18, 2022
Program and Abstracts

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Note of Departures & Acknowledgements

Steering Committee departures:

The National Nutrient Databank Conference is thankful to all the contributions of the following volunteers, all of whom gave generously of their time, talents, and energy to the conference.

- **Winnie Cheung** (Publicity Committee Chair, Program Committee)
- **Rachel Fisher** (Steering Committee)
- **Alison Kretser** (Program Committee)
- **Laura Sampson** (Steering Committee)

Thank you

Gracias

शुक्रिया

Merci

Mahalo

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ありがとう

Grazie

Danke sehr

谢谢

Obrigado

شكرا لك

Terima kasih

Dziękuję Ci

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Westat provides innovative professional services support to clients in addressing challenges to improve outcomes in health, education, social policy, and transportation. Our nutrition work includes development of dietary data collection tools, such as the ASA24, dietary data collection and analysis, database harmonization, and methodology to support numerous federal policy initiatives. We are dedicated to improving lives through research.

In Memoriam

Phyllis Stumbo (1934-2017)
University of Iowa

Marilyn Buzzard (1934-2015)
Nutrition Coordinating Center at the University of Minnesota and Virginia Commonwealth University

Joanne Holden (1946-2014)
Research Leader, USDA Nutrient Data Lab

Frank Hepburn (1922-2003)
Leader, USDA Nutrient Data Research Group

Ruth Matthews (1927-2000)
Chief, USDA Nutrient Data Research Branch

Robert Rizek (1931-1997)
Director of Consumer and Food Economics Research Division, USDA

Margaret Carrington Moore (1896-1995)
Louisiana State University Health Sciences Center, New Orleans, LA

The National Nutrient Databank Conference remembers and recognizes the contributions of the late volunteers, all of whom gave generously of their time, talents, and energy to the conference

Message from the NNDC Executive Committee Chair

Welcome to the 42nd National Nutrient Databank Conference and our 2nd all virtual meeting. Our personalized, interactive platform is designed to enhance your conference experience allowing attendees to view all sessions and posters during their schedule presentation times and at your leisure thereafter. We encourage you to network with other attendees at one of our virtual activities, view sponsor booths, and view information for NNDC 2024 in Ottawa. This year's NNDC 2022 theme, *125 Years of Food Composition: Where We've Been And How We're Evolving Globally*, celebrates over 125 years of global advancements in food and nutrient databases promoting health and well-being worldwide. These advancements would not be possible without numerous strategic partnerships formed across our countless nutrition research partners representing academia, industry and government perspectives advancing food and nutrient composition research.

As NNDC Chair, we, the NNDC Executive and Steering Committee volunteers, wish to acknowledge and express our appreciation to the Program Committee lead by Thea Bourianne for their tireless efforts organizing our the 42nd NNDC program along with our Chair-Elect Pamela Pehrsson, Past Chair David Haytowitz for updating the NNDC website, Treasurer Lisa Harnack for her financial planning expertise our Grants Manager Julie Eichenberger-Gilmore for securing grant support for this conference, and Historian Thea Zimmerman for preserving our legacy. This year's program is the culmination of 2 year's work, and we trust you will enjoy the thought provoking and stimulating experience. If we missed acknowledging anyone, please accept our apologies, please send the information so they may be acknowledged at the next meeting. On Tuesday, we honor the NNDC Recognition Awardees for 2018, Dr. Catherine Champagne who will give a brief presentation, and 2020 Awardee Mr. David Haytowitz.

Finally, my sincere appreciation goes to the 2020-2022 Executive Committee & Steering Committee for their helpful support, guidance, and encouragement to keep the 42nd NNDC moving forward during 2 years of a global pandemic. We welcome you to the 42nd NNDC and encourage you to network with your peers during the 42nd NNDC and join our volunteer community at the 43rd NNDC, in Ottawa!

Nancy J. Emenaker
NNDC Executive Committee Chair (2022)

Oral Presentation Schedule

Times are listed in US Eastern Daylight Time

Time	Monday, May 16th, 2022
10:00 AM	**Welcome and Introductory Remarks** **Nancy Emenaker, Chair**
10:15 AM	**Keynote Presentation** **David Jenkins** *Food composition databases, how they need to evolve to meet the nutrition research needs of the future – A look at carbohydrates*
11:15 AM	Break (15 mins)
11:30 AM	**Session 1: Government Database Updates** Moderator: Thea Bourianne
11:30 AM	Andrea Lindsey Operation Supplement Safety Ingredient Database: An Encyclopedic Collection of Ingredients
11:50 AM	Isabelle Rondeau & Marie-France Verreault The past, present and future of the Canadian Nutrient File and the Nutrition Survey System
12:10 PM	Natalie Partridge New Directions for the USDA's Child Nutrition Database - Where We Are Now
12:30 PM	Kyle McKillop Updates on USDA's FoodData Central, Current and Future Approaches to Food Composition Data at the USDA
12:50 PM	Session Q&A (15 mins)
1:05 PM	Lunch (45 mins)
1:50 PM	**Session 2: Advances in Nutrient Metadata for Dietary Assessment** Moderator: Catherine Champagne
1:50 PM	Alanna Moshfegh Gateway to Advancing Nutrient Profile Calculations in FNDDS
2:10 PM	James Harnly Variability in Foods: The Logic Behind Foundation Foods
2:30 PM	Linda Kantor

	Using the ERS Food Purchase Groups to Assess the Healthfulness of Food Purchases and Acquisitions
2:50 PM	Edwina Wambogo Potential Bias of Nutrient Intake Estimates Due to Using Nonsynchronous Versions of USDA's Food and Nutrient Database for Dietary Studies (FNDDS): NHANES 2015-2018
3:10 PM	Session Q&A (15 mins)
3:25 PM	**Session 3: Novel Applications of Nutrient Data** Moderator: Mary L'Abbé
3:25 PM	Adrianne K. Griebel-Thompson Dietary and Supplemental Iodine Intake and Urinary Iodine Concentration of Pregnant Women in the Midwestern United States
3:45 PM	Majd Jauhary-Nayfeh Simulating Changes in Sodium and Potassium Within Manufactured Foods in the U.S.
4:05 PM	Lauren O'Connor Estimating Lean and Non-Lean Oz-Equivalents of Red Meat and Poultry Using The USDA's Food Patterns Equivalents Database
4:25 PM	Julie Hess Modeling Dairy-Free and Vegan USDA Food Patterns
4:45 PM	Session Q&A (15 mins)
5:00 PM	**Day 1 Wrap-Up**
Time	**Tuesday, May 17th, 2022**
10:00 AM	**Keynote Presentation** **Gary Beecher and Naomi Fukagawa**
11:00 AM	Break (15 mins)
11:15 AM	**Session 4: International Perspectives** Moderator: Pamela Pehrsson
11:15 AM	Tahrir Aldhirgham Development of The Saudi Branded Food Database: Branded Beverage Database Chapter: Aims, Design and Structure

11:35 AM	Mary L'Abbé Development of the Food Label Information Program (FLIP): A Comprehensive Branded Food Composition Database for Canada and Latin American Countries
11:55 AM	Julia Lorenzana Peasley Adapting a US Dietary Analysis Software and Database for Use in Brazil
12:15 AM	Brienna Larrick A Partnership for Public Health: A Journey of Global Expansion of the USDA Global Branded Food Products Database
12:35 PM	Session Q&A (15 mins)
12:50 PM	**NNDC Recognition Awards:** **Catherine Champagne (2018)** **David Haytowitz (2020)** Introduction: Nancy Emenaker Lunch (45 mins)
1:35 PM	**Session 5: Expanding Food Composition Beyond Nutrients** Moderator: Judith Spungen
1:35 PM	Pamela Pehrsson Approach for Developing Special Interest Databases on Compounds of Public Health Importance
1:55 PM	Kellie Casavale FDA's Closer to Zero Action Plan – Reducing the Effects of Toxic Element Exposures to Children
2:15 PM	Carrie Martin Updating the Flavonoid Database for USDA Survey Food Codes 2007-2010 to Estimate Intakes in What We Eat in America, NHANES 2017-2018
2:35 PM	Session Q&A (15 mins)
2:50 PM	Break (15 mins)
3:05 PM	**Session 6: Spotlight on Nutrition Analysis of Specific Food Categories** Moderator: Julie Eichenberger
3:05 PM	Jee Hyun Lee Differences in the Nutritional Content of Ready-To-Eat Cereals, Cereal/Granola Bars, and Savory Snacks Available for Sale to School Food Service Versus Food Retailers

3:25 PM	Lisa Harnack Nutrient Composition Variability of Plant-Based Ground Beef Alternative Products Available in the U.S. Marketplace in 2019
3:45 PM	Ying Li Co-occurrences of Top Ingredients and Additives Used in Bread Products in the United States
4:05 PM	Megan Edelman Dietary Fiber Content of Refined Grain Pasta is Underreported in Nutrient Databases
4:25 PM	Session Q&A (15 mins)
4:40 PM	**Day 2 Wrap-Up**
Time	**Wednesday, May 18th, 2022**
10:00 AM	**Keynote Presentation** **Johanna Dwyer** *Do Adult Multivitamin/Mineral (MVM) Supplements Fill Critical Nutrient Gaps?*
11:00 AM	**Poster Awards**
11:15 AM	**Session 7: Advancements in Database Technology and Analysis** Moderator: Thea Zimmerman
11:15 AM	Kyle McKillop Food Composition and Graph Database, USDA's FoodData Central Technology Transfer to a Neo4j Graph Database
11:35 AM	Hande McGinty Evolving Chemical Composition Data Representations of Food Using Semantic Web
11:55 AM	Sidra Ahsan Guiding Principles and Considerations in Transfer and Sharing of Research Data
12:15 AM	Jaspreet Ahuja IngID, A Framework for Parsing and Systematically Reporting Ingredients Used In Commercially Packaged Foods: Its Development, Current Features, and Potential Applications

12:35 PM	Colin Kay Development of a Nutrition Knowledge Database To Support Precision Nutrition
12:55 PM	Session Q&A (15 mins)
1:10 PM	Lunch (45 mins)
1:55 PM	**Session 8: Influence of Consumer Behavior on Nutrition Research** Moderator: Yong Zhu
1:55 PM	Birdem Amoutzopoulos Evaluation of the Rationalization of the UK Nutrient Databank to Enable the UK National Diet and Nutrition Survey (NDNS) to Move to a Web-based 24hr Recall (Intake24)
2:15 PM	Donna Rhodes Food and Nutrient Database for Dietary Studies 2019-2020: An Application Database for National Dietary Surveillance
2:35 PM	Andrea Carlson Measuring Added Sugar Purchases and Habits 2013-2018: Using Retail- and Household-Based Food Scanner Data for Nutrition Monitoring
2:55 PM	Lisa Harnack An Approach to Enhancing a Food and Nutrient Database to Include Foods Unique to Jamaican, Haitian, Nigerian, and Somali Cooking Traditions in the U.S.
3:15 PM	Session Q&A (15 mins)
3:30 PM	Break (15 mins)
3:45 PM	**Session 9: Dietary Assessment of the Glycome** Moderator: Alanna Moshfegh
3:45 PM	Nikita Bacalzo Glycopedia: A Glycan Encyclopedia of Food
4:05 PM	Jules Larke Sources of Specific Monosaccharides From Foods and Ingredients Commonly Consumed by Healthy Adults
4:25 PM	Danielle Lemay Surveying Nutrient Assessment with Photographs of Meals (SNAPMe): A Dataset of Food Records and Companion Meal Photos

4:45 PM	Session Q&A (15 mins)
5:00 PM	**Oral Presentation Awards and Closing Remarks**

5:30 PM	**NNDC Steering Committee Meeting**

CPE credits – An Individual's Responsibility

For dietetic professionals who wish to receive Continuing Professional Education (CPE) credits for attending the activities that correspond to the performance indicators noted in your Learning Plan within your professional portfolio (e.g. attending virtual conferences), please note it is the individual's responsibility to submit the required information.

The NNDC will not provide certificates of attendance for this purpose. For more information, please visit the following link from the Commission on Dietetic Registration:

https://www.cdrnet.org/pdp-guide-featuring-essential-practice-competencies

Oral Presentation Abstracts

Session 1. Government Database Updates

1. **Operation Supplement Safety Ingredient Database: An Encyclopedic Collection of Ingredients**

Authors: Andrea T. Lindsey MS[1,2]; Carol M. Stockton M.ARCH[1,2]; Melissa Givens MD, MPH[1]; Gabrielle Couture MPH[1,2]; Jacqueline Forster MS[1,2]; Patricia A. Deuster PhD[1]
1. Consortium for Health and Military Performance, Department of Military & Emergency Medicine, F. Edward Hébert School of Medicine, Uniformed Services University, Bethesda, MD 20814, USA
2. Henry M. Jackson Foundation for the Advancement of Military Medicine, Bethesda, MD 20817, USA

Background: Operation Supplement Safety (OPSS) is a Department of Defense (DoD) program that provides evidence-based information about dietary supplements (DS) to Service Members, their families, healthcare providers, and leaders. OPSS fields questions from and advises Service Members on DoD prohibited ingredients to support informed decision making.
Objective: OPSS is developing a comprehensive database that will list all DS ingredients with their various synonyms, to include prohibited ingredients, that have been found in DS often used by Service Members.
Description: Operation Supplement Safety Ingredient Database (OPSSID) is a compilation of substances that have been encountered in DS. OPSSID includes 1) various terms by which an ingredient is or could be listed on the label of a product; 2) red, yellow, green or gray ratings that represent whether it is prohibited for use by Service Members, could result in minor to significant health risks, presents no significant health risks when used as recommended, or insufficient information to establish color code for risk, and 3) warnings for certain ingredients with known specific side effects. The database currently includes >1200 substances, including >7000 alternate names. The substances were initially chosen to include ones on the current list of Dietary Supplement Ingredients Prohibited by the DoD, substances present in approximately 1400 dietary supplement products we have received questions about between 2020 and 2021, or substances not listed on labels, but identified by laboratory testing performed by OPSS and its partners.
Data sheets for each substance will be continuously developed with terms and safety related information. Sources will include an array of reputable online databases coupled with scientific literature to support ratings, warnings, or other federal advisories.
Conclusion: OPSSID is a robust, unique and comprehensive database of dietary supplement ingredients that will serve DoD, our federal partners, and the public at large.

2. **The past, present and future of the Canadian Nutrient File and the Nutrition Survey System**

Author(s)*: Isabelle Rondeau[1], Isabelle Masarelli[1], Marie-Claude Mallet[2], Marie-France Verreault[2]
[1]Bureau of Food Surveillance and Science Integration, [2]Bureau of Nutritional Sciences Health Products and Food Branch, Health Canada, Ottawa

Background: The Canadian Nutrient File (CNF) is Canada's national food composition database. The Nutrition Survey System (NSS) is a food, recipe and nutrient database created for surveillance purposes. Both databases were developed by Health Canada to support food consumption and nutrition surveys, which serve as the evidence-base for the development of nutrition policies, guidelines and regulations.
Objective: To highlight the history, current developments, and future directions of the CNF and the NSS.
Description: Canada's first computerized food and nutrient database was developed in 1968. Over the years, several versions of the Canadian Nutrient File (CNF) have been released to the public and in different formats. The first public version of the CNF was published in 1981 on magnetic tapes and the most recent online version in 2015. The CNF2015 includes information on over 5500 foods and more than 150 nutrients.
The in-house Nutrition Survey System (NSS) was created in the 1990's as a nutrition survey data entry tool, processing system and a recipe management tool. The current use of the NSS has evolved from a survey tool to a food and nutrition surveillance database that includes more than 3,400 recipes, selected foods from the CNF and survey specific foods. CNF and NSS were housed on outdated platforms with limited enhancement and automated capabilities. In 2021, the Canadian Nutrient Database System (CNDS) was created. It features enhanced database functionalities combining both CNF and NSS. In the future, branded food products and other surveillance data will be integrated to this platform.
Conclusion: The CNF and NSS have been a reference for researchers, policy makers and health professionals in Canada. The new CNDS platform will improve data quality and management, as well as sharing of food composition data to support the monitoring of the food supply in Canada.

3. New Directions for the USDA's Child Nutrition Database - Where We Are Now

Author(s): Natalie Partridge, MS, RD; Bethany Showell, MPA; Anne Garceau, MS, RDN; and Rebecca MacIsaac MS, RD; Nutrition, Education, Training and Technical Assistance Division, USDA-Food and Nutrition Service (FNS)
Background: The United States Department of Agriculture's (USDA) Child Nutrition Database (CNDB) is a publicly available database required for nutrient analysis software approved by FNS for use in the National School Lunch Program and School Breakfast Program. FNS is currently modernizing the CNDB with the goal of improving the quality and quantity of food data available to school program operators. **Objective:** To describe the status of the CNDB modernization focusing on the new data collection process from food manufacturers for products marketed and sold to school food service. **Description:** FNS worked with A Partnership for Public Health: The USDA Global Branded Food Products Database (the Partnership) to utilize their existing process to obtain nutrient and serving size data from GS1 GDSN. When submitting data to GS1 GDSN for their products marketed and sold to school food service, manufacturers can select the new trade channel for "Child Nutrition Food Programs" along with the Global Location Number (GLN) for the Global Branded Food Products Database (GBFPD) to provide their product data to the CNDB. To transition to the new process for this year's database release, manufacturers had a choice to submit using the traditional process with an Excel spreadsheet or the new process. Changes were made to the database fields and

structure to accommodate the data obtained through the GBFPD process. Plans are in place to fully implement this process for the next CNDB release and explore new ways to obtain additional data sources included in the CNDB. **Conclusion:** The CNDB, provided to school program operators via USDA-approved nutrient analysis software, is an important and widely used resource. Modernizing the CNDB methodology is essential, as it plays a critical role in analyzing school meals to ensure they meet the nutrient requirements of Child Nutrition Programs.

4. **Updates on USDA's FoodData Central, Current and Future Approaches to Food Composition Data at the USDA**

Authors: Kyle McKillop[1], James Harnly[1], Naomi Fukagawa[1], Alanna Moshfegh[1], Pamela Pehrsson[1], and John Finley[2];
1. USDA ARS Beltsville Human Nutrition Research Center, Beltsville, MD 20705, USA.
2. USDA ARS Office of National Programs, Beltsville, MD 20705, USA.

Objective: A dynamic US food supply and need for assessment of diet on health demands transparent, easily accessible information on foods and food components and related data on production and variability for researchers, health and nutrition policy makers and professionals, and food manufacturers.

Materials and Methods: USDAs FoodData Central (FDC) is an integrated system with five unique types of data: 1) Foundation Foods - data for food components including nutrients derived from analyses, and metadata for a range of single foods and ingredients providing insights into variability. Foundation Foods highlight information on samples and acquisition details.; 2) SR Legacy (2018), the final release of Standard Reference (SR); 3) The Food and Nutrient Database for Dietary Studies (FNDDS) - nutrient values for foods and beverages reported in What We Eat in America, National Health and Nutrition Examination Survey (NHANES); 4) the USDA Global Branded Food Products Database, industry-provided label data for over 380,000 foods from a public-private partnership; and 5) Experimental Foods Data produced under experimental conditions such as those derived from an experimental design, new analytical methodology and/or are based on innovative sampling procedures for foods used for research purpose only.

Originally launched in 2019, FoodData Central is finishing its third year. The Foundational Food and Experimental Food datasets continue to expand and monthly updates to the global branded products database are now provided. The data system has seen changes to its data structure, a transfer to a new database technology, updates and additions to the website's feature set, and continued plans for database interoperability. New data, foods and sample information are continuously added and provide research insights on attributes that influence variability of classic nutrients and emerging bioactive compounds of public health importance.

Significance: Researchers, health professionals and consumers can access and download the data they need with transparency.

Session 2. Advances in Nutrient Metadata for Dietary Assessment

1. **Gateway to Advancing Nutrient Profile Calculations in FNDDS**

Authors: Alanna Moshfegh[1], MS, RD; James Friday[1], BS; Donna Rhodes[1], MS, RD; Kyle McKillop[2], MS; David Yunkong Pan[3], BS

[1]U.S. Department of Agriculture, Agricultural Research Service, Beltsville Human Nutrition Research Center, Food Surveys Research Group
[2]U.S. Department of Agriculture, Agricultural Research Service, Beltsville Human Nutrition Research Center, Methods and Application of Food Composition Laboratory
[3]Joint Institute for Food Safety and Applied Nutrition, Center for Food Safety and Security Systems, University of Maryland

Background: The US Department of Agriculture produces the Food and Nutrient Database for Dietary Studies (FNDDS), an application database designed to convert foods and beverages consumed in What We Eat In America (WWEIA), NHANES into gram amounts and determine their nutrient values.

Objective: The objective of this presentation is to describe the procedure for determining nutrient profiles in FNDDS and plans for modernizing the process including development of a public application for recipe processing.

Description: FNDDS is made publicly available to document the nutrient profile of energy and 64 nutrients/100 grams for each food/beverage consumed in the survey. Since it is impossible to chemically analyze each food, nutrient profiles for the majority of foods and beverages in FNDDS are generated using a recipe calculation process with two or more 'ingredients'. The resource for the underlying ingredient nutrient values includes Standard Reference Legacy and Foundation Foods, two data types in USDA's FoodData Central (FDC). The recipe calculation process comprises three summarized steps: 1) selection of each ingredient and gram amount, 2) application of adjustments that consider changes in nutrient content during preparation such as moisture change and nutrient retention factors, and 3) computation of nutrient values resulting in the nutrient profile. The current inhouse recipe calculation software requires a moderate degree of unique set-up and expertise to use effectively. Effort is underway to modernize the recipe processing program with the application of new technologies and streamlined procedures to enhance efficiency. Plans include adapting this modernized version to an application publicly available through FDC.

Conclusion: The massive increase in the number of commercial and restaurant food products available dictate the recipe calculation process will continue to be an important application in development of FNDDS. Modernizing the process and making the application publicly available will enhance timely development and further transparency of FNDDS.

2. Variability in Foods: The Logic Behind Foundation Foods

Authors: James Harnly, Pamela Pehrsson, Kyle McKillop, Alanna Moshfegh, Naomi Fukagawa, John Finley
Beltsville Human Nutrition Research Center and Office of National Programs, Agricultural Research Service, US Department of Agriculture, Beltsville, MD, USA

FoodData Central (FDC), USDA's national food data system, includes Foundation Foods (FFs), a new datatype for single ingredient foods and basic food ingredients. One of the major goals of FF is to allow users to view the variability of individual samples and examine the variance arising from genetics, environment, management, and processing. Every plant grown in a greenhouse or growth chamber (carefully controlled environments) will have natural differences in their chemical profiles based on biological variability. This variability increases with genetics (e.g., different cultivars), with environment (e.g., across a field, between fields, and between national locations due to

soil quality, rainfall, and temperature), with management, (e.g., fertilization, conventional or organic farming), and with processing, (e.g., handling, storage, shelf life, cooking, or something as simple as cutting up a clove of garlic). Although these sources of variance seldom dramatically change the appearance of the plant, the chemical profiles may be dramatically altered. The intent of FFs is to identify the most significant factors (metadata) and collect samples (a minimum of 6) that reflect the variability found in the US food supply. FFs focuses on single ingredient foods and basic foods (lightly processed foods, e.g., grinding, pressing, or shucking) as the building blocks of every complex food in the US diet. In addition, FFs offer the simplest, most controlled source of variability compared to the complexity foods on the dinner plate. Data characterizing the variability of the food supply provides the research infrastructure necessary to support nutrition research, food production, and, in the near future, personalized nutrition.

3. Using the ERS Food Purchase Groups to Assess the Healthfulness of Food Purchases and Acquisitions

Authors: Linda Kantor, MS (Corresponding author): USDA, Economic Research Service, linda.kantor@usda.gov; 202-694-5392 (due to COVID-19 the USDA remains on full telework so please contact Linda Kantor for mailing address if needed)
Andrea Carlson, PhD: USDA, Economic Research Service
Elina Page, PhD: USDA, Economic Research Service
Mary Muth, PhD: RTI International

Background: USDA uses several methods to group individual food items into broader categories for dietary assessment. The *What We Eat in America Food Categories* allow researchers to analyze foods and beverages as consumed in the American diet. USDA's Center for Nutrition Policy and Promotion developed *MyPlate* to synthesize the recommendations from the *Dietary Guidelines for Americans* into food groups that are the foundation of a healthy diet. USDA's Food Plans, which represent a nutritious diet at four different cost levels, use even more granular food groupings that consider both nutrient profiles as well as cost and consumer preferences. The Economic Research Service's Food Purchase Groups (EFPGs) provide an innovative food classification system that goes beyond existing methods to consider the form in which foods are purchased and how it relates to diet quality. These food groups aid researchers in sorting hundreds of thousands of food items from supermarket scanner data into food groups for policy-based research.

Objective: To describe the development, characteristics, and research applications of the ERS Food Purchase Groups.

Description: The EFPGs classify food items into one of 82 categories using multiple data sources, including ingredients, nutrient profile and grocery store aisle. The groups support research on the economic determinants of food choice by capturing food attributes, such as convenience and preparation method. For example, frozen spinach with an added sauce is classified as a frozen ready-to-heat food, rather than a frozen vegetable. Rotisserie chicken is grouped in ready-to-eat foods instead of fresh or frozen poultry. The categories are hierarchical and flexible and can be adjusted to meet individual research needs.

Conclusion: A novel method to categorize foods in their "as purchased" form can provide researchers with insight into how consumers balance time constraints, dietary

restrictions, tastes, preferences, and cooking or preparation skills when making food choices.

4. **Potential bias of nutrient intake estimates due to using nonsynchronous versions of USDA's Food and Nutrient Database for Dietary Studies (FNDDS): NHANES 2015-2018**

Author(s)*: [1]Edwina Wambogo, [1]Ana Terry, [1]Craig Hales, [1]Ryne Paulose, [1]Namanjeet Ahluwalia
[1]Centers for Disease Control and Prevention, National Center for Health Statistics

Objectives: USDA updates FNDDS biannually to incorporate new foods and beverages and any nutrient composition changes to existing foods. Nutrition studies often estimate macro- and micro-nutrient intakes using FNDDS nutrient values from the past. Using NHANES, we examined the potential bias of this practice.
Materials and Methods: Intake of 29 macro- and micro-nutrients in the US in 2015-16 were compared by mapping NHANES day 1 dietary recall Individual Foods files (DR1IFF) to both the synchronous 2015-16 FNDDS and the nonsynchronous 2013-14 FNDDS, and likewise using 2017-18 NHANES DR1IFF and both 2017-18 and 2015-16 FNDDS versions. Pairwise *t* tests were used to examine the difference in intake overall and by age, sex, race and Hispanic origin, and income.
Results: About 15% of food and beverage items reported in 2015-16 NHANES were not present in 2013-14 FNDDS, while 3.5% of those reported in 2017-18 NHANES were not present in 2015-16 FNDDS.
Compared to using synchronous FNDDS, using nonsynchronous 2013-14 FNDDS with 2015-16 NHANES resulted in significantly lower (5-30%) estimated intakes for all 29 nutrients overall and by socio-demographic factors. Using nonsynchronous 2015-16 FNDDS with 2017-18 NHANES resulted in significantly lower intakes for 11 of 29 nutrients (all macronutrients, vitamin A, Ca, Mg, P, and K), overall and in the subgroups. Differences were not consistent for the remaining nutrients.
Significance: Use of a nonsynchronous version of FNDDS to estimate nutrient intakes from a study underestimates nutrient intake overall and by key sociodemographic factors.

Session 3. Novel Applications of Nutrient Data

1. **Dietary and Supplemental Iodine Intake and Urinary Iodine Concentration of Pregnant Women in the Midwestern United States**

Author(s)*: Adrianne K. Griebel-Thompson, MS, RD, LD, CLC[1]; Scott Sands, PhD[1]; Lynn Chollet Hinton, PhD, MSPH[2]; Danielle Christifano, PhD[1]; Debra K. Sullivan, PhD, RD[1]; Holly Hull, PhD[1]; Susan E. Carlson, PhD
[1]Maternal and Child Nutrition and Development Lab, Department of Dietetics and Nutrition, University of Kansas Medical Center, Kansas City, KS 66160, USA. [2]Department of Biostatistics and Data Science, University of Kansas Medical Center, Kansas City, KS 66106, USA.

Objective: Iodine (I) is essential for optimal fetal growth and development. The USDA, FDA and ODS-NIH Database for the Iodine Content of Common Foods (ICCF) provided the first opportunity for US dietary I intake to be estimated. In a large pregnancy cohort

in the Midwestern US, we estimated overall dietary and supplemental I intake and related I sufficiency (urinary I concentration or UIC ≥150 mg/L) to total I intake.
Materials and Methods: Urine was collected between 12-20 weeks of gestation from 966 women participating in a pregnancy DHA supplementation trial. Participants were interviewed about their dietary intake at baseline and supplement intake several times during the study. UIC was measured using a modified Sandell-Kolthoff reaction. Dietary I intake was estimated using the ICCF.
Results: Median I intakes from diet and supplements were 108.8 and 81.0 µg/day, respectively (median total intake 188.5 µg/day, range 5-5219 µg/day). Median UIC was 154.2 µg/L. Participants were divided into groups not taking a supplement with I (n=437) or taking a supplement with I (n=529, dose range 3-567 µg/day). 259 participants (26.8%) consumed a supplement with the recommended amount of I (150 µg/day). By UIC, 42.9% taking a supplement were insufficient, while 54.2% of those not taking a supplement were insufficient (Chi-square analysis: χ^2=12.3, p=0.0005).
Significance: Median I intake from diet was below the EAR (160 µg/day) and fewer than 30% met the recommendation of 150 µg/day of supplemental I intake. The EAR was met by supplements and dietary I together. By UIC, nearly half of the participants were insufficient. A higher proportion of participants in the adequate group was taking an I supplement. Our results suggest that I insufficiency is evident in the regions sampled (Kansas City, KS; Cincinnati and Columbus, OH).

2. Simulating Changes in Sodium and Potassium Within Manufactured Foods in the U.S.

Authors: Majd Jauhary-Nayfeh B.S., Samara Joy Nielsen PhD, MDiv
Abstract and poster to be considered for Award Competition.
Advisor's Name (Student) or Supervisor's name (New Investigator): Samara Joy Nielsen PhD, MDiv (Majd Jauhary-Nayfeh) School: Russell Sage College
Objective: Sodium, potassium, and iodine are three major nutrients that contribute to the body's physiological homeostasis. Elevated sodium levels can lead to high blood pressure and an increased cardiovascular disease risk. Yet, recent studies have emphasized the importance of the sodium/potassium ratio and its association with blood pressure. Within the U.S. population ages ≥ 1 year, sodium consumption averaged 3,397 mg/day, exceeding the Dietary Guidelines for Americans' (DGA) recommendation of 2,300mg/day. Potassium's mean daily intake for the same population was 2,497mg/day with DGA of 2,600 mg/day for adult females and 3,400mg/day for adult males. However, iodine-deficiency diseases have been resurfacing within the US and globally, partly due to the decrease in iodine-fortified salt consumption.
In our analysis, we will simulate small shifts of sodium and potassium levels in different manufactured foods and discuss the importance of adding iodine-fortified salts.
Materials and Methods: Using the 2017-2018 National Health and Nutrition Examination Survey's (NHANES) 24-hour recall and the What We Eat in America Survey (WWEIA), we will simulate 25% sodium reduction in the following categories: deli meat sandwich, soup, and savory snacks since they were three of the top 10 contributors to sodium consumption in the American diet. We will examine six age groups: 2-5, 6-11,12-19, 20-39, 40-59 and 60 + year-olds.
Results: There was 3.8-4.7% overall decrease in sodium consumption and an increase of 1.8-2.8% in potassium consumption per each age category. The group with the

greatest sodium reduction was the 60+ year-olds, while the largest potassium increase was among the 20-39 year-olds.
Significance: Drastic dietary changes on a national scope in a short period of time are unrealistic. Therefore, the best suggested intervention would be to approach US manufacturers in the intent of reducing sodium content while substituting the remainder of salt with iodine fortified versions containing KIO_3.

3. Estimating Lean and Non-Lean Oz-Equivalents of Red Meat and Poultry Using The USDA's Food Patterns Equivalents Database

Authors: Lauren E. O'Connor[1], PhD, MPH, Kelly A. Higgins, PhD, MPH[1], Kirsten A. Herrick, PhD, MSc[2]
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Background: The 2020-25 Dietary Guidelines for Americans' recommended healthy dietary patterns are modeled with lean red meat and poultry to limit solid fats (SF). A standardized method of modeling lean and non-lean red meat and poultry would expand dietary pattern modeling applications, e.g. to younger age groups without SF limits.
Objective: To develop a method to estimate lean and non-lean oz-equivalents of meat and poultry intake for US populations.
Description: USDA 8-digit food codes from the 2017-18 Food Patterns Equivalents Database (FPED) were divided into two groups using the What We Eat In America categories: meat (i.e. red meat), poultry, and cured meat/poultry (i.e. processed red meat and processed poultry) as whole foods (WF, n=567) and mixed dishes (MD, n=1308). Gram weight of SF in meat, poultry, and cured meat greater than 2.63 g is allocated to the SF FPED variable. Therefore, for WFs, SF was converted into oz-equivalents and added to the corresponding lean meat FPED variable. For MDs, food codes were disaggregated into ingredients by merging in ingredient data from the 2017-18 Food and Nutrient Database for Dietary Studies. Grams of SF from the Food Patterns Ingredients Database (FPID) were converted into oz-equivalents and added to the respective lean meat FPID variable at the ingredient level. If an ingredient code corresponded to more than one type of meat, then SF was distributed evenly. Ingredient weights were adjusted to be proportional to the weight of the 8-digit parent food code recipe. Lean and non-lean meat oz-equivalents were then aggregated at the 8-digit food code level and amounts were readjusted to 100g recipe weights. All tasks were performed in SAS.
Conclusion: These novel FPED-aligned variables can be merged into participant-level intake data to estimate intakes of lean and non-lean red meat and poultry (processed and unprocessed) for dietary patterns research.

4. Modeling Dairy-Free and Vegan USDA Food Patterns

Authors: Julie Hess, PhD, USDA-ARS Grand Forks Human Nutrition Research Center
Objective: The 2020 Dietary Guidelines for Americans (DGA) recommends three dietary patterns for Americans, including a Healthy Vegetarian Dietary Pattern (HVDP). The

objective of this study is to assess whether the HVDP can be adapted for dairy-free and vegan diets while providing adequate nutrition for healthy adults.
Materials and Methods: Using the same food pattern modeling procedures as the 2020 DGA, we assessed the energy and nutrient composition of two alternative models of the 2000-calorie HVDP—dairy-free and vegan. For both models, we replaced the dairy food composite with a dairy alternative composite (dairyALT) comprised of fortified soy milk and yogurt. For the vegan model, eggs were replaced with equal proportions of vegetarian protein foods.
Results: Dairy-free and vegan models required minimal changes to the original HVDP. Servings of vegetables, fruits, grains, oils, and discretionary calories remained the same. The content of total fat, iron, riboflavin, niacin, and vitamin K increased in both models by 10-20% (all comparisons are relative to the original HVDP). Polyunsaturated fat, linoleic acid, linolenic acid, copper, vitamin D, and vitamin B_{12} increased by ≥20% in both models. Choline increased by 27% in the dairy-free model. Protein, sodium, and zinc decreased by 10-20%, while cholesterol and phosphorus decreased by ≥20%. Selenium decreased by 15% in the vegan model. Carbohydrate, fiber, saturated fat, EPA, DHA, calcium, magnesium, potassium, vitamin A, vitamin E, vitamin C, thiamin, and vitamin B_6 changed ≤10%. Both models contain adequate nutrition to meet Dietary Reference Intakes (DRIs) for most age and sex groups for which a 2000-calorie diet may be appropriate. Zinc is the only nutrient that was below the DRI for adult males.
Significance: The dairy-free and vegan HVDP models could help adults who choose not to consume dairy foods and/or other animal products to follow nutritionally adequate dietary patterns.

Session 4. International Perspectives

1. **Development of The Saudi Branded Food Database: Branded Beverage Database Chapter: Aims, Design and Structure**

Authors: Tahrir Aldhirgham[1],*, Nouf Alammari[1], Ghzail Aljameel [1], Aishah Alzuwaydi[1], Sarah Ali Almasoud[1], Sara Alawwad[1] , Nouf Alabbas[1], Amani S. Alqahtani[1]
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Background: Food composition data is fundamental for many governmental and nongovernmental activities such as food policy development, research conduction, national health status assessment, food advertisements and labelling development and assessment.
Objective: The Branded Beverage Database is the first part of structured initiative to develop Saudi branded food database.
Description: Between June and October 2021, local and international beverage labels entered into 1748 records as they appear on the pictures of their packages by a group of dedicated researchers. The food-label pictures were mainly obtained from the Saudi food and drug authority (SFDA) Food Registration System. Followed by a local super market scan and pictures collection to ensure most bevergaes are included in the database. Data were collected in five sections; beverage general information, nutrition composition for mandatory nutrients and extra nutrients, ingredient list and added sugar types, on-pack communication, and front-pack nutrition label. Beverages are classified based on their type shown on the label into 12 categories (water, milk, milkshakes, Laban, yoghurt drinks, fruit juices, pre-packaged coffee, iced tea, soft drinks, malt drinks,

energy drinks, and sports drinks. Quality and completeness of data monitored daily, then, random records (5%) from each researcher entries are cross-checked against the original source (pictures). In addition to timely error report and daily and weekly meetings and group discussions to ensure consistency and correctness of data entry. A descriptive analysis of the database variables indicates that 49.9% (n=872) of the products were imported, and 50% (n=876) of the products were locally produced. SFDA Food Registration System was the source of 83.9% (n=1468) of pictures. While 16.9% (n=280) were collected from the local market.
Conclusion: The current project highlights the attainability and possibility of developing local Saudi food composition database for branded pre-packed food and beverage.

2. **Development of the Food Label Information Program (FLIP): a comprehensive branded food composition database for Canada and Latin American Countries**

Authors: Mary L'Abbé, CM, PhD[1], Mavra Ahmed, PhD[1], Alyssa Schermel, MSc[1], Adriana Blanco Metzler, MSc[2], JoAnne Arcand, RD, PhD[3]
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Objectives: Overview the Food Label Information Program (FLIP), a big data approach to the collection and evaluation of brand-name foods in Canada and Latin American countries (LAC) and present the latest methods used in the development of this database.
Methods: The University of Toronto's FLIP is a longitudinal cloud-based database of prepackaged foods and beverages in Canada (FLIP 2010, 2013, 2017 and 2020) and in LAC (FLIP-LAC 2015, 2018, 2021). Until recently, FLIP used an iPhone Data Capture App to collect photos of foods in grocery stores for data input into the FLIP database for each country. The most recent iteration in Canada, FLIP 2020, was enhanced using website "scraping" and artificial intelligence-enhanced optical character recognition (AI-OCR) to collect and manage food label information (e.g., nutritional composition, price, product images, ingredients, brand, etc.) on all foods and beverages available on 7 major Canadian e-grocery retailer websites. LAC food label data was collected in FLIP in 2015, 2018, 2021 using the iPhone App to evaluate sodium content in processed foods and compare with regional and national sodium targets.
Results: FLIP-Canada is comprised of 119,541 prepackaged products and has been used by governments and researchers across Canada for research, policy setting, monitoring, and consumer apps. FLIP-LAC is comprised of 17,353 products and data have been used to monitor progress against the 2015 PAHO targets and to set new sodium reduction targets for LAC. New data for 4 LAC (Argentina, Costa Rica, Panama, Peru) will be collected in 2022 to support and monitor sodium reduction programs and to analyze levels of other nutrients of public health concern in foods.
Conclusions: FLIP, with its comprehensive sampling and granularity and use of an in-store data capture app and/or webscraping/AI-OCR, is a powerful tool for evaluating and monitoring both the Canadian and LAC food supply.

3. **Adapting A Us Dietary Analysis Software and Database for Use in Brazil**

Authors: Lisa Harnack, DrPH, RD, MPH (University of Minnesota School of Public Health), Julia Lorenzana Peasley, MPH (University of Minnesota School of Public Health), Tassia do Vale, PhD (University of Sao Paulo, Brazil), Junia N. de Brito, PhD, MPH (University of Minnesota School of Public Health)

Background: Food and nutrient databases exist in many countries, but using these databases for dietary assessment can be challenging due to the lack of a software program to interface with the data. Additionally, some databases contain limited numbers of nutrients and foods. The Nutrition Data System for Research (NDSR), a dietary analysis software application maintained by the Nutrition Coordinating Center (NCC) at the University of Minnesota, contains numerous foods and nutrients. However, nutrient composition values are for foods available in the U.S.

Objective: Describe the process used to adapt NDSR to analyze 24-hour dietary recalls collected for infants and children in Brazil.

Description: Dietary recalls for the Brazil Kids Nutrition and Health Study were collected using a paper and pencil interview method and then entered into NDSR for nutrient analysis. Portuguese/English bilingual staff at the University of Sao Paulo (USP) carried out recall entry using a detailed recall entry protocol developed by staff at NCC with input from USP staff. To develop entry rules, we referenced a list of foods commonly consumed in Brazil. Then, a data entry rule was established for each food to ensure the food selected in NDSR was a close nutritional match to the food as available in Brazil. The Brazilian Food Composition Database was used as a reference in carrying out matching. For foods without a comparable match, the NDSR User Recipe feature was used to add the food to the program. Differences in food fortification and enrichment practices between countries were adjusted for in post-processing.

Conclusion: Using a collaborative process, it was possible to use NDSR to calculate nutrient intake estimates for dietary recalls collected in Brazil. This process could be replicated in other countries to allow for software-assisted analysis when an existing software program is unavailable.

4. A Partnership for Public Health: A Journey of Global Expansion of the USDA Global Branded Food Products Database

Authors: Brienna Larrick[1], Pamela Starke-Reed[2], Kyle McKillop[2], Angela Fernandez[3], Marshall Keener[3], Jacqueline Dougherty[3], Scott Brown[4], Tim Marshall[4], Bridget Curran[4], Thea Bourianne[5], Joon Lee[6], David Yunkong Pan[6]

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Background: The USDA Global Branded Food Products Database provides nutrient and ingredient composition data on branded and private label foods, which are provided voluntarily by the food industry. This database is the result of a public-private partnership between USDA, the Institute for the Advancement of Food and Nutrition Sciences (IAFNS), GS1 US, 1WorldSync, NielsenIQ Label Insight, and the University of Maryland.

Objective: This presentation will provide an update on the Partnership's journey to expand the USDA Global Branded Food Products Database to international markets, using expansion activities in Canada as a case study.
Description: The USDA Global Branded Food Products Database was launched in 2016 with 100,000 branded and private label food products sold in the United States. Today, the database contains over 373,000 products, and the Partnership is exploring expansion of this database to international markets. To date, 11 countries have expressed interest in conducting a pilot with the Partnership to expand the database to their market, and the Partnership has developed a set of guiding principles to evaluate and prioritize expansion opportunities. As a result of these expansion efforts, data from one international market – New Zealand – were made available in the database in October 2021, and pilots with two additional international markets, including Canada, are currently underway. Using expansion efforts in Canada as a case study, this presentation will describe efforts needed to identify, set up, and pursue opportunities for global expansion of the USDA Global Branded Food Products Database.
Conclusion: Using expansion activities in Canada as a case study, this presentation will describe efforts needed to expand a US-based nutrient composition database to international markets and highlight learnings that the Partnership will apply to similar efforts moving forward.

Session 5. Expanding Food Composition Beyond Nutrients

1. **Approach for Developing Special Interest Databases on Compounds of Public Health Importance**

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Background: Several nutrients and other dietary constituents have emerged in recent years as having the potential to affect health in vulnerable population groups. These compounds of public health importance include iodine, iodine uptake inhibitors (IUIs, e.g., glucosinolates, thiocyanates, and perchlorates), nitrates/nitrites and purines.
Objective: Concerns about the biological effects of these compounds underscore the need for food and dietary supplement (DS) composition data beyond the conventional nutrients featured in food composition databases published by USDA and other groups.
Description: An interagency collaboration among USDA, FDA and the NIH Office of Dietary Supplements (ODS) has resulted in an iodine database, released in 2020. The technical approach developed for the iodine database is now being used by USDA and ODS to develop new databases on purines, IUIs, and nitrates/nitrites using the following steps: 1) Developing an inventory of existing data and evaluating the quality of available information, thereby identifying candidate foods and DS that will be major contributors; 2) Identifying appropriate reference materials and analytically validated laboratory

methods for analyzing nutrients and other compounds in foods and DS; 3) Analyzing nationally representative samples of foods and DS obtained from sample archives and new sample acquisitions; 4) Testing the performance quality according to USP disintegration protocols of varied dosage forms of DS that may contain the compound of interest (such as purines); 5) Compiling internal analytical results and analytical data from other sources that meet criteria for acceptable data quality; and 6) Publishing the results as Special Interest Databases, accessible at no cost through USDA's online datasets and websites. These databases will be released in the next 1-2 years and will be dynamic, with new data continuously being added.
Conclusion: The new databases will provide opportunities for estimating population-level exposures from multiple sources and will be useful resources for consumers and healthcare practitioners in providing individual-level guidance.

2. FDA's Closer to Zero Action Plan – Reducing the Effects of Toxic Element Exposures to Children

Authors: Kellie Casavale PhD, RD[1], Sherri Dennis PhD[2], Paul South PhD[3], Conrad Choiniere PhD[4]
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4. U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Analytics and Outreach, Office of the Director

Background. Exposure to toxic elements from foods depends on the levels of the elements in the food and the amount of the food consumed. The levels of toxic elements in foods depend on many factors, including levels of these elements in the air, water, and soil used to grow the crops; the type of food and "uptake" of specific elements from the environment; and industrial, manufacturing, and agricultural processes. Nutrient exposures can also interact with toxic elements and the nutrient status of children can modulate the effects of heavy metals on child development.
Objective. Closer to Zero is the U.S. Food and Drug Administration's (FDA) action plan for reducing exposure for babies and young children to the toxic elements lead, arsenic, cadmium, and mercury from foods to the lowest levels possible. FDA has prioritized reducing exposure to toxic elements to children because the smaller body sizes of children and rapid development makes them more vulnerable to the harmful effects of toxic elements.
Description. Closer to Zero uses a multi-phase, science-based, iterative approach for achieving continual improvements over time, laying out plans to further reduce the levels of toxic elements in foods. The plan includes advancing research and evaluation of changes in dietary exposures to toxic elements, setting action levels, encouraging adoption of best practices by industry, increasing targeted compliance and enforcement activities, and monitoring progress of food composition levels over time.
Conclusion. The goal of the Closer to Zero action plan is to reduce the levels of arsenic, lead, cadmium, and mercury in foods to the greatest extent possible without requiring

levels that are not currently feasible and without reducing the availability of nutritious, affordable foods that support a healthy dietary pattern.

3. **Updating the Flavonoid Database for USDA Survey Food Codes 2007-2010 to Estimate Intakes in What We Eat in America, NHANES 2017-2018**

Authors: Carrie L. Martin, M.S., R.D.; Rhonda S. Sebastian, M.A.; Joseph D. Goldman, M.A.
Affiliation (all authors): Food Surveys Research Group, Beltsville Human Nutrition Research Center, ARS, USDA

Background: In 2016, USDA released the Database of Flavonoid Values for USDA Food Codes 2007-2010 (Flavonoid Database). An addendum to the Food and Nutrient Database for Dietary Studies (FNDDS) 4.1 and 5.0, the Flavonoid Database allows estimation of flavonoid intake from all foods and beverages in What We Eat in America (WWEIA), NHANES 2007-2010. However, versions of the FNDDS which correspond to more recent survey cycles include foods that were not present in FNDDS 4.1 or 5.0. Estimating the flavonoid composition of these foods is required to calculate total dietary flavonoid intake using more current WWEIA, NHANES data.
Objective: Update the Flavonoid Database to permit estimation of flavonoid intakes in WWEIA, NHANES 2017-2018.
Description: FNDDS food code profiles are represented by one or more codes from USDA's Food Data Central (FDC). A total of 439 FDC codes, which were incorporated into the profiles of 1,319 FNNDS codes, are included in FNDDS 2017-2018 but not FNDDS 4.1 or 5.0. Imputation of the flavonoid content of these FDC codes was accomplished in three ways: 1) assuming zero values for all individual flavonoids and flavonoid classes when no flavonoid-containing ingredients are present; 2) assigning the flavonoid profile of a similar food or combination of foods whose flavonoid content was available in the Flavonoid Database, and 3) obtaining flavonoid composition data from the peer-reviewed literature, Phenol-Explorer, and/or USDA publications. Other procedures established during the development of the Flavonoid Database, e.g., excluding the flavonoid contribution of items that comprised <5% of an FNDDS food by weight, were applied in the development of the updated database.
Conclusion: Updating the Flavonoid Database to accommodate the most recently released WWEIA, NHANES data allows assessment of current dietary intakes of these bioactive compounds and facilitates further investigation of flavonoid-health associations.

Session 6. Spotlight on Nutrition Analysis of Specific Food Categories

1. **Differences in the Nutritional Content of Ready-To-Eat Cereals, Cereal/Granola Bars, and Savory Snacks Available for Sale to School Food Service Versus Food Retailers**

Authors: Jee Hyun Lee (Division of Epidemiology and Community Health, School of Public Health, University of Minnesota)

Lisa Harnack (Division of Epidemiology and Community Health, School of Public Health, University of Minnesota)

Objective: This study sought to identify the extent to which ready-to-eat cereal, cereal/granola bar and savory snack brands sold to schools participating in the National School Lunch and Breakfast Program have copycat products sold through food retailers (product with the same or similar name as product sold to schools but with different nutrient content).

Materials and Methods: Kellogg, General Mills, PepsiCo and Post website pages that list products for sale to schools were located. Foods listed on these webpages were documented and Nutrition Facts Panel information available for each product was recorded. Next, online shopping platforms for Walmart, Kroger and Walgreens were searched to locate foods with a complete matching or partial matching product name. Nutrition Facts Panel information for products with matching food names were then gathered. The mean nutrient content of complete matching products and partial matching products as available for sale to school food services versus as sold through food retailers were compared.

Results: There were no significant differences in the nutrient content of complete matching pairs of ready-to-eat cereals (n=44) and cereal/granola bar products (n=12). In contrast, there were significant differences in the total fat, saturated fat, dietary fiber and protein content of partial matching pairs of cereal/granola bars (n=5). Also, complete matching pairs of savory snacks (n=29) had significant differences in calories and total fat, and partial matching pairs of savory snacks (n=11) had differences in calories, total fat, saturated fat, sodium, total carbohydrates, and dietary fiber.

Significance: Food and nutrient database developers should consider including retail and school food service versions of some product brands, and when carrying out dietary assessment of school aged children source of these foods should be queried. Also, food companies should consider eliminating copycat products by providing only the healthiest product version in both school and food retail settings.

2. Nutrient Composition Variability of Plant-Based Ground Beef Alternative Products Available in the U.S. Marketplace in 2019

Authors: Lisa Harnack DrPH RD; Cecily Weber; Janet Pettit; Bhaskarani Jasthi, PhD RD; Jennifer Stevenson; Kristine Schmitz; Abigail J. Johnson PhD RD. Nutrition Coordinating Center, Epidemiology & Community Health, University of Minnesota

Objective: To describe nutrient content variability of plant-based ground beef alternative products sold by major brands in the U.S. marketplace in 2019.

Materials and Methods: The nutrient composition information available for plant-based ground beef alternative products in the 2020 version of the University of Minnesota Nutrition Coordinating Center (NCC) Food and Nutrient Database were analyzed to determine the median and range in nutrient content per 3-ounce portion of product. Nutrients for which a Daily Value (DV) exist were expressed as a percent DV.

Results: Across the 37 plant-based ground beef alternative products included in the analyses, nutrient value ranges were modest to large for most of the nutrients examined. Examples of nutrients with a modest range across products included dietary fiber (5-27% DV, median 15% DV) and saturated fat (0-30% DV, median 4% DV). Nutrients with the greatest variability across products were thiamin (0-1,763% DV, median 7% DV) and vitamin B12 (0-190% DV, median 0% DV). Calcium is an example

of a nutrient with relatively low variation (0-10% DV, median 4% DV). Factors that appeared to lead to the observed variability include formulation differences such as the use of legume/bean versus soy protein as a primary ingredient and differences in nutrient fortification.

Significance: Americans are increasingly choosing plant-based ground beef alternative products over animal meat for reasons related to minimizing diet's environmental impact, animal rights, and health. Consequently, it is important that food and nutrient databases include plant-based ground beef alternative products. Findings from this study indicate that several nutrients are found in highly variable amounts across different plant-based ground beef alternative product brands, which suggests that databases may need to include specific product brands rather than a general type of ground-beef alternative product such as 'veggie burger' or 'veggie crumbles'.

3. Co-occurrences of Top Ingredients and Additives used in Bread Products in the United States

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Background: Bread has a long history in the western diet. However, there has not been a tool to examine the current ingredients in breads. A framework for parsing and reporting of ingredients used in commercially packaged foods (IngID) was recently developed to make this analysis possible.

Objectives: This study aims to analyze top ingredients and additives used in bread products and their co-occurrence.

Methods: Ingredient lists of bread products were obtained from USDA Global Branded Food Product Database (BFPD). The Universal Product Codes (UPCs) of these products were linked to IRI's (Information Resources Incorporated) scanner data covering over 70% of the total sold products in the category of fresh bread & rolls. Ingredient text strings were parsed for each product (unique UPC) and assigned preferred descriptors (PDs). R program was used to create co-occurrence matrices and visualizations.

Results: Most breads contain wheat and yeast. Of the 2326 bread products, 1.1% did not list yeasts or sourdough culture, and 2.5% were wheat-free. The top co-occurring ingredients of these top-selling breads were water, yeasts, wheat flour, wheat gluten, fortified vitamins (e.g., niacin, thiamine mononitrate), soybean oil and several other additives. The wheat-free products were not fortified with the vitamins. The top co-occurring additives revealed several emulsifiers and dough conditioners that were frequently used together. The percentages of co-occurrence of ingredients showed the likelihood of their uses or consumptions. For example, 98% of vinegar co-occurred with yeast and 80% with wheat flour, respectively. The results could also be useful for monitoring ingredients of interest such as whole grains or fractionated/ interesterified vs. hydrogenated oils.

Conclusions: This study reports the highly used and co-occurring ingredients and additives in bread products in the US. The results may offer clinicians, researchers, and consumers information to understand key ingredients, and possible trends in breads.

4. **Dietary Fiber Content of Refined Grain Pasta is Underreported in Nutrient Databases**

Authors: Megan Edelman, Hallie Lundquist, Joanne Slavin
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Objective: Dietary fiber is an important component of any person's diet, but it has increasingly become a topic of concern in children. Fiber intake in the child and adolescent population is concerningly low, leading to a greater push for whole grain consumption. Still, it seems evident that kids show a preference for refined grains over whole grains and that these refined grains contribute largely to daily fiber intake. The purpose of this research is to use the most current validated methods to test the dietary fiber content of generic enriched white spaghetti pasta to better understand the true amount of fiber refined grain products can provide to children.

Materials and Methods: CODEX definition test, AOAC 2011.25, was performed at two separate labs to measure both total dietary fiber (TDF) and soluble and insoluble fiber individually. This test uses an enzymatic-gravimetric method and liquid chromatography to quantify the fiber content of identical 100 g samples of generic brand dry enriched white spaghetti pasta.

Results: TDF measured was 5.6 g/100 g sample of pasta from the first lab and 5.4 g/100 g sample from the second lab. Results from labs 1 and 2 showed that a single 56 g serving of pasta contains 1.136g and 1.024g more, respectively, than what is indicated on the nutrition label.

Significance: According to the most updated CODEX definition testing methods, the dietary fiber content of generic dry enriched white spaghetti pasta is greater than what is currently listed on nutrition facts labels, suggesting that refined grain products can provide a substantial source of fiber for children. This also indicates that current nutrient databases and nutrition labels may need to be updated to reflect accurate values.

Session 7. Advancements in Database Technology and Analysis

1. **Food Composition and Graph Database, USDA's FoodData Central Technology Transfer to a Neo4j Graph Database**

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Background and Objective: Food Composition databases are typically developed in a tabular format such as CSV, Microsoft Access, Microsoft Excel, or SQL. The growth of graph database technologies, such as Neo4j, affords new opportunities in the handling of complex data structures and data relationships for data that rapidly evolve. Graph databases also greatly assist in implementing a knowledge layer to your data that are then used in generating new insights. USDA's FoodData Central (https://fdc.nal.usda.gov/) is an integrated data system that provides expanded nutrient profile data and links to related agricultural and experimental research. With the goal of expanding and innovating the capabilities of the FoodData Central application, the integration of graph technologies becomes pivotal.

Description and Conclusion: FoodData Central originally launched in April of 2019 as a SQL database with a transfer to a Neo4j graph database in October 2020. The graph database technology transfer comes with positive and negatives that should be considered before applying the technology to existing databases. Having been established in a publicly available data system for one year, a better understanding of graph technology is now available to inform others considering the approach. The development of the graph database continues as FDC looks to integrate ontology and to make the graph database open and accessible for others to explore.
Originally launched in 2019, FoodData Central is finishing its third year. The Foundational Food and Experimental Food datasets continue to expand and monthly updates to the global branded products database are now provided. The data system has seen changes to its data structure, a transfer to a new database technology, updates and additions to the website's feature set, and continued plans for database interoperability. New data, foods and sample information are continuously added and provide research insights on attributes that influence variability of classic nutrients and emerging bioactive compounds of public health importance.
Significance: Researchers, health professionals and consumers can access and download the data they need with transparency.

2. **Evolving Chemical Composition Data Representations of Food Using Semantic Web**
Authors: Hande Kucuk McGinty, Kyle McKillop, Pamela Pehrsson, Jaspreet Ahuja, Melissa Nickle, Naomi Fukagawa, Peter Harrington, and James Harnly
Abstract: Food is an essential part of human and animal life. A recent focus on sustainable agriculture has brought new perspectives as well as the rapidly escalating pace in the different uses of food (e.g., food as medicine), which requires new approaches to analyze, compile, and represent food and food components data. Many food components can be represented as chemicals. Linking food components that can be expressed with chemical structures and analyzed using chemanalytics methods using the semantic web has its challenges that are currently being addressed. We will overview how the database and knowledge representations around food components evolved. We will present the current progress and how adding the semantic web component can help connect seemingly disconnected databases and datasets that are available world-wide. We will address some of the challenges, and workflows for linking food components to chemical representations and chemanalytics for creating a machine-actionable knowledgebase.

3. **Guiding Principles and Considerations in Transfer and Sharing of Research Data**
Authors: Sidra Ahsan, Ph.D., Technology Transfer Center, National Cancer Institute, NIH, Bethesda, MD.
Background: In order to receive or share data generated via research, an important administrative step is the establishment of an agreement that outlines the obligations of the collaborating parties with respect to the shared data. These agreements may be stand-alone agreements, such as Data Transfer and Use Agreements (DTUAs) or data sharing provisions may be incorporated into other forms of collaborative agreements.

The primary goal of these agreements is to protect the data, securely and ethically share data, and protect the rights of all parties involved.
Objective: To educate scientists, clinicians, and others, about the various considerations involved in sharing and disbursement of research data to allow for increased collaboration and promotion of research.
Description: Data Transfer and Use Agreements (DTUAs) are contractual documents that establish the terms and conditions under which the data provider will provide, and the data recipient will receive and use the data covered under the agreement. This presentation will focus on the various laws, regulations and policies that apply to data sharing collaborations with U.S. governmental institutions, and some of these policies may be broadly applicable to other institutions worldwide. Case examples will be used to briefly discuss data sharing issues related to confidentiality, stewardship, intellectual property, scientific practice, data sharing policies for sequences and genomic data, HIPPA and the Privacy Rule, etc.
Conclusion: DTUA is a key tool in facilitating collaborations between academia, government, non-profits, and for-profits, for the promotion of research and public health benefit. This presentation will inform the audience about the various steps and considerations involved in sharing and disbursement of data to enable efficient collaborations.

4. **IngID, A Framework for Parsing and Systematically Reporting Ingredients Used in Commercially Packaged Foods: Its Development, Current Features, and Potential Applications**

Authors: Jaspreet KC Ahuja, MS; Ying Li, PhD; Quynhanh Nguyen, MS; Pamela R Pehrsson, PhD. Methods and Application of Food Composition Laboratory, Beltsville Human Nutrition Research Center, ARS, USDA.

Background: Recent research has strengthened the link between consumption of commercially processed foods and health, and the need to look beyond nutrients. These foods are an integral part of the U.S. diet, contributing over 50% of energy and several nutrients, however, there is general lack of information in the scientific literature on the ingredients used in these foods.
Objective: To describe the development, current features and potential applications of IngID, a framework for parsing and systematically reporting ingredients used in commercially packaged foods.
Description: A prototype of IngID was recently developed, using ingredient statements mainly from USDA's Global Branded Food Products Database. The major steps included identifying top-selling products, obtaining ingredient lists for these products and parsing them into individual ingredients and building a thesaurus of equivalent terms. The steps, including the complexity and challenges will be discussed. The current version of IngID is based on baked products, selected mixed dishes, and beverages and includes a thesaurus of ~16,000 parsed ingredients. Work on other food categories such as dairy products and candy and automating parsing and thesaurus building processes are ongoing. Applications of IngID including its use to characterize food groups, study the distribution and co-occurrence of ingredients will be shared. The categories of ingredients explored include flours, sweeteners, and coloring agents.
Conclusion: IngID makes available a framework for understanding of commercial ingredients, not available before. It can potentially improve efficiency of data cleaning,

processing and analysis of ingredient list details, and contribute to improved food composition databases, dietary assessment tools, study of interaction of ingredients, and precision nutrition leading to better understanding of dietary intakes and eventually diet-health-disease relationships.

5. Development of a Nutrition Knowledge Database To Support Precision Nutrition

Authors: Colin Kay,[1,4] Aleksandr Smirnov,[2,4] Jessica Everhart[1,], Harry Schulz[1,], Ciara Conway,[2,4] Zhaocong Yang,[3] Jing Yang,[3] Xiuxia Du[2,4]
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Background. Precision nutrition aims to provide individualized and actionable dietary recommendations to help prevent and treat diseases. Achieving precision nutrition requires the availability of comprehensive nutrition knowledge databases that link various foods to diseases through nutrients in foods and their metabolites. Such knowledge databases require futureproofing to support a diversity of users, including researchers in metabolomics, nutrition cohort and interventionists, government and the public. However, there are many challenges associated with database (DB) harmonization. Further, although nutrients are relatively well captured in compositional databases, non-nutrient dietary phytochemicals are poorly represented. To address this gap, we are building a cloud-based knowledge database (KDB) named "The Metabolome of Food" (MetaboFood-KDB®) which focuses on phytochemical compositional and metabolite data.
Objective. Fill gaps in nutrition databases associated with phytochemicals to support researcher and public precision nutrition initiatives.
Description. MetaboFood-KDB® features P-MetDB®, a database of nutritionally relevant phytochemicals derived from systematic literature reviews of 17 commonly consumed phytochemical-rich foods, with careful curation of compound synonyms matched to InChI key, physical and chemical properties (mass, formula) and database identifiers (i.e., PubChem ID, HMDB ID, PhytoHub, KEGG ID, CAS InChiKey, SMILES). Researchers and the general public can search MetaboFood-KDB® by food, phytochemicals, and pathway and diseases. The search results can be explored in a highly visual and interactive way in the form of self-organizing maps, node-link diagrams, Sankey diagrams and other visual analytics techniques. Information curated and organized in MetaboFood-KDB® will also facilitate the prediction of nutrition dark matter that are unknown food compounds and their metabolites.
Conclusion. MetaboFood-KDB® builds on traditional food composition databases by integrating metabolite, pathway and disease linkage data in various databases. Continued development includes expansion to other fruits, vegetables, supplements, and processed foods most common in the US diet, building data richness and enabling connections between diet and health.

Session 8. Influence of Consumer Behavior on Nutrition Research

1. **Evaluation of the Rationalization of the UK Nutrient Databank to enable the UK National Diet and Nutrition Survey (NDNS) to move to a web-based 24hr recall (Intake24)**

   Authors: Birdem Amoutzopoulos, PhD; Toni Steer, PhD; Caireen Roberts; David Collins; Angela Mulligan; Polly Page.

   Objective: Present study aimed to evaluate the impact of using a rationalized food composition database (RFCD) (n=2481 foods) as opposed to using an extensive food composition database (EFCD) (n=5933 foods) for dietary data collection in the UK NDNS Rolling Programme (NDNS RP). This process of rationalization was undertaken to facilitate a dietary assessment method change in NDNS RP (implemented October 2019) from traditional paper-based diet diary to web-based automated self-administered 24-hour dietary recall (https://ndns.intake24.org/). Due to the role of NDNS in nutritional surveillance, it was important to evaluate changes in order to assess any impact on monitoring trends.

   Materials and Methods: Dietary data from NDNS RP Year 10 (2017-18) was recalculated after matching coded paper diary entries to foods available in Intake24 using RFCD. Mean daily intake of selected nutrients calculated using former EFCD was compared with mean daily intake calculated using RFCD for 1211 participants aged 1.5-93 years.

   Results: Significance of the difference between estimated intakes was small (less than 7%, ≤0.1 defined by Cohen's d) for most nutrients (21 out of 25 nutrients) and foods (3 out of 4 foods). Over 80% of participants were classified into same tertile of intake for most nutrients (21 out of 25 nutrients), and into same categories of nutrient adequacy using RFCD for carbohydrate, free sugar, total fat, saturated fat, fibre, and fruit and vegetable compared to EFCD. There were greater nutrient differences in complex dishes (e.g. soup) (difference ranging from -9% to 27%) compared with single foods (e.g. yoghurt) (difference ranging from -4% to 0.7%) and sandwiches (difference ranging from -5% to 0.6%).

   Significance: Recalculation of dietary intake using RFCD resulted in small differences in summary population estimates of nutrients in comparison to EFCD. This indicates that use of RFCD has minimal impact on the reporting of NDNS RP dietary data.

2. **Food and Nutrient Database for Dietary Studies 2019-2020: An Application Database for National Dietary Surveillance**

   Authors: Donna Rhodes[1], MS, RD; Suzanne Morton[2], MPH, MBA; James Friday[1], BS; Carrie Martin[1], MS, RD; Alanna Moshfegh[1], MS, RD; [1]US Department of Agriculture, Agricultural Research Service, Beltsville Human Nutrition Research Center, Food Surveys Research Group; [2]American Society for Nutrition

   Background: The USDA Food and Nutrient Database for Dietary Studies (FNDDS) is an application database created for analyzing dietary intakes from What We Eat in America (WWEIA), National Health and Nutrition Examination Survey. It contains data to convert foods and their amounts reported into gram amounts and to determine their nutrient values.

   Objective: The objective of this presentation is to describe enhancements and updates for FNDDS 2019-2020 and discuss current strengths and limitations.

Description: The FNDDS 2019-2020 contains approximately 5800 food/beverage codes and 30,000 portion weights. Every FNDDS code contains a complete nutrient data set for 65 nutrients. The source for most nutrient values is USDA Food Data Central (FDC): however, some nutrient values were adjusted for inclusion in FNDDS. To enhance the transparency of the database, the source of every individual underlying nutrient value is provided as well as derivation code and year of modification or sample acquisition. For this release of FNDDS, specific categories of foods/beverages were updated to yield standardization of codes, descriptions, weights, and nutrient profiles. The continued focus is on more generic codes that reflect likely products, as consumed. The FNDDS is integral to monitoring dietary intake of the US population. In addition, this application database allows for new research analyses and provides additional detail on database development and nutrient profiles for foods and beverages.
Conclusion: The complete FNDDS 2019-2020 will be available at www.ars.usda.gov/nea/bhnrc/fsrg in multiple formats.

3. Measuring Added Sugar Purchases and Habits 2013-2018: Using Retail- and Household-Based Food Scanner Data for Nutrition Monitoring

Authors: Andrea Carlson, M.S. PhD, USDA- Economic Research Service (corresponding author): andrea.carlson@usda.gov ; 202-694-5072
Armen Ghazaryan, M.S, PhD, Colorado State University (work completed as a graduate student at Colorado State University)
Alessandro Bonanno, M.S., PhD, Colorado State University
Rebecca Cleary, M.S., PhD, Colorado State University
The findings and conclusions in this abstract are those of the author(s) and should not be construed to represent any official USDA or U.S. Government determination or policy. This research was supported in part by the U.S. Department of Agriculture, Economic Research Service. Also, these results should not be attributed to IRI.
Objective: (1) Determine major sources of added sugar purchases in the grocery store. (2) Profile households who purchase higher and lower levels of added sugar. (3) Test the use of food scanner data for nutrition monitoring.
Materials and Methods: We use the Purchase to Plate Crosswalk—a recently developed data tool created by the ERS that maps USDA nutrition data such as the FNDDS and FPED to food scanner data—to determine a pre-label change baseline of added sugar purchases by means of regression analysis. Retail food scanner data is collected at the store check-out (retail), or by individual households, and represents multiple years of weekly (retail) and daily (household) food purchases. We also compare our results to other researchers using the National Health and Nutrition Examination Survey (NHANES).
Results: In contrast to dietary intake data, we find that the category "candy, sugars and sugary foods" has the largest share of added sugar retail purchases, while soft drinks are second. We also find that grocery stores sell the most added sugars, followed by mass merchandisers, and club stores. In contrast, households who purchase a higher percent of all items purchased from drug stores, convenience stores and dollar stores purchase a higher share of their total sugar as added sugar. Also, we find households with teenagers purchasing a higher share of total sugar as added sugar, and households with children under six a lower share.

Significance: These findings present a baseline measurement before the FDA required label change to include added sugar. Due to COVID-19, NHANES and WWEIA could not collect data starting in March 2020, however retail food scanner data are available at both the household and store level. By using the PPC researchers can study the healthfulness of retail food purchases.

4. **An approach to enhancing a food and nutrient database to include foods unique to Jamaican, Haitian, Nigerian, and Somali cooking traditions in the U.S.**

Authors: Lisa Harnack DrPH RD; Tricia Alexander MPH CPE; Marian Ramoni; Zainab Ramoni; Janet Pettit; Jennifer Stevenson; Kristine Schmitz Bhaskarani Jasthi PhD RD; Abigail Johnson PhD RD. Nutrition Coordinating Center, Epidemiology & Community Health, University of Minnesota

Background: Those who immigrate to the U.S. bring food traditions that are passed to future generations and to broader American society. Consequently, it is important to ensure foods from these cooking traditions are reflected in U.S. food and nutrient databases. This need is acute for Jamaican, Haitian, Nigerian, and Somali cooking traditions because nutrition and health inequities exist for immigrants from these countries.

Objective: In 2020 the University of Minnesota Nutrition Coordinating Center (NCC) launched an initiative to ensure the NCC Food and Nutrient Database includes foods unique to Jamaican, Haitian, Nigerian, and Somali cooking traditions.This effort encompasses popular main dishes, side dishes, desserts, and beverages as prepared in the U.S.

Description: University of Minnesota students familiar with the aforementioned cooking traditions were hired to collaborate with NCC staff in identifying foods and appropriate recipes for these foods. The foods and recipes identified by student collaborators were reviewed by NCC database scientists to determine whether the food item already existed in the database. For foods that were already in the database, food names were reviewed and modified as needed to align with the cultural food names identified by the student collaborators. The recipe, variable ingredient, and food unit reporting options were also reviewed to identify any needed changes. Work is underway to add foods that were not already included in the NCC database. These additions will be completed for inclusion in the 2022 release of Nutrition Data System for Research (NDSR), a dietary analyses software used for research in the U.S.

Conclusion: Food and nutrient databases should include foods unique to the cooking traditions of those who have immigrated to the U.S. Individuals familiar with the eating traditions of the immigrant group should be included as paid collaborators to ensure the addition of relevant foods and use of appropriate recipes.

Session 9. Dietary Assessment of the Glycome

1. **Glycopedia: A Glycan Encyclopedia of Food**

Authors: Nikita P. Bacalzo Jr,[1,2] Juan J. Castillo,[1,2] Garret Couture,[1,2] Ye Chen,[1,2] Elizabeth L. Chin,[4] Sarah E. Blecksmith,[5] Yasmine Y. Bouzid,[5] Yael Vainberg,[2,3] Chad Masarweh,[2,3] Qing Zhou,[1,2] Jennifer T. Smilowitz,[2,3] J. Bruce German,[2,3] David A. Mills,[2,3] Danielle G. Lemay,[4,5] Carlito B. Lebrilla[1,2,3,6,*]

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Background: Dietary carbohydrate composition and structure have different health functions in the human body. Unfortunately, current methods to characterize dietary carbohydrates are limited to quantifying sugars, starch, and fiber.
Objective: The primary goal of this work was to establish a carbohydrate-centric database to support nutrition research. We used high-throughput ultra-high performance liquid chromatography triple quadrupole mass spectrometry (UPLC-QqQ-MS)-based monosaccharide analysis of carbohydrates in complementary foods consumed by weaning toddlers and in foods commonly consumed by adults.
Materials and Methods: High-throughput monosaccharide analysis was performed in a 96-well plate format and this consisted of (1) enzyme digestion and acid hydrolysis to breakdown carbohydrates into monosaccharides, and (2) chemical derivatization to improve chromatographic separation and ionization for mass spectrometry analysis. The absolute monosaccharide composition of each sample was then determined using a 4.6-min UPLC-QqQ-MS analysis. The monosaccharide compositions of over 800 foods from diverse food groups were obtained and used to construct the glycan encyclopedia (Glycopedia). Hierarchical clustering and statistics were done using R and Excel.
Results: The Glycopedia is an open-access database that provides quantitative monosaccharide composition of carbohydrates in food. While many foods within the same group possessed similar compositions, hierarchical clustering analysis revealed similarities between different groups as well. Grain products largely clustered together with higher glucose level and low moisture content, while most fruits and vegetables grouped together having lower carbohydrate content due to higher moisture content and more diverse monosaccharide profiles. Of the 14 monosaccharides monitored, glucose and fructose were quantified in high amounts in a majority of the foods. Other common and abundant monosaccharides included xylose, arabinose, galactose, and galacturonic acid, which compose major plant cell wall polysaccharides such as arabinoxylan and pectins.
Significance: The total quantitative monosaccharide composition provides more useful structural motifs on dietary carbohydrates than traditional gravimetric methods especially in the context of the gut microbiome and infant nutrition research. The Glycopedia provides information needed to design a precise diet tailored to modulate the gut microbiome, which could lead to better health.

2. Sources of Specific Monosaccharides From Foods and Ingredients Commonly Consumed By Healthy Adults

Authors: Jules A. Larke, Ph.D.[1], Elizabeth L. Chin, Ph.D.[1], Juan J. Castillo, Ph.D.[2], Nikita Bacalzo, M.S.[2], Garret Couture, B.S.[2], Charles B. Stephensen, Ph.D. [1,3], Carlito B. Lebrilla, Ph.D. [3,4], Danielle G. Lemay, Ph.D. [1,3]

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Objective: Our ability to model the relationship between whole diets and measures of health or disease inherently depends on the quality and granularity of nutrient databases. We sought to characterize the monosaccharide composition of frequently consumed foods and ingredients in a healthy U.S. adult cohort (ClinicalTrials.gov Identifier: NCT02367287).
Materials and Methods: Dietary records consisting of two to three Automated Self-Administered 24-hour Dietary Recalls (ASA24) were obtained from 341 subjects in the USDA Nutritional Phenotyping Study which assessed healthy U.S. adults balanced for age, sex, and BMI. Dietary recalls were merged with the Food and Nutrient Database for Dietary Studies (FNDDS) 2017-2018 to retrieve ingredient level data. From this dataset, recall items were mapped to the food glycan database (Glycopedia) to retrieve monosaccharide quantities for matching food items. Subjects with at least 75% of calories consumed from carbohydrates mappable to the Glycopedia were included in the final analysis (n = 177).
Results: The number of recalls from the ASA24 totaled 1,026, consisting of 19,373 recall items across 2,143 unique food codes. Merging the recall data with FNDDS 2017-2018 expanded the total recall items to 45,731 foods and ingredients of which 1,199 were distinct in the 341 participants. Of these distinct items, 496 were appropriate matches to the Glycopedia. Retaining subjects with at least 75% of calories consumed from carbohydrates, 14332 total recall items were mapped to the Glycopedia. Total carbohydrates consumed per subject, estimated from ASA24 food records, was correlated with total monosaccharides estimated using the Glycopedia (Pearson's r, r^2 = 0.869). Monosaccharide compositions of diets varied across subjects reflecting interpersonal food glycan consumption.
Significance: This is the first study to investigate population-based dietary intake at this resolution of food glycan composition. Fine-scale food composition data is needed to better characterize dietary intake and tailor personalized dietary recommendations.

3. Surveying Nutrient Assessment with Photographs of Meals (SNAPMe): A Dataset of Food Records and Companion Meal Photos

Authors: Elizabeth L. Chin[1], Yasmine Y. Bouzid[2], Yael Vainberg[2], Juan J. Castillo[3], Nikita P. Bacalzo[3], Garret Couture[3], Carlito B. Lebrilla[3,4], Jennifer T. Smilowitz[4,5], Danielle G. Lemay[1,2]
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Background: Photo-based dietary assessment methods are becoming more feasible as artificial intelligence methods improve. Validation of photo-based dietary assessment

methods will require photos of "real world" meals that are labeled with meal components and ingredients. Ingredient-level labels will also allow for linking to food composition databases. Additionally, photos paired with "ground truth" data—traditional food records—are needed to assess the accuracy of photo-based methods.
Objective: Introduce the Surveying Nutrient Assessment with Photographs of Meals (SNAPMe) Study (ClinicalTrials ID: NCT05008653), describe the data, and discuss the utility of the data.
Description: The purpose of the SNAPMe Study was to pair meal photographs with food records. The goal was to collect approximately 1000 meal photos from 100 participants consuming at least three meals per day, for a total of three study days. Participants were recruited nationally and completed enrollment meetings via web-based video conferencing. Participants uploaded and annotated their meal photos using a mobile phone app called Bitesnap and completed food records using the Automated Self-Administered 24-hour Dietary Assessment Tool (ASA24®) on the same day. A sizing marker containing black and white boxes of known size were included in meal photos to assist with portion estimation. Participants included photos before and after eating non-packaged and multi-serving packaged meals, as well as photos of the front package label and ingredient label for single-serving packaged foods. Examples showing the utility of SNAPMe data with respect to artificial intelligence and linking to food composition databases, such as a novel database of food monosaccharide compositions (the "Glycopedia"), will be presented.
Conclusion: The SNAPMe dataset will be made publicly available and will link meal photos, annotations, write-in notes, and ASA24 food records together. These data will be useful for the development of artificial intelligence methods to support the use of photo-based dietary assessment methods.

Poster Abstracts

1. Waste of Edible Food from a College Student Perspective

Authors: Priscilla L. Connors Ph.D[1]. & William C. Schuelke M.S.[2]
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2. New College, University of North Texas

Background: Students at a US Southwestern university completed a module on food safety, security, and healthy nutrition that included a section on consumer food handling and waste. Subsequently they wrote reflective essays that bridged module concepts with personal experiences as they shared observations on food waste and incorporated relevant evidence-based facts.

Objective: Summarize student perceptions of choice, action, and consequences in what they viewed as waste of edible food.

Description: During fall 2021 students enrolled in a freshman nutrition class wrote essays in response to the following prompt: "Does food waste matter?" Fifty essays out of 110 submitted were randomly selected for content analysis. Patterns emerged around three topics: location, alternatives, and knowledge.

Results: Location - Food waste was described as in three main areas: grocery stores, restaurants, and homes. Alternatives - Suggestions for choice included grocery store donations to food banks and pantries, smaller portions sizes in restaurants, and moderate food offerings at events. Knowledge -The students felt that greater confidence in judging food quality and safety was key. They questioned why grocery stores relied on date labels in disposal of edible food and restaurants routinely overproduced food items that were discarded after a prescribed time. In terms of personal food handling practices, the students outlined barriers that impacted their ability to shop, store, and prepare food, as they described how limited knowledge about food labeling and safety resulted in waste. **Conclusion:** Results suggest an opportunity to impact waste through changes in retail food management and education on food safety in the home. In addition, young adults are passionate about food waste and open to smaller portions sizes that reduce waste in restaurants and during events.

2. Nutrient Profiling of Products with Gut Health Marketing Claims

Authors: Tim Younger, MS, RD, Label Insight

Background: Many factors play into the health of one's gut microbiome. As more products market themselves toward shoppers looking to improve and maintain a healthy gut microbiome, it is important to review the nutrient profile of such products and ensure alignment with an overall healthy lifestyle. This includes reviewing marketing claims around gut microbiome, gut health, prebiotics, and probiotics, as we have seen products with high levels of nutrients of concern like added sugars and low levels of nutrients like fiber posed is such a light.

Objective: To share learnings that Label Insight has experienced from working with products that market themselves as improving the gut microbiome. Assessing food composition data allows for one to get a well-rounded view of nutrients of interest, such as added sugars and fiber. In addition to the nutrients, it is also important to look at the ingredient content for the presence of FDA-recognized fiber additives, probiotics, and prebiotics. This presentation will give attendants a comprehensive view of what is being marketed to consumers as healthy for the gut microbiome.

Description: The Label Insight database includes over 80% of the top-selling food and beverage CPG products in the US. This allows for the ability to quickly and effectively query nutrient and ingredient profiles for products that market themselves as gut healthy. This data can be aggregated and analyzed to display the other qualities of these products.
Conclusion: Gut microbiome health is a growing area of research and is top of mind for many people seeking a healthy lifestyle. It is important to understand more about the overall nutrient and ingredient profile of products marketing themselves as gut healthy. With this information, one will gain a better understanding of the products marketed for gut health and can identify gaps and opportunities to better represent gut healthy products to the public.

3. Modelling the addition of one serving of yogurt to the diet of children participating in the Special Supplemental Nutrition Program for Women, Infants and Children

Authors: Yong Zhu[1], PhD; Neha Jain[2], MS; James Normington[2], PhD; Norton Holschuh[2], BS; Jessica Smith[1], PhD; [1]Bell Institute of Health and Nutrition, General Mills, Inc. [2]Global Knowledge Solutions, General Mills, Inc.
Objective: Yogurt is a nutrient dense food that provides under-consumed nutrients of public health concern, like calcium and vitamin D. The Special Supplemental Nutrition Program for Women, Infants and Children (WIC program) aims to improve the nutrition of vulnerable women and children by providing nutritious foods. Yogurt is included in the WIC package but yogurt consumption among WIC participants remains low. The objective of the study was to model the impact of adding one serving of yogurt per day on daily nutrient intake and nutrition adequacy in children from the WIC program.
Methods: WIC children aged 1 to 5 years from National Health and Nutrition Examination Surveys 2013-2016 with either one or two days of dietary recalls were included (N=531). A composite nutrition profile for yogurt was created that averaged the nutritional composition of the 5 most frequently consumed yogurts in this population. The impact on dietary outcomes was modeled when one serving (8 oz) of the yogurt was added to existing dietary intake.
Results: Twenty-one percent of children in the WIC program reported consuming yogurt. Adding one serving of yogurt per day to the diet in WIC children resulted in increased intake of several key nutrients including vitamin D (25%), calcium (23%), potassium (15%), and protein (12%). The percentage of children with intake below Estimated Average Requirements decreased for calcium, from 7.4% to 0.4%, and for vitamin D, from 86.6% to 52.7%. Meanwhile, the percentage of children with intake above Adequate Intake for potassium increased from 37.5% to 78.9%, and those who met or exceeded the Dietary Guidelines for Americans recommendation for servings of dairy increased from 51.5% to 84.8%.
Significance: Adding one serving of yogurt to the diets of children in the WIC program would have meaningful impact on dietary intake, particularly for several nutrients of public health concern.

4. Creation of a Ready-to-use-Item Database to Improve Nutrition Labeling Program Efficiency

Authors: Katie Kirkpatrick MS, RD[1,2], Jennifer Billington MS, RD[3], Deborah Robinson MPH, RD[1,2]
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Background: Go for Green® (G4G) is an evidence-based, comprehensive, dining facility nutrition program designed to improve access, availability, and knowledge of nutrient-dense foods to Service Members. A key component assigns color codes to recipes and ready-to-use (RTU) foods and beverages so Service Members can make choices based on performance impact (Green = high, Yellow = moderate, Red = low) and sodium content (Low, Moderate, High). A gap identified was RTU items being coded repetitively at local levels, which resulted in inefficient use of limited resources and inconsistencies in coding. Moreover, packaged foods and beverages are constantly evolving and expanding. In particular, worksite snack bars are a target venue as their high-performance options are often limited.
Objective: The aim is to create a database of common RTU items on the public G4G website to decrease resources spent coding locally and maximize consistency among coded items. Another objective is to increase availability and variety of Green-coded items.
Description: The initial RTU database was a list of coded RTU items from dietitians and other certified coders in the field, which was then quality checked by the G4G lead coder. The database was shared with G4G operators and posted on the G4G website with searching and sorting capabilities. Stakeholders were informed via email, work groups, meetings, G4G website, and social media. It is updated on the website quarterly and a RTU request form is now available. The percentage of Green-coded items increased from 14% (September 2020) to 18% (August 2021).
Conclusion: A publicly available, pre-coded database of RTU items streamlines G4G coding efforts, enhances coding consistency, and showcases high-performance (Green) options across the military. Future plans include increasing RTU Green-coded items to 30%, identifying healthier alternatives to high-interest items (example: energy drinks), and investigating the impact of the RTU database on G4G program operators.

5. Discontinued food codes between Food and Nutrient Database for Dietary Studies 2017-2018 and 2019-2020

Authors: James Friday, BS, Rebecca Myrowitz, MHS, RDN, LDN, CPH, Donna Rhodes, MS, RD, Alanna Moshfegh, MS, RD
Author affiliations: Food Surveys Research Group, Agricultural Research Service, USDA, Beltsville, MD
Background: The Food and Nutrient Database for Dietary Studies (FNDDS), an application database that provides nutrient values for foods/beverages reported in What We Eat in America (WWEIA), National Health and Nutrition Examination Survey (NHANES), is updated and a new version released to accompany each 2-year release of WWEIA, NHANES. In addition to new food/beverage codes being added for the new

survey, each update includes an extensive review of select food categories resulting in food/beverage codes being discontinued.
Objective: The objective of this study was to identify the discontinued codes between FNDDS 2017-2018 and FNDDS 2019-2020 and the resource developed to assist researchers.
Description: Overall, more than 1,550 codes were discontinued between FNDDS 2017-2018 and FNDDS 2019-2020. A file was created which lists discontinued FNDDS 2017-2018 codes by number, main description, and rationale for discontinuation. The rationale for discontinuation was defined as: dropped, expanded, consolidated, renumbered, or revised. Dropped codes included products no longer on the market, codes rarely used in the survey or items better coded in the survey using individual components as a combination. Expanded codes were linked to two or more 2019-2020 codes, as the original code was replaced with multiple codes between versions. Consolidated codes were multiple codes subsequently captured under a single 2019-2020 code. Renumbered codes were assigned a different 8-digit number for 2019-2020 yet represented the same product in 2017-2018. Revised codes are those with extensive revisions for 2019-2020.
Conclusion: The availability of a resource to crosswalk discontinued food/beverage codes between FNDDS versions benefits food intake analysis over time and use of the FNDDS to support other food intake databases. The file will be available on the Food Surveys Research Group Web site at http://www.ars.usda.gov.nea/bhnrc/fsrg.

6. Estimating animal and plant protein intake among adolescents, What We Eat in America, NHANES 2015-2018

Authors: M. Katherine Hoy, EdD, RDN; Theo Murayi, PhD; Alanna Moshfegh, MS, RD. Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, USDA
Background: The 2020 Dietary Guidelines for Americans encourage increasing protein intake from plant foods. Estimating intake must consider single ingredient foods and mixed dishes.
Objective: To describe the process for estimating contribution of foods and USDA food pattern components to animal and plant protein intake among U.S. adolescents.
Materials and Methods: One day dietary intake data from adolescents 12-19 years (N=2241) in What We Eat in America (WWEIA), NHANES 2015-2018 were used. Proportions of protein intake from animal and plant sources were estimated for each food in the Food and Nutrient Database for Dietary Studies (FNDDS) 2015-2016 and 2017-2018. The contribution of USDA food pattern components to animal and plant protein intake was also estimated. Single ingredient foods such as chicken or beans were classified as 100% animal or plant, respectively and were further sub-classified as poultry and legumes, respectively. Proportions from multi-ingredient foods were estimated from the amounts of animal and plant food ingredients in each item. If ingredients were not specified, the proportions from a similar food were applied; a recipe was constructed using single ingredient items in FNDDS; or nutrition information on a company's website was used. The proportions from animal and/or plant protein sources in each FNDDS item were applied to the dietary intakes to estimate the population intake of protein from each. Animal sources accounted for 66% of total protein intake: 42% was Meat/poultry/seafood, 20% Dairy, and 4 % Eggs. Plant sources accounted for

34% of total protein intake: 23% was Grains, 5% Vegetables/Fruit, 2% Legumes, 2% Nuts and seeds, and < 1% Soy.
Significance: Estimating contribution of animal and plant foods to total protein intake from the ingredients in foods provides a more comprehensive description of protein foods consumed by adolescents. This information is important for nutrition assessment and can inform nutrition education.

7. **Labeling analysis in the Uruguayan yogurt industry applying the FLIP-LAC program. What information does the consumer have in reference to the sugar content?**
Authors: Gisela Avalo, Lara Martinez, Maria Laitano, Luisa Urioste, Agustina Villegas
Objective: Assessing sugar content in yogurt containers of national dairy industry in four supermarket chains in Montevideo, Florida, Rocha and Tacuarembó through FLIP-LAC (Food Label Information Program – Latin America and Caribe) program.
Materials and methods: A secondary data base with 120 products was yielded in which descriptive studies and statistical analyses were held. Data was exported to a worksheet to enable to analyze the presence/absence of added sugar octagons; as well as the distribution, quantity and type of sweetener present in yogurts.
Results and meaning: At analyzing the types of sweetener it was found that 97% of yogurts were sweetened and of this percentage, a 62% with sugar present as second and third ingredient. Although sugar is considered a critical nutrient, its declaration on the national nutritional label is not obligatory. This reinforces the importance of front warning labeling in highlighting to the consumer upon products that exceed the established critical nutrient limits. Emphasis should be done on nutritional food education as a tool that allows informed decision-making at the time of purchase. For this, it is necessary to have the participation and commitment of actors linked to health and industry, giving rise to social participation, and supported by public policies that can improve behaviors and eating habits of the population.

8. **Generation process of Uruguay's food composition database and ranking of nutrients of public health concern**
Authors: Paula Moliterno, Antonella Vaccani, Vanessa Gugliucci, Marina Moirano, Fernanda Risso, Pablo Pereira, Laura Raggio.
Background: Food Composition Databases (FCDB) and chemical composition tables are essential instruments to know the nutritional composition of foods and estimate the intake of nutrients and food components. They make it possible to study and characterize the composition and heterogeneity of the diet, as well as variations over time. They require a periodic update and a systematization of the information at the level of countries and regions. The School of Nutrition of Universidad de la República, Uruguay has been developing activities to update the Uruguayan chapter of the FCDB of Latin America (LATINFOODS), a task that has little precedent and continuity. The current process began in 2019 through the formation and training of the team, the review, updating of materials and protocolization of processes.
Objective: spreading the process carried out by Uruguay for the primary selection of nutrients of public health concern to be included in FCDB.
Description: For the primary selection of nutrients of public health concern, a review

and systematization of available data information at the national or regional level was carried out in the absence of local data. Health problems were identified respect to food-nutrition, knowledge regarding nutritional requirements for various age groups and physiological stages as well as the regulation on nutritional labeling. FAO criteria were taken as reference (2003).
To define the hierarchy of nutrients of public health concern, the following criteria were established (CDC-1995): food components related to current public health problems; potentially linked to public health problems for which further study is required, not linked to current public health problems.
Conclusion: as a result of the process, nutrients of public health concern for Uruguayan population were hierarchized. Through revision, the lack of some epidemiologic data at national level was evident.

9. Generation of analytical food composition data of traditional fruits and vegetables in Costa Rica

Authors: M.Sc. Cindy Hidalgo[1-3], M.Sc. Carolina Cortés[2-3], M.Sc. Milena Cerdas[1]
[1]Nutrition School, University of Costa Rica
[2]National Center for Food Science and Technology
[3]Network COSTA RICAFOODS - LATINFOODS
Objective: generate food composition data (FCDB) for fruits and vegetables of traditional consumption in Costa Rica.
Materials and Methods: foods were selected using criteria validated in Costa Rica for prioritizing foods and nutrients for FCDB. The sampling plan was carried out considering seasonality, producing areas, commercialization, and cultivar. The number of primary samples (n) was determined using Cochran's formula with a coefficient of variation of 12% and a maximum estimated error (r) of 5% for the content of vitamin C in fruits and vegetables. The samples were collected in wholesale markets of Costa Rica, ensuring representativeness of the areas of production. Eleven foods were analyzed in the form that they are usually consumed. A determination of mass (g), size (cm), edible fraction, ° brix, color was made, and the following nutrients were analyzed (in triplicate) protein, fat, fatty acid profile, carbohydrates, dietary fiber, content of
minerals (Na, Ca, K, P, Fe, Cu, Zn, Mg), vitamin C and fat-soluble vitamins for each food at the National Center for Food Science and Technology.
Results: the analysis of fruits and vegetables for which there was no updated data in the country's FCDB was prioritized, in addition to presuming that they have a good nutrient profile and they have been traditionally consumed. The prioritized foods were Cas (Psidium friedrichsthalianum), Granadilla (Passiflora ligularis), Green and ripe Jocote (Spondias purpurea), sweet lemon (Citrus limettioides), water apple (Syzygium malaccense), cashew (Anacardium occidentale), passion fruit (Passiflora edulis), pejibaye (Bactris gasipaes) and tender and seasoned tacaco (Sechium tacaco). Tacaco is endemic to Costa Rica.
Significance: this study is part of the project to strengthen the FCDB of ValorNut, the only software in Costa Rica to calculate the nutritional value of foods that is also considered a national database, so it is necessary to include the country's own foods.

10. Associations between lower diet quality and higher frequency of eating meals prepared away from home among adults, NHANES 2011-2018

11. Does Dietary Seaweed Consumption Modulate Prostate Cancer in Multiethnic Cohort Populations?

Authors: Thailynn Glover[1], Kevin Dodd[1], Carol Boushey[2], Luz M Rodriguez[1], and Nancy Emenaker[1]

[1]Division of Cancer Prevention, National Cancer Institute, NIH, Bethesda, MD, [2]University of Hawai'i at Manoa, Honolulu, HI.

Background: Prostate cancer is one of the most common cancers for men, especially African American males. Approximately 1.2 million people were diagnosed with prostate cancer in 2018 alone. Epidemiological evidence suggests that edible seaweed intake can modify disease risks (e.g., hemophilia, obesity and for some obesity related cancers).

Objective: This project aims to investigate a possible association between edible seaweed intake and prostate cancer incidence in underrepresented U.S. populations.

Description: We plan to use data from the multiethnic cohort (Japanese Americans, Native Hawaiians, African Americans, Latinos, and Caucasians) that assessed seaweed intake via a food frequency questionnaire (FFQ). We will use a Cox Proportional-Hazards model to determine the relative risk of prostate cancer in individuals with high seaweed intake (90th percentile) versus individuals with low intake (10th percentile). Data was collected on dietary supplement use, medications, physical activity, occupations, diet, and cancer. We will treat seaweed consumption as a continuous, rather than categorized, exposure to preserve as much statistical power as possible in the presence of measurement error in the FFQ. This error induces bias into estimated relationships, but in simple models, detecting a qualitative relationship is still possible if a) the correlation between true and reported intake and b) the "signal" from the risk model between cancer and true intake are both reasonably large.

Conclusion: The project only seeks to test for a qualitative relationship; if one is found, additional analyses using better dietary assessment would be required to make acceptable quantitative inference. Our reported findings will include a discussion of the potential effects of measurement error and the difficulties of obtaining data during a COVID pandemic.

12. Edible seaweeds and risk of colorectal cancer in the Multiethnic Cohort

Authors: Hannah Holmes, BS[1,2], Carol Boushey, PhD, MPH, RD[2], Kevin Dodd, PhD[1], and Nancy Emenaker, PhD, MEd, RDN, LD, FAND[1]

[1]Division of Cancer Prevention, National Cancer Institute, NIH, Bethesda, MD, [2]University of Hawai'i at Manoa, Honolulu, HI.

Background: Colorectal cancer (CRC) is one of the most common U.S. cancers, and incidence of early-onset CRC is rising in young adults. Nutrition is a modifiable CRC risk factor. Edible seaweed consumption is known to alter hormone levels, inflammation, gut microbial populations, and may reduce risk for some cancer types including CRC.

Objective: We will investigate whether increased consumption of edible seaweed is associated with CRC risk in underrepresented minority groups living in the U.S. using the Multi-Ethnic Cohort (MEC) Study population.
Description: MEC is an observational study following >215,000 participants in Hawaii and Los Angeles, representing 5 main U.S. ethnic groups (African Americans, Caucasians, Japanese Americans, Latinos, and Native Hawaiians). Diet was assessed via a food frequency questionnaire (FFQ). We will analyze data from the MEC Study to determine whether higher seaweed intake is associated with reduced CRC risk overall and by ethnicity. Statistical analysis will include a Cox proportional hazards regression modeling CRC incidence with seaweed consumption as the primary exposure. Seaweed consumption will be analyzed as a continuous rather than a categorized exposure to preserve statistical power in the presence of measurement error in the FFQ. This error induces bias into estimated relationships, but in simple models, detecting a qualitative relationship is still possible if a) the correlation between true and reported intake and b) the "signal" from the risk model between cancer and true intake are both reasonably large.
Conclusion: The project will test qualitative relationships for seaweed consumption and CRC risk. Pending data analyses, we hypothesize higher edible seaweed consumption reduces CRC risk. Findings will be reported alongside a discussion of the potential effects of dietary measurement error on results and the challenges of obtaining data during a global pandemic.

13. Feasibility of Using the USDA Global Branded Food Products Database to Update a Food and Nutrient Database

Authors: Bhaskarani Jasthi, PhD RD; Jennifer Stevenson; Janet Pettit; Kristine Schmitz; Lisa Harnack, DrPH RD; Abigail J. Johnson, PhD, RDN. Nutrition Coordinating Center, Epidemiology & Community Health, University of Minnesota
Objective: To evaluate the feasibility of using the USDA Global Branded Food Products Database (GBFPD) to update branded food products in a database used to support a dietary intake assessment software application.
Materials and Methods: In 2020, the University of Minnesota Nutrition Coordinating Center (NCC) database scientist team evaluated whether the GBFPD could be used to update margarine and buttery spreads in the NCC Food and Nutrient Database. NCC staff downloaded all CSV (Comma-Separated Values) files of Branded Foods and merged the files to create a single file that included all the relevant food attributes (e.g., food description, brand, nutrients). Database scientists reviewed the 'butter & spread' food category to identify products from the 16 brands in the NCC Food and Nutrient Database. The identified products were evaluated for currentness and completeness by comparing them to the matching product information available on each brand's website.
Results: The GBFPD contained at least one product for each of the 16 margarine and buttery spread brands in the NCC Food and Nutrient Database, with a total of 76 products identified. Manufacturers "Modified Date" for these products ranged from June 2017 to January 2019. Comparison of GBFPD data with each brand's website revealed discrepancies. Only 45% of the products were a match; the rest were either no match, discontinued, or multiple rows of the same product. The GBFPD was missing numerous products advertised on each brand's website. For example, the GBFPD included one Land O' Lakes product, whereas 13 products were on the brand's website.

Significance: The GBFPD includes many branded food products with crucial information (e.g., label nutrients, ingredients, etc.) consistently available for products included in it. However, NCC staff had to use brand website information to update the database because GBFPD didn't have the most current and complete data for the products.

14. The Human Milk Composition Initiative in the United States and Canada: Progress to Improve Data to Support Public Health

Authors: Ashley Vargas, PhD, MPH, RDN, FAND6; Kimberlea Gibbs, MPH, RD6; Dennis Anderson-Villaluz, RD5; Jaspreet Ahuja, MS1; Subhadeep Chakrabarti, PhD3; Kathryn E. Hopperton, PhD3; Mélanie L. Stanton, MPH, RD3; Pamela Pehrsson, PhD1; Sophie Parnel, MSc, RD3; Kellie O. Casavale, PhD, RD2
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[4]Office of Nutrition Policy and Promotion, Health Canada;
[5]Office of Disease Prevention and Health Promotion, HHS;
[6]Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, HHS

Objective: To describe new work performed by the Human Milk Composition Initiative (HMCI).

Background: Human milk (HM) is a complex biological fluid important for infant nutrition. Currently, neither the United States nor Canada collects HM samples in national population health and nutrition surveys. Additionally, data on HM are scarce and outdated in the national food composition databases in both countries. The Human Milk Composition Initiative (HMCI) is a joint United States (U.S.)-Canada federal undertaking to articulate how data related to human milk composition (HMC) are relevant to federal programs, policies, and regulations that positively impact public health. The HMCI views national nutrition and health monitoring by the federal governments in both countries as essential to support the health of infants and young children. Including HM data into monitoring efforts could capture nutritional, environmental, immunological, and other biological factors important to infant, child, maternal, and population health.

Description: Over about the past decade, the federal governments of the U.S. and Canada have progressed from publicly stating a federal need for HMC data to taking specific federal action to fulfill data needs. HMCI has played key roles, where needed, by bringing together diverse scientific perspectives as well as communicating and coordinating between federal agencies, academic researchers, and other public health professionals. HMCI is currently developing a manuscript series with broad federal input in the U.S. and Canada and a scoping review aimed at generating an interim HMC reference for use in food composition databases.

Conclusion: While the immediate objective for HMCI is to support the development of an updated interim HMC reference for use by public health professionals and researchers, HMCI continues to envision a more comprehensive surveillance-based program to provide a full picture of HMC in the United States and Canada.

15. Nutrient Composition Comparison of Cow's Milk with Plant Based Milk Alternatives

Authors: Dana Hoffman-Pennesi, Sarah Winfield, Alexandra Gavelek, Judi Spungen

Background: The U.S. Food and Drug Administration's Total Diet Study (TDS) collected and analyzed samples of cow's milk (whole, reduced fat, skim) and plant-based milk alternatives (PBMAs). Data generated from the program for these foods include various mineral nutrients. The Dietary Guidelines for Americans (DGAs) recommend plain cow's milk or unsweetened fortified soy beverage for children at least 12 months of age to meet calcium and potassium needs. The DGAs also recommend dairy products for pregnant and lactating women to meet necessary iodine requirements.

Objective: Nutrient data from cow's milk (whole, reduced fat, and skim) and soy and almond PBMA TDS samples collected from October 2017 through March 2020 (FY 2018 – FY 2020) were compared.

Description: Calcium, iodine, iron, and potassium were selected for comparison. Whole, reduced fat, and skim milk (N = 27 each) had average calcium concentrations of 117, 121, and 124 mg/100g, respectively. Both soy and almond beverage (N = 3 each) had higher average calcium concentration with 190 and 193 mg/100g, respectively. This is most likely due to the fortification of soy and almond beverages. Average iodine concentrations in the three cow's milk types were 11 – 12 times higher than soy beverage and 38 – 41 times higher than almond beverage. Soy and almond beverage had 21 – 37 times and 49 – 88 times higher average iron concentrations, respectively, than all types of cow's milk. Average potassium concentrations were similar for whole, reduced fat, and skim milk and soy beverage and about 2 times higher than almond beverage.

Conclusion: Cow's milk remains a source of important nutrients like calcium, iodine, and potassium. PBMAs may be a source of iron and if fortified, a source of calcium. As PBMAs become more common, it is important to be aware of nutrient recommendations for those who frequently consume these products to ensure appropriate nutrition.

Submission of Manuscripts for a Special Issue of the Journal of Food Composition and Analysis

NNDC encourages all presenters to submit manuscripts based on their 42nd NNDC oral or poster presentations to the Journal of Food Composition and Analysis (JFCA), for inclusion in a special 42nd NNDC online issue.

About the journal from the publisher: The Journal of Food Composition and Analysis publishes manuscripts on the chemical composition of human foods, analytical methods, food composition data and studies on the statistics, use and distribution of such data. More details are available on their website: https://www.journals.elsevier.com/journal-of-food-composition-and-analysis

Important guidelines for submission to all interested authors: Please format your manuscript based on the specifications listed in the Guide for Authors: https://www.elsevier.com/journals/journal-of-food-composition-and-analysis/0889-1575/guide-forauthors.

Manuscripts should be submitted via the following website: https://www.evise.com/profile/api/navigate/JFCA. Please make sure that you select the NNDC special issue (VSI: 42nd NNDC) when you upload your manuscript.

More information on the submission portal and final timeline will be communicated in the months following the conference.

Keynote Speakers Photos and Bio Sketches

David Jenkins

David J.A. Jenkins is an University Professor, and a professor in the Departments of Nutritional Sciences and Medicine, University of Toronto, a staff physician in the Division of Endocrinology, Director of the Clinical Nutrition and Risk Factor Modification Center, and a Scientist in the Li Ka Shing Knowledge Institute, St. Michael's Hospital. He was educated at Oxford University. He has served on committees in Canada and the United States that formulated nutritional guidelines for the treatment of diabetes and recommendations for fiber and macronutrient intake under the joint US-Canada DRI system (RDAs) of the National Academy of Sciences. He also served as a member of Agriculture Canada's Science Advisory Board (2004-2009) on the future direction of Canada's agriculture and agricultural research. He has spent much time working with the food industry to develop products for the supermarket shelf and, for example, helped to initiate Loblaw's (Canada's largest supermarket chain) 'Too Good To Be True' and most recently their popular "Blue Menu" line of products (for cardiometabolic health). His research area is the use of diet in the prevention and treatment of hyperlipidemia and diabetes. He has over 400 original publications on these and related topics. His team was the first to define and explore the concept of the glycemic index of foods and demonstrate the breadth of metabolic effects of viscous soluble fiber, including blood glucose and cholesterol lowering. His group developed the cholesterol-lowering concept of the dietary portfolio that has entered guidelines in many jurisdictions (e.g. CCS, Heart UK etc.). He is co-chair of the International Carbohydrate Quality Consortium (ICQC) that promotes research and recommendations on the use of carbohydrate foods and their components. He believes in the therapeutic value of plant-based diets and their components and the diets that are advocated have to be environmentally sustainable and reduce the human footprint on the planet.

Keynote Speakers Photos and Bio Sketches

Gary Beecher

Gary Beecher has over 40 years of experience in academia, government and as a consultant. Beecher retired from the USDA in 2001. While at USDA his research was on minor components of foods that improve health. To this end his group was a champion in the development of analytical methodology for several of these components, analyzed typical foods to obtain accurate data, and assembled these and other reliable data into user-friendly databases that could be employed by other professionals. Food components that were investigated included carotenoids, isoflavones, flavonoids and proanthocyanidins. His team and his collaborators also developed analytical techniques for several other minor food components and nutrients, as well as conducted biological research on several of these important constituents. Beecher served as Research Leader of the USDA Food Composition Laboratory for nearly 15 years. He has authored or co-authored over 160 scientific publications, book chapters and patents. He was coeditor of, "History of Human Nutrition Research in the U.S. Department of Agriculture, Agricultural Research Service: People, Events, and Accomplishments." He is a member of the American Society for Nutrition (ASN). In addition, Beecher served on several U.S. National Academies/Food and Nutrition Board Panels. In 1998, Beecher was awarded the Maurice and Charmine Kaplan Distinguished Lecturer award at the University of California, San Diego Cancer Center. He received the USDA Superior Service Award in 2001, as well as a Lifetime Member Award from the Plant Phenolics and Human Health Research Interest Group in 2002. He was elected fellow of ASN in 2006. Beecher received a Bachelor of Science in Agriculture/Chemistry, Master of Science in Food Science and PhD in Biochemistry all at the University of Wisconsin–Madison.

In retirement Beecher has reactivated his woodworking skills, that he learned from his father, specializing in furniture and cabinetry for homes and churches. He has done extensive genealogical research on both his and his wife's families.

Keynote Speakers Photos and Bio Sketches

Naomi Fukagawa

Naomi K. Fukagawa, MD, PhD, Director, USDA Beltsville Human Nutrition Research Center, and previously Professor of Medicine and Acting Director Gerontology, U Vermont. Dr. Fukagawa is a board-certified pediatrician with expertise in nutritional biochemistry and metabolism, including protein and energy metabolism; oxidants and antioxidants; and the role of diet in aging and chronic diseases, such as diabetes mellitus. She served as President of the American Society for Clinical Nutrition (American Society for Nutrition), an Associate Editor for the American Journal of Clinical Nutrition and the Editor-in-Chief of Nutrition Reviews until 2018. She was also Vice-Chair of the 2010 USDA/HHS Dietary Guidelines Advisory Committee. She received her MD degree from Northwestern University and her PhD from the Massachusetts Institute of Technology. Her clinical training included residency at the Children's Hospital of Philadelphia, U Pennsylvania, Chief Residency at the U Vermont, and nutrition/ gerontology fellowships at the Children's Hospital and Beth Israel Hospital, Harvard Medical School. Research ranges from cells and animals to in vivo studies in human volunteers with more recent focus on the impact of environmental stressors (metabolic or physical) on human health, specifically effects of exposure to petrodiesel and biodiesel exhaust and alternative fuel sources that may divert food crops to fuel production. The unanswered question is whether diet can help to mitigate the adverse effects of environmental stressors while maintaining adequate food production in an environmentally-friendly and sustainable manner.

Keynote Speakers Photos and Bio Sketches

Johanna Dwyer

Johanna Dwyer, D.Sc., R.D., Dr Dwyer is senior nutrition scientist (contractor) at the Office of Dietary Supplements, NIH where she works on dietary supplement databases and population based studies of dietary supplement used. She has served for many years as Director of the Frances Stern Nutrition Center, Tufts Medical Center and as Professor of Medicine and Community Health at the Schools of Medicine and Friedman School of Nutrition Science and Policy at Tufts University, Boston. She is also a senior scientist at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts. Her prior positions include assistant administrator for human nutrition at the USDA's Agricultural Research Service and adjunct professor at the Harvard School of Public Health. She attended Cornell University and received her M.S. from the University of Wisconsin and her M.Sc. and D.Sc. from the Harvard School of Public Health. Dr. Dwyer's career has been devoted to expanding the scientific basis for clinical and public health interventions related to diet, especially in obesity, cardiovascular disease, and kidney disease, and to ensuring that public policy fosters such efforts. is not only a discipline but an agenda of problems that must be solved.

Dr. Dwyer was a member of the year 2000 Dietary Guidelines Committee and of the Food and Nutrition Board, NASEM , is a member of the National Academy of Medicine and served on its Council. She has written over 550 research and review articles in scientific journals and books. She is editor of Nutrition Today, a review journal for nutrition practitioners. Her honors include the W.O. Atwater Award ; the Harvard School of Public Health Distinguished Alumnae Award; the C.A. Elvehjem Award of the American Society of Nutrition, fellow of the American Society for Parenteral and Enteral Nutrition and American Society for Nutrition, the Institute of Food Technologists' Trailblazer Award and Lectureship, the American Society for Nutrition's Excellence in Nutrition Education Award, the Elaine Monsen Award of the Academy of Nutrition and Dietetics, and one of the group receiving the Mary Swartz Rose Award of the American Society of Nutrition in 2022. She is past president of both the American Institute of Nutrition (now the American Society of Nutrition) and the Society for Nutrition Education, and a fellow of both organizations. She also served in Congress as a Robert Wood Johnson Health Policy Fellow.

Presenter Photos and Bio Sketches

Adrianne Griebel-Thompson
Dr. Adrianne Griebel-Thompson recently graduated from the University of Kansas Medical Center with a PhD in medical nutrition sciences. She is a registered dietitian and certified lactation counselor with experience working in the WIC program and in the clinical setting. Her interests in nutrition have always revolved around the nutritional needs of the fetus and infant as she believes nutrition during these critical periods is essential for future health. As a lactation counselor she is also a passionate breastfeeding advocate. Dr. Griebel-Thompson's dissertation work focused on the role of iodine and fluoride on thyroid function in pregnant women. She has also worked on projects assessing breastfeeding attitudes in college students and measuring rural physicians' knowledge and recommendations related to prenatal nutrition. Dr. Griebel-Thompson plans to work as a post-doctoral researcher at the children's hospital in her location where she will assess the nutritional intake of infants. She hopes that her work will help to improve the health and neurodevelopment of infants through optimal nutrition. She is pleased to be presenting a portion of her dissertation work, Dietary and Supplemental Iodine Intake and Urinary Iodine Concentration of Pregnant Women in the Midwestern United States.

Alanna J. Moshfegh
Alanna Moshfegh, M.S., R.D., is Research Leader, Food Surveys Research Group at the Beltsville Human Nutrition Research Center, U.S. Department of Agriculture (USDA). She is responsible for directing What We Eat in America, the dietary interview component of the National Health and Nutrition Examination Survey. She oversees data preparation for public release data files, statistical reports, and research papers; initiates enhancements to national dietary data collection methodology; and develops nutrient databases of foods commonly consumed. She directed development and validation of USDA's Automated Multiple-Pass Method, a 5-step 24-hour dietary recall system used in What We Eat in America and in research studies in the U.S. and internationally. She previously served in numerous positions in USDA including Assistant to the Administrator, Human Nutrition Information Service, and nutritionist, Food and Nutrition Service. She received her M.S. in nutrition and food service management from the University of Nebraska and her B.S. in nutrition and dietetics from North Dakota State University. Her research interests focus on national dietary assessment, food and nutrition policy, and dietary guidelines. Ms. Moshfegh is a member of the Academy of Nutrition and Dietetics, and a member and Fellow of the American Society for Nutrition.

Andrea Carlson

Andrea (Andi) Carlson is an economist in the Food Markets Branch of the Food Economics Division in USDA's Economic Research Service. She researches gateways and barriers to consumers' ability to choose and purchase healthy diets, and organic retail markets. She is the project lead for the Purchase to Plate Suite, which allows users to import USDA nutrient and food composition data into retail food scanner data and estimate individual food prices for dietary intake data. Her research interests include the affordability of healthy diets, tracking consumption over time, and examining organic food purchases and price premiums. Carlson joined ERS after 9 years with USDA's Center for Nutrition Policy and Promotion (CNPP), where she was the project leader for the USDA Food Plans and CNPP Food Prices Database. Before joining USDA, she was a CDC Prevention Effectiveness Fellow in the Lead Poisoning Prevention Branch and the Agency for Toxic Substances and Disease Registry. Andi received the Secretary's Award for developing and implementing USDA's Food Patterns, the Under Secretary's award for developing the Purchase to Plate Suite of products, and an Honorable Mention for the Agriculture and Applied Economics Association Bruce Gardner Memorial Prize for Applied Policy Analysis.

Andrea Lindsey

Andrea Lindsey serves as Director of Operation Supplement Safety (OPSS) and Senior Nutrition Scientist with the Consortium for Health and Military Performance (CHAMP), Uniformed Services University. She received her Master of Science degree in Nutrition from University of Maryland, College Park. Andrea is a nutrition information specialist with extensive experience in the field of dietary supplements, and she has considerable knowledge and understanding regarding the content, safety, labeling, and marketing of these products. Andrea joined the Uniformed Services University in 2010 after having worked for more than 16 years on a cooperative project with the Food and Nutrition Information Center, National Agricultural Library, and the Office of Dietary Supplements, National Institutes of Health. At CHAMP, most of her work encompasses the topic of dietary supplements and their ingredients, which involves reviewing, evaluating, and interpreting the scientific literature; writing; and directing the Operation Supplement Safety program. Ms. Lindsey also regularly educates Service Members, healthcare providers, military family members, and leaders about dietary supplements. She also oversees all the Nutrition content for the Human Performances Resources by CHAMP website (HPRC-online.org). Ms. Lindsey currently maintains membership in the American Society for Nutrition and the Collegiate & Professional Sports Dietitians Association.

Ashley Vargas
Ashley Vargas, Ph.D., M.P.H., R.D.N., a registered dietitian nutritionist (R.D.N.) and molecular epidemiologist, is a program director in NICHD's Pediatric Growth and Nutrition Branch. Her clinical and research experience focuses on improving the precision of nutrition risk assessment and the application of nutrition therapy to individuals across their lifespan. She currently serves as the U.S. Coordinator for the Human Milk Composition Initiative. Dr. Vargas received her doctoral degree in nutritional science from the University of Arizona, her master's degree in public health from Harvard University, and her bachelor's degree in dietetics from Wayne State University, where she also completed her coordinated dietetic training program. She has experience as a clinical R.D.N. in many different settings, has served in leadership roles in professional societies, and is a fellow of the Academy of Nutrition and Dietetics.

Bhas Jasthi
Bhas Jasthi is a Food and Nutrient Database Scientist at NCC University of Minnesota. Bhas has been with NCC since 2007. She received her Ph.D. in Food Science and Nutrition from Banaras Hindu University, India. Bhas is primarily responsible for adding and updating nutrient values in the NCC Food and Nutrient Database. The nutrients Bhas has added to the database over the years include vitamins D2 and D3, conjugated linoleic acid, gluten, and lignans, to name a few.

Birdem Amoutzopoulos
Birdem is a nutritionist working in the Dietary Assessment team in the NIHR Cambridge BRC Measurement Platform. She takes primary responsibility for managing dietary data and related databases, including supporting the development of innovative approaches for data capture, coding and administration, such as moving the UK National Diet and Nutrition Survey (NDNS) to NDNS Intake24. She is responsible for the development of the NDNS Nutrient Databank in conjunction with Public Health England. Her role includes development and management of collection and coding systems. She provides specialist expertise, support method innovation and development, and delivers specific inputs to projects in accordance with the needs of a research. This means working with collaborators, researchers and experts in the field for input and to ensure alignment with standardised approaches where applicable. Birdem had supported dietary assessment and food composition projects, including the NDNS, since 2014. Prior to this she worked in EU projects and clinical trials with a focus on food composition and nutritional effects of foods. She has a PhD in nutrition and dietetics.

Brienna Larrick
Brienna Larrick, PhD, PMP is a Scientific Program Manager at the Institute for the Advancement of Food and Nutrition Sciences (IAFNS), a 501(c)3 nonprofit organization that brings together scientists from government, academia and industry to advance science in support of public health. In her current role, Brienna represents IAFNS in the Public-Private Partnership on the USDA Global Branded Food Products Database, and manages IAFNS's scientific committees on food microbiology, caffeine safety, and scientific integrity. Brienna holds a PhD in Biochemical and Molecular Nutrition from Purdue University, and a BS in Nutrition Sciences from Bowling Green State University.

Carrie Martin
Carrie Martin, M.S, R.D., has been a Nutritionist at the USDA Beltsville Human Nutrition Research Center, Beltsville, MD since 2007. Prior to joining USDA, she was a Research Dietitian at the University of Hawaii, Cancer Research Center from 2001-2007. Carrie received her Masters of Science in Nutrition and Bachelors of Science in Dietetics from the University of Hawaii in Honolulu, Hawaii. She is also a Registered Dietitian. In her current position, she works on the maintenance and development of foods, recipes, and nutrient components for the Food and Nutrient Database for Dietary Studies (FNDDS) and other related products including the Database of Flavonoid Values for USDA Food Codes. She also conducts research using WWEIA data. Carrie has authored or co-authored journal articles, data briefs, and database releases on the USDA Food Surveys Research Group website and presented her research at AND's FNCE, ASN's Nutrition, the National Nutrient Databank Conference, and other local and national meetings.

Catherine Champagne
Catherine M. Champagne, PhD, RDN, LDN, FADA, FAND, FTOS, FAHA is Professor/Chief, Nutritional Epidemiology/Dietary Assessment and Nutrition Counseling, Pennington Biomedical Research Center, Baton Rouge, LA. She is a native of Louisiana and received her MS and PhD degrees from Mississippi State University in Nutrition with a minor in Food Science. She is a long-standing member of the Academy of Nutrition and Dietetics (including the following Dietetic Practice Groups:Weight Management; Sports, Cardiovascular, and Wellness; Research; and School Nutrition Services), the American Diabetes Association, American Society of Nutrition, The Obesity Society, American Heart Association, American Diabetes Association and the National Nutrient Databank Conference. Dr. Champagne is a Fellow of the Academy of Nutrition and Dietetics, The Obesity Society, and the American Heart Association. She is involved in studies which include dietary counseling and/or dietary intake assessment. Her interests are

Catherine Champagne cont'd	women and children's health, child nutrition, diet for weight loss and chronic disease, Mediterranean diet approaches, physical activity promotion, nutritional assessment of diverse populations, cancer prevention/treatment and functional foods. One of her significant achievements was the final design of the DASH and DASH-Sodium diets. She has been involved in several NIH-funded trials: The Diabetes Prevention Program, the Look AHEAD Trial for Diabetes Management, PREMIER, Weight Loss Maintenance, POUNDS LOST, and others.
	Christina Barroso Cristina S. Barroso, DrPH, is a health disparities researcher who partners with community organizations, local and regional health departments, and policymakers to provide a more equitable physical and social environment so that all populations can achieve high health status to enable them to thrive in their communities. She is particularly interested in topics concerning childhood obesity, healthy eating, active living, and body image.
	**Cindy Hidalgo Viquez** Cindy Hidalgo Víquez has Master's Degree in Food Science and Degree in Human Nutrition of the University of Costa Rica. Professor and researcher of the School of Nutrition at the University of Costa Rica. She has experience in research projects about generation and compilation of food composition data in Costa Rica. She also leads the ValorNut program which oversees the developing and updating of the only software in Costa Rica with a food composition database to determine the nutrition value of foods. She was the principal investigator of the research on Analysis of methodological components and human and technological resources available in Costa Rica to generate food composition data. She is the President of COSTA RICAFOODS and member of the Regional Technical Committee of Compilation of LATINFOODS.
	Claire Peacock Claire Peacock joined the MenuTrinfo team in 2012 as a recent Biomedical Sciences graduate from Colorado State University. She has spent the last eight years working with the foodservice industry to meet and exceed labeling regulations and provide food that is safe for consumers with special dietary needs. She specializes in nutrient analysis, menu labeling and food allergy identification.

Colin Kay
Dr Colin Kay is a Professor of Translational Nutrition in the Department of Food, Bioprocessing and Nutrition Sciences at the North Carolina State University's Plants for Human Health Research Institute. Dr Kay's research is centered on establishing the metabolism of dietary phytochemicals and the potential impact this has on their biological activity. His research core is focused on the development of qualitative and quantitative metabolomic MS/MS methodologies for establishing the contribution of dietary phytochemicals to the human metabolome. This work has led to the developing an in-house phytochemical exposome knowledge database comprising chemical composition and metabolome data, including chemical, reaction and pathway identifiers linked to thousands of analytes identified through evidence mapping and characterizing of nutrition intervention study samples.

Dana Hoffman-Pennesi
Dana Hoffman-Pennesi earned her B.S in Chemistry and M.S. in Food Science from the University of Delaware. Following a quality assurance position at Tastykake in Philadelphia, she joined FDA-CFSAN as a fellow working on sodium reduction. For the last 10+ years she has been part of the branch that works on FDA's Total Diet Study. Additionally, she performs data analysis, project management, and exposure assessment. Most recently she has been involved in FDA's Closer to Zero initiative. In her personal time, Dana enjoys taking walks, cross-stitch, spending time with friends and family, cuddling with her three cats, and volunteering with a local cat rescue as a foster.

Danielle Lemay
Danielle G. Lemay is a Research Scientist at USDA ARS Western Human Nutrition Research Center. She is also an Associate Adjunct Professor in the Department of Nutrition at the University of California, Davis and the Nutrition Cluster Lead at the USDA/NSF AI Institute for Next-Generation Food Systems. Her lab uses bioinformatics to study how dietary components, especially fermentable carbohydrates, affect gastrointestinal health and whether that health response is modulated by the functional capabilities of the resident gut microbiome. Her lab also applies machine learning/AI to understand the effects of diet on human health. She has a PhD and MS in Nutritional Biology from UC Davis, and a BS in Electrical Engineering & Computer Science from MIT.

David Haytowitz

David Haytowitz retired on February 1, 2019 after 41 years of federal service with USDA. He served as a nutritionist with USDA's Nutrient Data Laboratory and joined USDA in 1977 after receiving his B.Sc. in Food Science from the University of Massachusetts. He later received a M.Sc. in Food Science from the University of Maryland His entire career at USDA has been with the Nutrient Data Laboratory through several reorganizations. Mr. Haytowitz is an internationally recognized expert on food composition. He has worked on several iterations of USDA's Nutrient Databank System and most recently on the development of FoodData Central. He has coordinated the National Food and Nutrient Analysis Program, the dissemination of USDA's Food Composition Data and compiling representative nutrient values for vegetables, legumes, spices and herbs, and nuts and seeds. He also worked on developing Special Interest Databases on bioactive compounds. In 2011 he spent two months at the Food and Agriculture Organization of the United Nations Headquarters as an expert consultant. He has authored or coauthored over nearly 150 scientific articles and over 160 scientific presentations. Mr. Haytowitz has been recognized as being a highly cited researcher for 2014-2016. Mr. Haytowitz also serves as the coordinator of the North American (NORAMFOODS) regional data center for INFOODS and is past chair of the National Nutrient Databank Conference.

Donna Rhodes

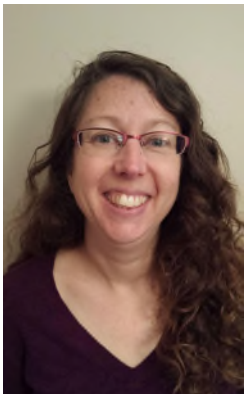
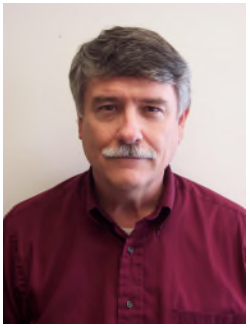
Donna Rhodes is a Nutritionist with the Food Surveys Research Group at the Beltsville Human Nutrition Research Center, ARS, USDA where she has worked for 21 years. Ms. Rhodes plans and conducts research using data from What We Eat in America (WWEIA), the dietary interview component of the National Health and Nutrition Examination Survey. In that capacity, she prepares publicly released data tables summarizing nutrient intakes and eating patterns of the U.S. population. She oversees updates to USDA's Food and Nutrient Database for Dietary Studies, as well as the WWEIA Food Categories. Ms. Rhodes also conducts research focusing on validating the USDA Automated Multiple-Pass Method, the 5-step 24-hour dietary recall instrument used in What We Eat in America, NHANES for both energy and sodium. Before joining the Food Surveys Research Group, she was a research dietician involved in the Dietary Approaches to Stop Hypertension (DASH)-Sodium Study. Ms. Rhodes received her Master of Science in Nutrition from the University of Maryland and her Bachelor of Arts in Home Economics Education from Florida State University. She is a member of the Academy of Nutrition and Dietetics and is a Registered Dietitian.

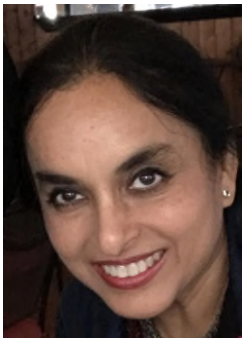
Edwina Wambogo
Edwina has a PhD in nutrition and an MPH in community health education, both from the University of Maryland. Edwina also holds an MS in nutrition and dietetics from Kenyatta University, Nairobi, Kenya, and is a registered dietitian. She is a nutrition epidemiologist with the National Center for Health Statistics, CDC. Her research interests include dietary patterns, dietary assessment, maternal/child health, aging, and food security.

Gisela Avalo
My name is Gisela Avalo Ortega, a student of the last year of the Bachelor of Nutrition at the University of the Republic in Uruguay, I am currently studying the fourth cycle of the degree. Prior to graduation, professional practices are carried out, in which I carry out my specialization in the clinical area and the final degree project in order to be able to define the professional profile of the graduates. The latter is carried out based on the interest of those who speaks, Maltilde, Enriqueta, Lara and Agustina in carrying out a study of product labeling in the market of our country, for which a quantitative investigation called Labeling analysis in the Uruguayan yogurt industry applying the FLIP-LAC program was carried out. What information does the consumer have in reference to the sugar content?.

Hande Kucuk McGinty
Dr. Hande Kucuk McGinty is a Research Associate Professor at the Department of Chemistry and Biochemistry at Ohio University. She received a Ph.D. in Computer Science from University of Miami, but she has a long history of working with interdisciplinary teams. Her most recent research focuses on food and bio-ontologies and their applications for artificial intelligence and machine learning. She previously worked on designing and implementing ontologies such as BioAssay Ontology (BAO) and Drug Target Ontology (DTO) as well as generating methods on knowledge acquisition and representation. Dr. McGinty served several conferences and workshops. She is the general chair of the US2TS conference and is helping organize ICBO 2022 as well as several workshops.

Isabelle Massarelli
Chief, Food Surveillance Integration Division. Isabelle Massarelli is a registered dietitian and has worked in the Food Directorate at Health Canada for the past 27 years. She has extensive experience in food and nutrition consumption surveys, having been involved in the Provincial Nutrition Surveys, the Canadian Community Health Surveys and the Canadian Health Measure Surveys. Her team manages a food and recipe database used in surveillance activities, collaborates in the adaptation of dietary collection tools for use in Canada, including the Automated Multiple-Pass Method (AMPM) , the ASA24 a self-automated 24 hour recall tool, and the Diet

	History Questionnaire (DHQ). Areas of Expertise/Interest include: Nutrition Surveillance and Dietary assessment tools.
	**Isabelle Rondeau** Isabelle Rondeau is a registered dietitian at Health Canada where she manages the Nutrition Survey System, the food and recipe database used in surveillance activities. Isabelle has extensive experience in food and nutrition consumption surveys, having been involved in the Canadian Community Health Surveys - Nutrition in both 2004 and 2015 and the Canadian Health Measure Surveys. She has also collaborated in the adaptation of dietary collection tools for use in Canada, including the Automated Multiple-Pass Method (AMPM), the ASA24 a self-automated 24 hour recall tool, and the Diet History Questionnaire (DHQ).
	**James Friday** James Friday is a nutritionist with the Food Surveys Research Group of the Beltsville Human Nutrition Research Center, Agricultural Research Service. He is a graduate of the University of Maryland at College Park and began his Federal career with the Human Nutrition Information Service of the United States Department of Agriculture. James has played a critical role in the development of the MyPyramid Equivalents and other specialized databases that allow researchers to assess American diets according to USDA's dietary guidance initiatives. He has also developed many of the methods and protocols used to translate USDA survey foods into ingredients and commodities to create specialized databases such as the Food Commodity Intake Database used by the Environmental Protection Agency to estimate Americans' pesticide exposure through foods, and the Food Intakes Converted to Retail Commodities Database which converts foods into retail-level commodities. James is currently working with other ARS staff on the maintenance and development of foods, recipes, and nutrient components for the Food and Nutrient Database for Dietary Studies (FNDDS) and supporting the What We Eat in America dietary intake data collection.
	**James Harnly** James Harnly, PhD, is an analytical chemist with more than 40 years of experience in industry and government. He serves as the Research Leader for the newly organized Methods and Applications Food Composition Lab, which is responsible for analytical and food nutrition research and FoodData Central, the new USDA food composition database system. Dr. Harnly has authored more than 170 peer-reviewed papers, technical reports, and book chapters, and holds two patents. He served as the US editor of the Journal of Analytical Atomic Spectrometry and as Editor-in-Chief of the Journal of Food composition and Analysis. He is a member of the Society

James Harnly cont'd	for Applied Spectroscopy, American Society for Nutrition, American Society for Mass Spectrometry, and AOAC International. He served on the Board of Directors and as President of the Board for AOAC International and is on the Advisory Board for the American Botanical Council. He received his Bachelor of Arts from the University of Colorado and his Ph.D. in Analytical Chemistry from the University of Maryland.
	**Jaspreet Ahuja** Jaspreet K Ahuja is a nutritionist with expertise in food composition research as related to public health, national nutrition monitoring, and dietary exposure assessment. She has co-led several inter-agency collaborative projects, such as the 'Monitoring sodium and selected nutrients in the U.S. food supply (USDA-CDC)' and the 'Human Milk Composition Initiative (Joint US/Canada project)'. For several years, Jaspreet was the co-lead for the update of the USDA National Nutrient Database for Standard Reference and the Food and Nutrient Database for Dietary Studies, USDA food and nutrient databases that provide the infrastructure for food and nutrition research, policy and practice. She has over 100 publications in major food and nutrition journals. Her current research projects include: Development and use of IngID, a framework of parsing and systematic reporting of ingredients used in commercially packaged foods; Application of machine and deep learning techniques for automation of food processing tasks such as determining nutrients, ingredient proportions and classification of foods; Improving availability of human milk composition data through national and international collaborations.
	Jee Hyun Lee Jee Hyun Lee, RD MPH MEd, graduated from the University of Minnesota School of Public Health in Public Health Nutrition in 2021 where she completed the research she is presenting as a student. She is currently working at the University of Minnesota Extension and will be pursuing a PhD in Community Nutrition starting Fall 2022. She is particularly interested in community nutrition and nutrition education around school settings.
	**Judith Spungen** Judi Spungen, a Nutritionist with FDA's Center for Food Safety and Applied Nutrition (CFSAN), works to estimate dietary exposure to contaminants in foods. Judi also serves as an expert in dietary exposure assessment for the Joint FAO/World Health Organization Expert Committee on Food Additives (JECFA). From 2015-2018, Judi chaired the Interagency Risk Assessment Consortium's Dietary Exposure Assessment Working Group in an interagency effort to describe federal dietary exposure assessment methods and available resources. Judi is a member of the National Nutrient Databank Conference (NNDC) Steering Committee and was

Judi Spungen bio cont'd	Program Chair for the 41st NNDC. Prior to joining FDA, Judi had positions with USDA and with several consulting firms, including Environ and Exponent. She has a BS with high honors in foods and nutrition from Drexel University, an MS in nutritional sciences from the University of Maryland, a Certificate in Risk Policy and Analysis from the Johns Hopkins Bloomberg School of Public Health, and is a Registered Dietitian.
	**Jules Larke** Dr. Jules Larke is a Computational Biologist postdoctoral researcher with the USDA Agricultural Research Service. In Dr. Danielle Lemay's lab at the Western Human Nutrition Research Center, he studies the role of diet in shaping gut microbial communities and their impact on host health. Additionally, his research seeks to improve dietary assessment by integrating novel food glycan composition data with the current tools and databases used to estimate dietary intake. Dr. Larke's overarching goal is to continue developing and integrating fine-scale food composition data that accurately captures the molecular detail and diversity of our food to better characterize the relationship between diet and health outcomes.
	**Julie Eichenberger** Julie Eichenberger is Chief of Nutrition and Food Services at the Iowa City VA Health Care System. She has served in the capacity of research dietitian, clinical dietitian, clinical manager, patient food service manager, assistant director and director of Nutrition and Food Service for the University of Iowa Hospitals and Clinics, as well as director of research training and career development at The Institute for Clinical and Translational Science. She holds adjunct professor appointments in dentistry and epidemiology at the University of Iowa. She is has been involved with NNDC for 33 years and a member of the Steering Committee for the past 17 years serving as Treasurer, Fund Raising Chair, Scholarship Director and Grants Manager.
	**Julia Lorenzana Peasley** Julia is the Research Services Manager for the Nutrition Coordinating Center at the University of Minnesota's School of Public Health. She hires and trains dietary interviewers to use NDSR to collect 24-hour dietary recalls and complete data entry for dietary analysis studies being conducted in the NCC Service Center.

Julie Hess
Dr. Hess received Bachelor of Arts degrees in French and English from the University of Texas at Austin and earned a doctoral degree in Human Nutrition from the University of Minnesota, where she studied the health impacts, consumption patterns, and dietary guidance around snacking, mushroom intake, and dairy intake. Before joining the USDA-ARS Grand Forks Human Nutrition Research Center as a Research Nutritionist, Dr. Hess served as Vice President of Scientific Affairs for the National Dairy Council in Rosemont, Illinois. She is an active member and volunteer with several nutrition and scientific organizations, including the Institute of Food Technologists and the American Society for Nutrition. Dr. Hess's current research is centered on identifying and evaluating strategies to help Americans meet recommendations from the Dietary Guidelines for Americans. Her work involves investigating how American diets currently align with dietary guidance and recognizing and addressing barriers to following recommendations, including diet cost, dietary restrictions, and dietary preferences. She is especially interested in eating frequency and how "snacking," or eating between meals, may impact overall energy and nutrient intakes as well as how external factors may affect eating frequency and eating behaviors.

Kathy Hoy
Kathy Hoy is a Nutritionist with the Food Surveys Research Group at the USDA Beltsville Human Nutrition Research Center, Beltsville, MD. She conducts, publishes and presents research using data from What We Eat In America, NHANES. Research interests include protein intake, dietary patterns, and factors associated with diet quality. Previously, she was nutrition research manager for the Fruits and Veggies – More Matters program at Produce for Better Health Foundation, and national coordinator for the Women's Intervention Nutrition Study, a multi-center study on fat intake and breast cancer recurrence. Dr. Hoy is a registered dietitian and member of the Academy of Nutrition and Dietetics (AND) and has been a Lead Evidence Analyst for the AND Evidence Analysis Library since 2006. She received her BS in Dietetics from the University of Dayton, and MEd in Applied Physiology and EdD in Nutrition from Teachers College, Columbia University.

Katie Kirkpatrick
Katie Kirkpatrick, MS, RD, CSSD is a Senior Environment Nutrition Manager at the Henry M. Jackson Foundation, in support of the Consortium for Health and Military Performance (CHAMP). Ms. Kirkpatrick is responsible for the operational oversight of nutrition-environment education and research initiatives, including the Go for Green® program. A Registered Dietitian with a board-certified specialty in sports nutrition, she has years of

	experience in wellness and prevention, sports and performance nutrition, mindful eating, culinary nutrition, and plant-based eating. Her focus is on optimizing nutrition to impact nutritional fitness and Total Force Fitness for everyone.
	**Kellie Casavale** Kellie Casavale is a Senior Nutrition Advisor in the Office of Nutrition and Food Labeling in CFSAN, FDA.She supports cross-Center and cross-Departmental collaborations, particularly those related to the Dietary Guidelines for Americans (DGAs) and maternal and child populations. She has led in the Dietary Guidelines process through roles at USDA/CNPP, HHS/ODPHP, and now FDA for four cycles of the DGAs. She supported the development of the first Dietary Patterns for children under 2 years with 2020 Dietary Guidelines Advisory Committee. Other leadership roles include the U.S. Federal Data Consortium on Pregnancy and Birth to 24 Months, the Human Milk Composition Initiative in the U.S. and Canada, and the "Birth to 24 Months" projects in CDC's National Health and Nutrition Examination Surveys (NHANES). She contributes leadership for the FDA/EPA Fish Advice and Closer to Zero, supporting nutrition while reducing potential exposures to chemical contaminants through food. Dr. Casavale has a BS in Biology from Lander University, a PhD in Nutrition Science from the University of North Carolina-Greensboro, and is a Registered Dietitian.
	**Kimberlea Gibbs** Kimberlea Noelle Gibbs, MPH, RD, LD, CHES., is a Lieutenant and Registered Dietitian Nutritionist in the Commissioned Corps of the U.S. Public Health Service. LT Gibbs is currently stationed at the National Institutes of Health as a Nutrition Specialist in the Eunice Kennedy Shriver Institute for Child Health and Human Development (NICHD) and Pediatric Growth and Nutrition Branch (PGNB). Her primary tasks include serving as lead analyst for precision nutrition initiatives and international nutrition programs; leading reviews for diversity supplemental funding, prioritize and communicate with key external stakeholders on important nutrition issues; and researching, generating, and presenting to NIH leadership short-and long-term stakeholder engagement goals that support and advance the institute's strategic plan. She currently serves as the U.S. Executive Secretary for the Human Milk Composition Initiative. LT Gibbs earned her master's degree in public health from Drexel University and her bachelor's degree in dietetics in nutrition from Howard University, where she completed her coordinated dietetic training program. LT Gibbs is a Certified Health Education Specialist and has received training in global health, exercise science, and community nutrition.

Kyle McKillop
Kyle McKillop is the lead on USDA's FoodData Central, an integrated data system that provides expanded nutrient profile data and links to related agricultural and experimental research. He has a Bachelor's in Computer Science and a Master's in Information Management with a specialty in Technology Development and Deployment. He previously worked for the University of Maryland's Joint Institute for Food Safety and Applied Nutrition where he worked on developing food database systems,including modernizing USDA's food composition database. Kyle is now with the USDA/ARS Beltsville Human Nutrition Research Center to lead FoodData Central's data collection efforts and manage future application developments. He is an active participant of the public private partnership that works to expand the Global Branded Food Products database, published on FoodData Central.

Laura Raggio
Escuela de Nutrición, Unviersidad de la República URUGUAY
Doctorate in Chemistry, University of the Republic. Food Engineering, University of the Republic.
Professor and Researcher at the School of Nutrition of the University of the Republic of URUGUAY.
Researcher in projects related to:
Food composition in Uruguay.
Study and development of foods in response to the eating behavior of the population towards disease prevention and health promotion.
Characterization of bioactive compounds in extra virgin olive oils marketed in Uruguay towards health promotion
Revaluation of by-products from the food industry for the development of functional foods.
Tutor of undergraduate and graduate thesis at the University of the Republic related to the thematic lines mentioned.
National Coordinator of URUGUAYFOODS of LATINFOODS.
SNI - Ciencias Médicas y de la Salud
Researcher - PEDECIBA MEC UdelaR

Lauren O'Connor
Dr. O'Connor is a Research Nutritionist in the Food Components and Health Lab at the USDA's Beltsville Human Nutrition Research Center. Her research covers a range of topics under the umbrella of dietary patterns and chronic disease, with emphasis on how certain foods (e.g., red meat and processed foods) behave both metabolically and methodologically within the context of various dietary patterns for US populations. She currently serves as the chair-elect for the American Society for Nutrition (ASN)'s Climate/Environment, Health, Agriculture, and Improved Nutrition (CHAIN) Research Interest Group; the Awards Chair for ASN's Early Career Membership Group; a member of the FASEB Early Career

Lauren O'Connor bio cont'd	Representative Engagement Task Force; and is on the Editorial Board for Frontiers in Nutrition's Nutrition Methodology Section. Before coming to USDA, Dr. O'Connor was a Cancer Prevention Research Fellow at the NIH's National Cancer Institute (NCI). She served on the Data Analysis Team for the 2020-25 Dietary Guidelines for Americans; played an integral role in advancements for NCI's Automated Self-Administered 24-Hour (ASA24®) Dietary Assessment Tool as well as conducted independent research using nationally representative nutrition surveillance data. During her fellowship at NCI, Dr. O'Connor completed an MPH at Johns Hopkins' Bloomberg School of Public Health with a concentration in epidemiology and biostatistical methods.
	**Lauri Byerley** Lauri O Byerley, PhD, RDN, LDN, FAND, is currently an Associate Professor at the Louisiana State University Health Sciences Center in the School of Medicine's Physiology Department, where she teaches nutrition wellness to allied health professionals and our next generation of doctors. She is also a Professor at the American Public University System (APUS), where she teaches sports nutrition and develops nutrition curriculum for the Sports and Health Sciences program. Dr. Byerley received her BS in Food and Nutrition, Related Science from Iowa State University, MS in Nutritional Science from Purdue University, and PhD in Nutritional Science/Public Health with a minor in Biological Science from UCLA. In addition, she completed two post-doctoral fellowships, one at Stanford University and the other at Harbor-UCLA Medical Center. Dr. Byerley's current research focuses on the interaction of diet with the gut microbiome and its impact on metabolic processes within the body. She has more than 35 peer-reviewed articles from her original scientific research. Also, she has several nutrition-related publications and books written for the lay press. In addition, she has presented at local, state, and national meetings, appeared on television and radio talk shows and chaired events at several national meetings.
	Linda Kantor Linda Kantor is an agricultural economist in the Diet, Safety, and Health Economics Branch of the Food Economics Division at USDA's Economic Research Service. Linda is the research lead for the ERS Food Availability Data Series, which annually reports the amount of food available for human consumption in the United States and the LossAdjusted Food Availability Data Series, which adjusts the food supply data for spoilage and other losses, and is one of two Federal government sources of food loss in the United States. Her research interests include tracking changes in the healthfulness of the food supply over time, food loss measurement, and as a member of the ERS National Household Food Acquisition and Purchase Survey

	(FoodAPS) team, identifying data needs for food item identification in FoodAPS-2. Linda joined ERS in 1991 after receiving her M.S. in Agricultural and Applied Economics from the University of Minnesota.
	**Lisa Harnack** Lisa is a Professor in the School of Public Health at the University of Minnesota. She conducts research to identify policies and programs that are effective in supporting good nutrition and health for all. She has led or collaborated on dozens of studies and published more than 200 peer-reviewed papers. She also directs the University of Minnesota Nutrition Coordinating Center (NCC). This Center developed, maintains, and supports two widely used dietary assessment tools- Nutrition Data System for Research (NDSR) and the NCC Food and Nutrient Database.
	**Majd Jauhary-Nayfeh** Majd Jauhary-Nayfeh is currently a master's degree candidate at Russell Sage College in the Applied Nutrition program. She received her bachelor's degree from the University of Jordan in Nutrition and Food Technology and her Didactic Program in Dietetics certification from New York University. Majd has work experience as a research assistant at Harvard School of Public Health, a coordinator of a food insecurity program at a local non-profit agency, and a planner at a public health initiative program. She is presently managing nutrition related government grants for a community action agency and is a member of the Academy of Nutrition and Dietetics (AND). Majd is passionate about research and its role in advancing public health. She currently resides in the Capital District of NY state with her husband and three children.
	**Marie-France Verreault** Marie-France is a registered dietitian at Health Canada where she manages the Canadian Nutrient File with her team. She has extensive experience in food composition and has a special interest in improving data quality and data sharing. She oversees the Sampling and Nutrient Analysis program and she is co-chair of NORAMFOODS. Marie-France is a mother of 3 teenagers and a competitive dragonboat paddler.
	**Mary R. L'Abbé** Dr. L'Abbé is a Professor and former Chair, Department of Nutritional Sciences, University of Toronto, where she leads a research group on Food and Nutrition Policy for Population Health. In 2018 Dr. L'Abbé was named to the Order of Canada; she is an inaugural Fellow of the CNS-SCN and a fellow of the ASN. Her research examines the nutritional quality of the Canadian food supply, nutrient profiling methods, dietary intake patterns, and

Mary L'Abbé bio cont'd	consumer research on food choices related to obesity and NCDs. She led the development and updating of FLIP and Menu-FLIP, branded food composition databases of packaged and chain restaurant foods in Canada since 2010. Professor L'Abbé has authored over 285 peer-reviewed scientific publications, book chapters and government reports, and chaired or participated on numerous expert committees for WHO, PAHO, Health Canada and the US National Academies for DRIs. She is the Director of the WHO Collaborating Centre on Nutrition Policy for NCD Prevention and one of the founding members of INFORMAS (International Network for Food and Obesity/Non-communicable Diseases Research, Monitoring and Action Support). A graduate of McGill, Professor L'Abbé began her research career at Health Canada, rising to Director, Bureau of Nutritional Sciences, before joining University of Toronto.
	**Megan Edelman** Megan is a nutrition graduate student at the University of Minnesota where she works as a research assistant for Dr. Joanne Slavin on research projects related to dietary fiber. She grew up in a small town in western Wisconsin and attended college at the University of Wisconsin-La Crosse, where she received her first bachelor's degree in exercise and sport science. Following graduation, she spent time in Alajuelita, Costa Rica volunteering in a clinic for the Foundation for International Medical Relief of Children (FIMRC) and working with a local women's group. Megan returned to school at the U of M to obtain a bachelor's degree and a master's degree in nutrition. She plans to complete her dietetic internship with the University of Minnesota and to become a registered dietitian specializing in the field of maternal and child nutrition.
	**Nancy Emenaker** Nancy J Emenaker, PhD, MEd, RDN, LD, FAND, is a National Cancer Institute (NCI) Program Director in the Nutritional Science Research Group, Division of Cancer Prevention. She has overseen a basic and clinical research portfolio in nutrition and cancer prevention since joining NCI in 2006. Dr. Emenaker is a member of the American Society for Nutrition (ASN), Academy of Nutrition and Dietetics (AND) and several Academy Dietetics Practice Groups (DPG). She is currently AND Research DPG Chair-Elect and Chair-Elect of the International Nutrient Database Executive Committee. Dr. Emenaker serves on the Introduction to Cancer Research Careers Program Selection Committee and is a program mentor. Prior to joining NCI, her scientific and clinical experiences included: NIH Center for Scientific Review, Endocrinology, Metabolism, Nutrition and Reproductive Sciences and Oncology Integrated Review Groups, 2004-2006; Department of Defense's Congressional Directed Medical Research Program (CDMRP) for the Prostate and Breast Cancer Research Programs, 2004; and Life Sciences

Nancy Emenaker bio cont'd	Research Office, 2002-2003. Dr. Emenaker was Associate Research Scientist at Columbia University College of Physicians & Surgeons, Department of Physiology & Cellular Biophysics, 1998-2002. In that role, she maintained an independent biomedical research program, mentored undergraduates and medical students while earning full memberships in Gastrointestinal Malignancies, Carcinogenesis, and Prevention & Control Programs at the Columbia University Herbert Irving Comprehensive Cancer Center. Dr. Emenaker was one of six founding members ASN Diet & Cancer Research Interest Group and held multiple leadership roles in professional organizations including: ASN Diet & Cancer RIS Chair, 2000-2001, and on its Steering Committee until 2004; an author and co-editor of the first NCI Nutrition in Cancer Care PDQ (professional and patient versions); Academy's Oncology Nutrition DPG Chair, 2002-2003, and Research DPG Chair, 2013-2014; Academy's Scientific Advisory Board, Food & Nutrition Conference & Expo Committee for Professional Development, Oversight Group for the Dietetics Based Practice Research Network (DPBRN), and Council on Research. In 2017, she was awarded Fellow of AND. She earned a Masters in Nutrition Education and Bachelor of Science in Dietetics from the University of Cincinnati before earning a doctorate (Ph.D.) in Human Nutrition at The Ohio State University. She completed rigorous Postdoctoral and Fellowship training at Yale University School of Medicine, Department of Surgery, in New Haven, Connecticut where her research included dietary modification of invasive and metastatic human colorectal cancers and wound healing. While at Yale, Dr. Emenaker promoted women in the sciences and medicine, a passion she still pursues today. Her research include: molecular biology, nutrition, pathology & genetics.
	**Natalie Partridge** Natalie has worked for the Child Nutrition Programs in the Nutrition and Technical Assistance Branch since 2015. Her primary tasks include coordination of the Child Nutrition Database and the USDA-software evaluation and approval projects. Prior to working at USDA, Natalie worked for many years at USDA's Food and Nutrition Information Center at the National Agricultural Library in Beltsville, MD. She has a BS in Applied Nutrition and a MS in Nutrition from The Pennsylvania State University.
	**Nikita Bacalzo** Nikita Bacalzo is currently a fourth-year PhD student from the Department of Chemistry in University of California – Davis. He is under the mentorship of Prof. Carlito B. Lebrilla. His main project revolves around developing new methodologies for in-depth characterization of food carbohydrates and proteins using state-of-the-art liquid chromatography-tandem mass spectrometry techniques. He obtained both his master's and bachelor's degree in

	Chemistry from Ateneo de Manila University in the Philippines.
	**Pamela Pehrsson** Pamela Pehrsson, PhD, is a nutritionist/food scientist with almost 40 years of experience at the US Department of Agriculture (USDA) and 6 years management experience in the restaurant industry. She is Lead Scientist for the Food and Nutrition Research group, Methods and Application of Food Composition Laboratory, BHNRC, Agriculture Research Service (ARS), USDA and prior to that, Research Leader of the Nutrient Data Laboratory, USDA. Her recent projects include planning and implementing research and data development for foods and dietary supplements (DS) and estimates of nutrient intake; the NIH-USDA Dietary Supplement Ingredient Database; the Human Milk Composition Initiative (multiple federal agencies); carbohydrates in foods and impact of processing and cooking; special interest databases/ datasets for iodine/iodine uptake inhibitors, nitrates/nitrites, purines, glucosinolates, in foods and DS, and indigenous foods in the diets of American Indians/Alaska Natives, working with tribes across the US. She has authored over 140 papers and food composition databases and presented on food sampling plans and analysis, food composition databases and research, collaborating with colleagues nationally and internationally. She is a member of the CODEX Committee on Nutrition and Foods for Special Dietary Uses Delegation, NORAMFOODS – INFOODS, and ASN, among other professional organizations. She also served as Co-Executive Secretary on the 2005 Dietary Guidelines for Americans and on data analysis teams in subsequent guideline initiatives. She has taught courses on development of food composition databases. Pamela received her PhD and MS in Nutrition from the University of Maryland.
	**Paula Moliterno** Paula Moliterno is a Dietitian, Associate Professor (grade 4/5) at the Department of Clinical Nutrition, School of Nutrition, Universidad de la República in Uruguay. After graduation, she obtained a Master's degree in Nutrition in Public Health and a Specialization Diploma in Nutrition in Chronic Non-communicable Diseases. Currently, she has a Doctoral degree in Medical Science from the Faculty of Medicine, Universidad de la República in Uruguay. The main area of her research is focused on Nutritional Epidemiology and Non-Communicable Diseases, especially hypertension, type 2 diabetes, obesity, and cardiovascular disease in both adults and children. Her work has recently also involved food composition in Uruguay as a member of the URUGUAYFOODS of LATINFOODS group.

Priscilla Connors
Priscilla Connors, PhD, RDN, is an Associate Professor at the University of North Texas (UNT). She conducts research in food choice and waste with past funding by the University of North Texas, U.S. Department of Agriculture, and National Dairy Council. She is experienced in survey research and field methods including observational studies, focus groups, and face-to-face interviews. Along with a team of faculty and student researchers, Dr. Connors directed a yearlong project in public school cafeterias that resulting in a unique collection of 1,400 meal images pairs archived on the UNT Digital Library. As a Visiting Scholar at SUNY-Oneonta (2019) she conducted intercept surveys in a food labeling project funded by a Small Grants award. Currently she is collaborating with the UNT Division of Digital Strategy and Innovation to design an immersion experience (virtual reality) that educates consumers on the purpose of date labels on packaging, connects them to reliable sources of information about food safety, and that increases utilization of safe, edible food.

Sayaka Nagao-Sato
Sayaka Nagao-Sato, MS, RDN, received a Bachelor of Science degree in Bioscience in 2003, and a Master of Science degree in Biological Sciences in 2005 from Tokyo Institute of Technology. After working at companies and institutions, she received a Bachelor of Science degree in Nutrition in 2020 from Ochanomizu University and became a registered dietitian certificated by Japan. She is a research fellow at the University of Minnesota, Department of Food Science and Nutrition. One of her research projects at the University of Minnesota examined associations between dietary quality and eating meals prepared away from home among U.S. adults. Currently, Ms. Nagao-Sato is a PhD student at Ochanomizu University, and her current research interest is eating behavior.

Sidra Ahsan
Dr. Ahsan is a Senior Technology Transfer Manager at National Cancer Institute (NCI) of the National Institutes of Health (NIH), where she manages technology transfer matters for NCI's Division of Cancer Prevention (DCP). DCP is a complex extramural division that leads and supports research to prevent cancers via its multiple programs and initiatives that provide funding and support to clinical and laboratory researchers, community and multidisciplinary teams, and collaborative scientific networks nationwide. Dr. Ahsan negotiates and establishes collaborative agreements for preclinical and clinical studies, non-exclusive and exclusive licenses, reviews invention disclosures, manages patent prosecution, establishes intellectual property (IP) policies, advises scientists and staff on IP and tech transfer matters, federal policies and procedures, etc. Dr. Ahsan is also a certified Patent Agent. Dr. Ahsan received her Ph.D.

Sidra Ahsan bio cont'd	in Cancer Biology from Wayne State University School of Medicine and the Karmanos Cancer Institute. Prior to joining NCI, she worked as a Product Manager at a biotech startup, Advaita Bioinformatics, for a multi-omics pathway analysis platform. During her tenure at NCI, Dr. Ahsan has received numerous awards and served on several committees/groups that further the mission of NCI and promote technology transfer.
	Tahrir Aldhirgham Tahrir Aldhirgham has been a senior researcher in the Saudi Food and Drug Authority (SFDA) since September 2018. She has a Master degree in Human Nutrition from Ulster University, and currently, she is a PhD candidate in Human Nutrition at King Saud University. Her research focuses on the regulatory roles of SFDA in food safety from different prospects, such safety of local and imported food in the markets and assessing food regulation impact. However, Mrs Tahrir is particularly interested in food intake and diet composition. Recently, her work focused on assessing beverage intake among the general population. She also serves as a member of the Health and Nutrition Claims committee in SFDA.
	**Thea Bourianne** Thea Bourianne, MBA, RD, LDN is a licensed and registered dietitian based in Chicago specializing in nutrition, US and international food labeling regulation, food composition, and consumer trends and insights. Thea Bourianne is a regular thought leader for NielsenIQ and their partners with regular appearances in webinars and industry articles. In her current role at NielsenIQ, Thea manages a team of subject matter experts which supports retailers, CPG brands, US government, technology companies, researchers, and other entities to build data-driven, customer-centric solutions by applying high order attribution to drive client results. Prior to working at Label Insight, previous positions have included product development, commercialization, fresh and frozen food manufacturing, and regulatory affairs with companies and clients such as Taco Bell Corp., Wilton Brands, Starbucks, Ahold, Walgreens and 7-Eleven, among others. Mrs. Bourianne serves as the Program Committee Chair for the 42nd NNDC, coordinating the work of other Program Committee members to elicit, review and select abstracts for podium and poster presentations. She will also be serving as Guest Editor for the 42nd National Nutrient Databank Conference Special Issue of the Journal of Food Composition and Analysis.

	**Thea Zimmerman** Thea Zimmerman is a research nutritionist and Westat Senior Study Director with more than 25 years of experience in dietary assessment, with a focus on food and nutrient databases. She directs Westat's Dietary Assessment Team (DAT) of research nutritionists and has served as project director and task lead for dozens of nutrition and dietary studies for USDA's Food and Nutrition Service (FNS) and Economic Research Service (ERS), the National Cancer Institute, and the Environmental Protection Agency. Throughout her career, Ms. Zimmerman has written or contributed to numerous technical publications, conference presentations, and published articles.
	**Timothy Younger** Tim is a Registered Dietitian who holds a Master's degree from St. Louis University. For the past 6 years, he has focused on enhancing Label Insight's product attribution and insights with a team of dietitians and CPG experts. He now uses this attribution to help fuel performance and consumer insights as a part of NielsenIQ. As the Data Transformation Manager, he works closely with retailers and brands throughout the industry to help solve their unique health and wellness initiatives.
	**Ying Li** Dr. Ying Li is a Food Scientist at the Method and Application of Food Composition laboratory in the US Department of Agriculture and Department of Nutrition and Food Science at the University of Maryland College Park. Her expertise includes food science and chemistry, as well as developing, managing, and analyzing food composition databases for public health and national nutrition monitoring purposes. She has over 40 publications/ presentations in major food and nutrition journals and conferences.
	**Yong Zhu** Dr. Zhu is an epidemiological research lead from the Bell Institute of Health and Nutrition at General Mills. In his current role, he leads epidemiological research strategy with primary data collection and secondary data analysis. Dr. Zhu received his doctoral degree in Nutritional Sciences from Iowa State University and completed a postdoctoral training at the Department of Epidemiology at the University of Iowa.

Thank you all for being part of this virtual event. We hope to see you again in 2024 at our 43rd National Nutrient Databank Conference in Ottawa, Canada!