2025

International Conference on Diet and Activity Methods

April 27 - 30, 2025
Hilton, Toronto

25 years on: Diet and activity methods for all

TERRITORIAL ACKNOWLEDGEMENT

Toronto, or Tsi Tkaronto, is the traditional territory of many nations including the Huron-Wendat and Petun First Nations, the Seneca, and the Mississaugas of the Credit River. Toronto is covered by Treaty 13 signed with the Mississaugas of the Credit, and the Williams Treaty signed with multiple Mississaugas and Chippewa bands. Toronto continues to be home to many diverse Indigenous peoples from across Turtle Island. We are grateful for the opportunity to host ICDAM 2025 on the territories of Turtle Island's first peoples.

As we consider the overarching goals that motivate our work to advance diet and activity methods–improving the health and well-being of communities globally and protecting our planet—it is imperative that we meaningfully engage communities and integrate various ways of knowing, including those of Indigenous peoples. We recognize there is much work to do in Canada to embrace and empower Indigenous knowledges and welcome the opportunity to learn from delegates from around the world about the work they are doing with communities, including Indigenous peoples.

Learn about work toward truth and reconciliation in Canada:
Truth and Reconciliation Commission of Canada
Indigenous Watchdog

Sunday, April 27

8.00am – 9.30am	**Registration (Convention Level Foyer)**	
9.00am – 12.00pm		**9.30am – 12.30pm**
Varley	**Jackson**	**Carmichael**
Workshop 1 Nutrients/Components of Foods Used in Defining National Food, Nutrition, and Health Policy	**Workshop 2** Novel subjective and objective methods to monitor food intake	**Workshop 4** Theory and application of intake-balance assessments using criterion and surrogate measures
10.15am – 10.45am Refreshment Break		**Refreshment Break**
12.00pm – 1.30pm Lunch		
1.30pm – 4.30pm		**1.30pm – 4.30pm**
Varley	**Jackson**	**Carmichael**
Workshop 1 continued	Workshop 2 continued	**Workshop 5** Developing a comprehensive food system profile
3.15pm – 3.30pm Refreshment Break		**Refreshment Break**
4.30pm – 6.30pm	**Registration (Convention Level Foyer)**	
5.00pm – 6.30pm	**Welcome Reception (Convention Level Foyer)**	

Monday, April 28

8.00am – 6.30pm	**Registration (Convention Level Foyer)**		
	Toronto 1		
9.00am – 9.15am	**Welcome**		
9.15am – 10.15am	**Keynote:** Marian Neuhouser, Fred Hutchinson Cancer Center, USA Evolution in and key directions for advancing dietary assessment methods Chair: Sharon Kirkpatrick		
10.15am – 10.45am	**Refreshment Break and Networking (Convention Level Foyer)**		
	Toronto 1	**Toronto 2**	**Toronto 3**
10.45am – 12.15pm	**Symposium 1** Sharing dietary data as a global public good: challenges and opportunities Chair: Bridget Holmes	**Symposium 2** Towards precision 24-hour movement behaviour recommendations – revolutionizing guidelines Chair: Mark Tremblay	**Symposium 3** INTAKE24 for all: a multi-cultural tool for dietary assessment Chair: Tracy McCaffrey
12.15pm – 1.15pm	**First Annual General Meeting, International Society for Diet and Activity Methods (open to all, lunch provided)**		
	Toronto 1	**Toronto 2**	**Toronto 3**
1.15pm – 2.45pm	**Symposium 4** Dietary intake assessment according to the NOVA Food Classification System: tools and technological innovation Chair: Maria Laura Louzada	**Symposium 5** When 24-hour dietary recalls are your assessment method – strategies, contextual considerations, and advanced modeling techniques Chair: Sharon Kirkpatrick	**Symposium 6** Advancing wearable sensor validation: Frameworks, measurement theory, and statistical approaches for standardizing physical behavior assessment Chair: Sarah Keadle
2.45pm - 4.15pm	**Poster Session and Refreshments (Convention Level Foyer)**		

Monday, April 28

	Toronto 1	Toronto 2	Toronto 3
4.15pm – 5.15pm	**Oral Session 1** Advancing 24-hour dietary recall methodology Chair: Megan McCrory	**Oral Session 2** Database enhancements and predictive analytics Chair: Marga Ocké	**Oral Session 3** Assessing physical activity and play Chair: Sarah Keadle

Varley	Toronto 1
5.30pm – 7.00pm Early-Career Research Pathways: Perspectives and Conversations **7.30pm** Early-Career Researcher Networking (registration only)	**5.30pm – 6.15pm** The Mid-Career Pivot: Insights and Reflections **6.30pm** Mid-Career Researcher Networking (registration only)

Tuesday, April 29

8.00am – 5.30pm	**Registration (Convention Level Foyer)**			
	Toronto 1			
8.30am – 9.30am	**Keynote:** Aiden Doherty, University of Oxford, UK Insights from wearable sensing at scale in large-scale international biobanks Chair: Pedro Saint-Maurice			
9.30am – 9.45am	**Transition Break**			
	Toronto 1	**Toronto 2**	**Toronto 3**	**Varley**
9.45am – 11.00am	**Oral Session 4** Advances in dietary assessment methods Chair: Keren Papier	**Oral Session 5** Biomarkers and omics Chair: Edith Feskens	**Oral Session 6** Usual intake modeling and estimation Chair: Sharon Kirkpatrick	**Oral Session 7** Integrating diet quality and environmental sustainability Chair: Benoît Lamarche

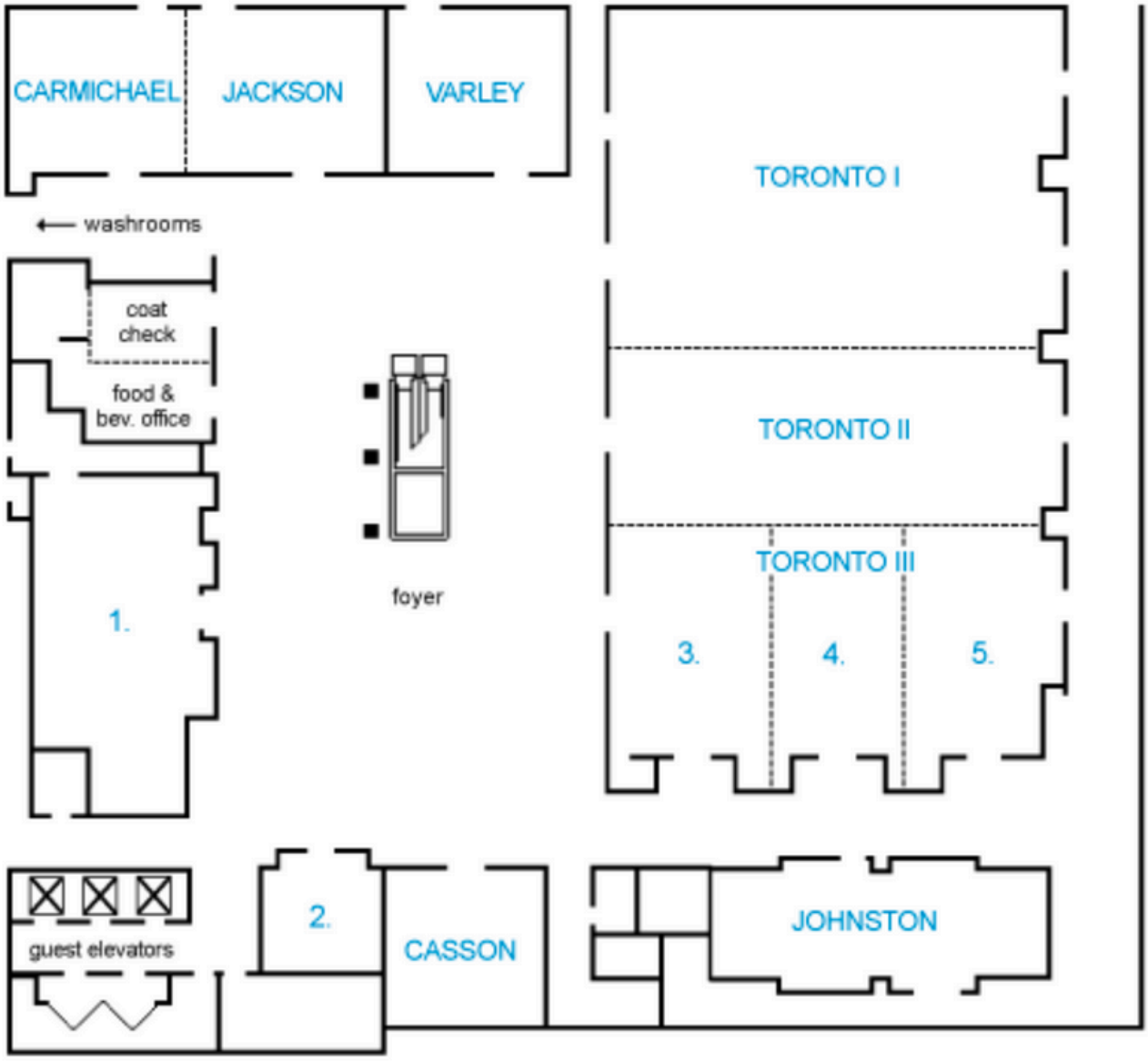
Tuesday, April 29

11.00am - 11.30am	**Refreshment Break and Networking (Convention Level Foyer)**			
	Toronto 1	**Toronto 2**	**Toronto 3**	**Varley**
11.30am - 1.00pm	**Symposium 7** Lessons learned from introducing self-administered dietary assessment in national food consumption surveys Chair: Caroline Van Rossum	**Symposium 8** Applications of metabolomics in diet assessment and analysis Chair: Marji McCullough	**Symposium 9** Lessons learned from developing tools with children and youth to measure food choices, eating behaviors, and food literacy Chair: Clare Collins	**Symposium 10** Integrating global positioning systems and accelerometor data in health behavior research studies Chair: Erika Rees-Punia
1.00pm - 2.00pm	**Lunch (Convention Level Foyer)**			
	Toronto 1			
2.00pm - 3.00pm	**Keynote:** Juan Rivera, National Institute of Public Health, Mexico Using dietary intake data in Mexico for policy design and evaluation Chair: Jung Eun Lee			
3.00pm - 4.30pm	**Poster Session and Refreshments (Convention Level Foyer)**			
	Toronto 1	**Toronto 2**	**Toronto 3**	
4.30pm - 6.00pm	**Symposium 11** Dietary assessment and applications in the Nutrition for Precision Health study Chair: Megan McCrory	**Symposium 12** Measurement of food insecurity in high-income country contexts: cross-country differences, debates, and avenues for future exploration Chair: Valerie Tarasuk	**Symposium 13** Diet and physical activity assessment in older adults Chair: Stéphanie Chevalier	
7.00pm - 10.00pm	**Tastes of Toronto ICDAM 2025 Dinner (Chefs Hall)**			

Wednesday, April 30

8.00am – 1.00pm	**Registration (Convention Level Foyer)**		
	Toronto 1		
8.30am - 9.30am	**Keynote:** Melody Ding, University of Sydney Steering physical activity research in ever-changing landscapes Chair: Tracy McCaffrey		
9.30am - 9.45am	**Transition Break**		
	Toronto 1	**Toronto 2**	**Toronto 3**
9.45am - 10.45am	**Oral Session 8** Diet quality, food costs, and food insecurity Chair: Sandra Crispim	**Oral Session 9** Harmonization, reporting, and protocols Chair: Pedro Saint-Maurice	**Oral Session 10** Activity, fitness, and health Chair: Erika Rees-Punia
10.45am - 11.15am	**Refreshment Break and Networking**		
	Toronto 1	**Toronto 2**	**Toronto 3**
11.15am - 12.15pm	**Oral Session 11** Dietary pattern indices and chrononutrition Chair: Rebecca Leech	**Oral Session 12** Ultra processed food consumption Chair: Carolina Batis	**Oral Session 13** Data sciences and modeling to advance assessment Chair: Marji McCullough
12.15pm - 1.00pm	**ICDAM 2025 Closing (Toronto 1)**		

VENUE FLOORPLAN



PROGRAM CONTENTS

Follow us on

#ICDAM2025 #dietandactivitymethodsforall

ICDAM 2025 CHAIR'S WELCOME

A very warm welcome to ICDAM 2025, the 12th ICDAM and the first to be held in Canada. I hope you enjoy your time in Toronto, one of the most multicultural cities in the world.

Over the next few days, we will engage in critical discussions on diet and activity methods, providing an opportunity to share the latest developments and to network with colleagues from around the world. The ICDAM 2025 theme is **25 years on: Diet and activity methods for all.** This theme embraces the evolution in diet and physical activity methods since the 2000 conference (Promoting the appropriate use of dietary assessment tools for all), while thinking about the work that lies ahead to ensure that high-quality methods are available and accessible for all.

We are grateful for your submissions to help us explore this theme and excited to host four pre-conference workshops, four keynote presentations, over a dozen symposia, and more than 200 oral and poster presentations. The diversity of work presented at ICDAM highlights the myriad ways in which researchers around the world are striving to improve diet and activity assessment for different contexts and purposes. We are thrilled to offer specific events for early career researchers, who are the future of this dynamic field, and thank the individuals who participated in the planning of these events.

I am grateful to the members of the ICDAM 2025 International Scientific Committee for their guidance in steering the conference theme, submission process, and many other details. We are indebted to our many colleagues who served as abstract reviewers and oral and poster judges. Thanks are also due to past and current members of the International Society for Diet and Activity Methods (ISDAM) Board for helping to launch the Society to support ICDAM and our community into the future.

If you have a chance to explore some Toronto neighbourhoods, you will find that we are very fortunate to have access to amazing cuisine from around the world. We'll be celebrating this multicultural food culture during the conference, including at Tuesday's dinner.

I look forward to interacting with you over the next few days. I wish you a stimulating conference and thank you for your engagement and participation.

Sharon Kirkpatrick
ICDAM 2025 Chair

ISDAM PRESIDENT'S WELCOME

Dear participants,

We welcome you to ICDAM 2025! This is an exciting time for us to come together to discuss the most recent science on the measurement of diet and physical activity. I am looking forward to the keynote presentations, along with the many symposia, oral presentations, and posters.

ICDAM has had a long history but this year, we celebrate our first conference since we launched the International Society for Diet and Activity Methods (ISDAM). I'm particularly excited about our first ISDAM Annual General Meeting (AGM), scheduled for the first day of the conference during lunch. The Board has been working on our strategic plans for the Society during the last year and we are ready to go live and talk with you about how to create opportunities for ongoing scientific discussions on the measurement of diet and physical activity, as well as community building. During the AGM, you will have the opportunity to share your ideas for the Society. I hope you will join us!

Toronto is a fascinating city with much to do. Being a physical activity measurement scientist, I'm particularly keen on exploring the bike trails that run along Lake Ontario and walking around the underground PATH (the largest underground pedestrian walkway in North America) and counting my steps at the end of the day.

Thank you to the ICDAM 2025 International Scientific Committee for putting together such a fantastic conference program!

Looking forward to seeing you all.

Pedro Saint-Maurice
ISDAM President

ICDAM 2025 International Scientific Committee

Sharon Kirkpatrick, University of Waterloo, Canada (Conference Chair)
Carolina Batis, Instituto Nacional de Salud Publica, Mexico
Kathryn Beck, Massey University, New Zealand
Andrew Hills, University of Tasmania, Australia
Sarah Keadle, Cal Poly, USA
Rebecca Leech, Deakin University, Australia
Megan McCrory, Boston University, USA
Kentaro Murakami, University of Tokyo, Japan
Marga Ocké, National Institute for Public Health and the Environment (RIVM), Netherlands
Marji McCullough, American Cancer Society, USA
Polly Page, University of Cambridge, UK
Erika Rees-Punia, American Cancer Society, USA

Early Career Researcher Perspectives and Conversations Event Organizers

Didier Brassard, McGill University
Clémence Desjardins, Université Laval
Berit Follong, University of Auckland
Joy Hutchinson, Université Laval

Oral and Poster Presentation Award Judges

Carolina Batis, Instituto Nacional de Salud Publica, Mexico
Sandra Crispim, Federal University of Paraná, Brazil
Edith Feskens, Wageningen University and Research, Netherlands
Sarah Keadle, Cal Poly, USA
Sharon Kirkpatrick, University of Waterloo, Canada
Edwige Landais, French National Research Institute for Sustainable Development, France
Rebecca Leech, Deakin University, Australia
Tracy McCaffrey, Monash University, Australia
Megan McCrory, Boston University, USA
Kentaro Murakami, University of Tokyo, Japan
Keren Papier, University of Oxford, UK
Erika Rees-Punia, American Cancer Society, USA
Pedro Saint-Maurice, Champalimaud Foundation, Portugal

ABSTRACT REVIEWERS

Thank you to our ICDAM 2025 Abstract Reviewers

- Megan A. McCrory – Boston University
- Benjamin Allès – EREN
- Margaret Allman-Farinelli – University of Sydney
- Birdem Amoutzopoulos – University of Cambridge
- Joanne Arsenault – Intake - Center for Dietary Assessment at FHI 360
- Carolina Batis – National Institute of Public Health, Mexico
- Hendriek Boshuizen – Wageningen University & Research
- Janet Cade – University of Leeds
- Laura Caulfield – Johns Hopkins Bloomberg
- Mai Chin A Paw – Amsterdam UMC
- Clare Collins – The University of Newcastle
- Sandra Crispim – Federal University of Paraná
- Megan Deitchler – Intake - Center for Dietary Assessment at FHI 360
- Kevin Dodd – National Cancer Institute
- Heather Eicher-Miller – Purdue University
- Lisa-Anne Elvidge – Health Canada
- Maijaliisa Erkkola – University of Helsinki
- Edith Feskens – Wageningen University & Research
- Didier Garriguet – Statistics Canada,
- Malcolm Granat – University of Salford
- Anne Griffin – University of Limerick
- Giles Hanley-Cook – Food and Agriculture Organization of the United Nations
- Genevieve Healy – University of Queensland
- Kirsten Herrick – National Cancer Institute
- Paul Hibbing – University of Illinois Chicago
- Anne-Kathrin Illner – UniLaSalle
- Mahsa Jessri – University of Cambridge
- Deborah Kerr – Curtin University
- Sharon Kirkpatrick – University of Waterloo
- Carl Lachat – Ghent University
- Benoît Lamarche – Université Laval
- Johanna Lampe – Fred Hutchinson Cancer Center
- Edwige Landais – French National Research Institute for Sustainable Development
- Camille Lassale – Barcelona Institute for Global Health
- Dana Lee Olstad – University of Calgary
- Rebecca Leech – Deakin University
- Joanne Lemieux – University of Alberta
- Simone Lemieux – Université Laval
- Marleen Lentjes – Örebro University
- Jennifer Lerman – John Hopkins University
- Leah Lipsky – National Institute of Child Health and Human Development
- Carla M. Prado – University of Alberta
- Fiona Malcomson – Newcastle University
- Vasanti Malik – University of Toronto
- Marjorie McCullough – American Cancer Society
- Sarah McNaughton – University of Queensland
- Alanna Moshfegh – United States Department of Agriculture
- Kentaro Murakami – University of Tokyo
- Rachel Murphy – University of British Columbia
- Marian Neuhouser – Fred Hutchinson Cancer Center
- Lauren O'Connor – Texas A&M Agriculture
- Marga Ocké – National Institute for Public Health and the Environment (RIVM)
- Polly Page – University of Cambridge
- Jill Reedy – National Cancer Institute
- Erika Rees-Punia – American Cancer Society
- Nicola Ridgers – University of South Australia
- Isabelle Rondeau – Health Canada
- Pedro Saint-Maurice – Champalimaud Foundation
- Edward Sazonov – University of Alabama
- Matthias Schulze – German Institute of Human Nutrition Potsdam-Rehbruecke
- Marissa Shams-White – American Cancer Society
- Julia Steer – Oxford University Press
- Toni Steer – University of Cambridge
- Janet Tooze –Wake Forest School of Medicine
- Mark Tremblay – Children's Hospital of Eastern Ontario Research Institute
- Katherine Tucker – University of Massachusetts Lowell
- Maya Vadiveloo – University of Rhode Island
- Jennifer Vena – Alberta's Tomorrow Project, Alberta's Health Services
- Lynne Wilkens – University of Hawaii Cancer Center

Connect with sponsor representatives at their exhibit spaces in the Convention Level Foyer (near the Registration/Information Desk).

ActivInsights
Delivering Activity, Sleep and Lifestyle insight

We simplify access to real-world patient data with our wearables, connected technologies and secure data infrastructure.

With a commitment to improving global public health, ActivInsights is enhancing clinical practice and improving disease management

activPAL
The activPAL™ is a single-sensor solution for quantifying free-living Physical Behaviors (Time-In-Bed, Sitting and Ambulatory Behaviors). Typically worn continuously for up to 14 days, this discrete sensor provides researchers with objective Free-Living Outcomes (FLO) based on an analysis of the patterns of participation in the primary activities of Lying, Sitting, Standing and Stepping (and the travel choices of Cycling and seated transportation). In addition, the latest generation of the activPAL software characterizes the locus of activity in terms of sitting and ambulatory task behavior and out of locus journeys.

Movisens
movisens provides technologies for ambulatory assessment, mobile psycho-physiological measurement and expertise in the field of stress- and lifestyle-monitoring and analysis. The movisens product line combines innovative and cutting-edge products such as wearable sensors for physical activity, ECG and electrodermal activity with suitable data analysis software. Our EMA platform movisensXS is the leading solution for experience sampling with smartphones. Today movisens provides Europe's most complete wireless ambulatory assessment and analysis package for unobtrusive monitoring of human physiology, mood, stress, behaviour and performance. movisens sensors and systems are used by top researchers all over the world.

Département de nutrition
Faculté de médecine
Université de Montréal

Université de Montréal, Faculté de Médecine, Département de nutrition

Le Département de nutrition de l'Université de Montréal a comme mission de former des nutritionnistes engagés aptes à exercer dans la société.

Nous avons aussi comme mission de mener une recherche de pointe en nutrition et de former des chercheurs pouvant contribuer à l'avancement des connaissances appliquées en nutrition.

Le Département offre un programme de baccalauréat en nutrition, en plus de six programmes d'études aux cycles supérieurs dans des domaines variés en nutrition fondamentale, clinique et en santé publique.

The mission of the Department of Nutrition at the Université de Montréal is to train socially engaged nutritionists.

We also have a mission to conduct cutting-edge research in nutrition, and to train researchers who contribute to the advancement of applied knowledge in nutrition.

The Department offers an undergraduate program in nutrition, as well as six graduate programs in various fields of nutrition - fundamental, clinical and public health.

Canadian Institutes of Health Research | Instituts de recherche en santé du Canada

We are grateful for a Canadian Institutes of Health Research Planning and Dissemination grant (PCS-197302) that made it possible to offer travel bursaries and poster and oral awards.

NUTRISS
CENTRE NUTRITION, SANTÉ ET SOCIÉTÉ

The Centre NUTRISS at Université Laval is a research center funded since 2019 by the Fonds de recherche du Québec – Santé sector (FRQ). Being one of the largest research centers on nutrition and health in Canada, the Centre NUTRISS federates and mobilizes the strengths of 57 experienced research members, many of whom are international leaders in their field. These researchers come from 12 of Université Laval's 18 faculties, reflecting the fully transdisciplinary and intersectoral nature of the Centre's research program. The Centre NUTRISS has more than 200 graduate students and nearly a hundred research professionals whose work focuses on three areas: 1) Precision Nutrition, 2) Food and Behaviour, and 3) Nutrition and Society.

Le Centre NUTRISS est financé par les Fonds de recherche du Québec – secteur santé (FRQ) comme Centre de recherche à l'Université Laval depuis 2019. Il regroupe 57 chercheuses et chercheurs provenant de 12 des 18 facultés de l'Université Laval dont les intérêts touchent la nutrition et la santé dans toutes ses dimensions, allant de la nutrition de précision aux aspects sociétaux en passant par les comportements alimentaires. La nature pleinement interdisciplinaire de la recherche soutenue et déployée par les membres du Centre NUTRISSest d'ailleurs l'une de ses principales forces et caractéristiques. Le Centre NUTRISS compte plus de 200 étudiants diplômés et près d'une centaine de professionnels de la recherche dont les travaux se concentrent sur trois axes : 1) Nutrition de précision, 2) Alimentation et comportements, et 3) Nutrition et société.

Conference Venue
Hilton Toronto
145 Richmond Street West
Toronto, ON, Canada M5H 2L2

Conference Contact
E: isdam@podiumconferences.com
Or contact us through the Networking feature on the Pheedloop ICDAM 2025 App.

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Podium Conferences

Staff from Podium Conference
Conference Managers can be identified by bright orange STAFF ribbons on their name badges. ICDAM VOLUNTEERS can be identified by the yellow ribbons on their name badges. Feel free to ask any of our staff for assistance.

Internet and Wifi Access
Wireless internet (Wi-Fi) is available free of charge.
Wireless Network: Hilton Honors
Password: ICDAM25

Emergency details while attending the event
In the event of an emergency, please call 911 and indicate your location (Toronto Hilton, Convention Level Foyer) and the nature of the emergency.

Conference Registration
Full registration for the conference includes admission to all sessions (Monday-Wednesday), the Welcome Reception (Sunday), lunch and refreshment breaks (Monday-Wednesday), as well as complimentary Wi-Fi in the conference space.

Tickets for the Tastes of Toronto ICDAM 2025 Dinner at Chefs Hall (Tuesday, April 29 7pm - 10pm) may be purchased through the registration portal until Friday, April 18. Tickets may be available for purchase onsite at the registration desk.

Registration and Information Desk
The Registration Desk will be in the Convention Level Foyer of the Hilton Toronto at the following times:
Sunday, April 27 8.00am – 6.30pm
Monday, April 28 8.00am – 5.30pm
Tuesday, April 29 8.00am – 5.30pm
Wednesday, April 30 8.00am – 1.00pm

Name Badges
All ICDAM 2025 attendees are required to wear their name badge to all sessions and social functions.

Entrance into sessions is restricted to registered ICDAM 2025 attendees. If you misplace your name badge, please see staff at the registration desk to arrange a replacement ($25 replacement fee). At the end of the conference, we ask that you return your badge to the registration desk, or one of the badge recycling stations.

Dietary Requests
If you have advised the Conference Secretariat of special dietary requirements, please check in at the Registration Desk on-site for further instructions.

Conference App
Registered attendees can download the ICDAM 2025 conference app – Pheedloop –for the most current program information, abstracts, and the opportunity to network with other delegates. Create your own schedule, review talks, and even make plans for the evenings.

Download the conference app

Exhibits
Exhibitor displays are located in the Convention Level Foyer of the hotel and can be accessed at the following times:
Monday, April 28 8.00am – 5.30pm
Tuesday, April 29 8.00am – 6.00pm
Wednesday, April 30 8.00am – 1.00pm

Poster Information
There are two Poster Sessions during the conference. Posters will also be available for viewing during refreshment and networking periods. Information on Poster Authors (Primary), Poster Numbers, and Poster Titles begins on page 142
Please ensure you set up your poster in the location designated by your poster number.

Any posters that are not taken down by the removal deadline will be held at the registration desk until the end of the conference. Posters that remain unclaimed by the end of the conference will be disposed of.

Poster Session 1
Monday, April 28
Set Up: 8.00am – 10.15am
Session Time: 2.45pm – 4.15pm
Tear Down: 4.30pm -7.30pm

Poster Session 2
Tuesday, April 29
Set Up: 8.00am –11.00am
Session Time: 3.00pm – 4.30pm
Tear Down: 4.45pm – 7.00pm

Mobile Phones and Electronic Devices

As a courtesy to speakers and your fellow delegates, please switch off phones and electronic devices during presentations and while in session.

Duplication/Recording

Unauthorized photography, audio taping, video recording, digital taping, or any other form of duplication is prohibited in the conference sessions.

Networking and Social Events

Welcome Reception

Sunday April 27 (5.00pm - 6.30pm)

Join us for a relaxed and informal launch of ICDAM 2025 in the Convention Level Foyer of the Hilton! Take a chance to reconnect with old friends and meet new ones. Enjoy light canapés and a complimentary beverage, while a cash bar is also conveniently available. Admission is included in your conference registration.

Early-Career Researchers Including Trainees

Monday, April 28 (5.30pm - 7.00pm)
Join us for a panel on research career paths, featuring mentors from diverse backgrounds. No registration required.

After the panel, join us at The Pint (near the CN Tower) for informal networking with food provided. Pre-registration only. Ask at the registration desk for more information.

The Mid-Career Pivot: Insights & Reflections

Monday, April 28 (5.30pm - 6.15pm)
Our ICDAM 2025 keynote speakers will share their mid-career experiences and lessons learned. Moderated by Rebecca Leech. No registration required.

Keep the conversation going at Local Public Eatery Adelaide. Limited spots and pre-registration required. Ask at the registration desk for more information.

Tastes of Toronto ICDAM 2025 Dinner

Tuesday April 29 at 7pm, Chefs Hall

The ICDAM 2025 Dinner. Designed to foster mingling and meaningful conversations, this dinner is more than just a meal—it's an opportunity to engage with peers, share ideas, and build lasting relationships in a relaxed, welcoming atmosphere.

Tickets may available at the registration desk.

Welcome to Toronto!

Toronto is easy to navigate with one of the most extensive public transit systems in North America and a large number of attractions concentrated in a walkable downtown.

Getting Around

The most cost-effective and convenient transportation from Pearson International Airport to downtown Toronto is UP Express. Once at Union Station, the Hilton Toronto can be reached via a short subway ride or by walking (~10-15 minutes).

If arriving at Billy Bishop Toronto City Airport, there is a complimentary Porter shuttle to Union Station.

For the UP Express; Toronto subways, buses, and streetcars; and GO trains (which connect Toronto to other parts of the province), passengers can purchase and load a **PRESTO card** (or get the app) or tap a credit/debit card or mobile device. If you are transferring from one route to another, transfers will be automatically accounted for when paying with PRESTO or a card.

Local Info

Climate and Clothing - Spring weather in Toronto can be unpredictable and layers are useful for chilly mornings and evenings. Average April temperatures range from a low of 3 to a high of 12 degrees C (and in May, from 9 to 18 degrees C).

Currency - Canadian Dollar

Languages - English and French

Emergency - 911

Taxes - The Harmonized Sales Tax (HST) is a 13% tax that is applied to most purchases of taxable supplies of goods and services in the Province of Ontario.

Tipping - It is standard to tip 15 to 20% at cafes and restaurants and for other services. At higher end restaurants, the going rate is closer to 18 to 22%. The gratuity may be added to bills automatically in the case of large groups. Bellhops and porters generally receive at least $2 per suitcase or per service.

Smoking - Smoking is not permitted in the venue. The city of Toronto has public health regulations that prevent smoking in public buildings, on public transit and in all restaurants and lounges

Dr. Marian L Neuhouser
Fred Hutchinson Cancer Center
Evolution in and key directions for advancing dietary assessment methods

Marian L Neuhouser is Professor and Program Head of the Cancer Prevention Program, Division of Public Health Sciences at Fred Hutchinson Cancer Center. Dr. Neuhouser's NIH- and USDA-funded research focuses on: (1) dietary modification trials for cancer prevention and survivorship; (2) short-term interventions to delineate the role of foods and dietary patterns on human metabolism; and (3) methodologic research including dietary biomarker discovery to improve dietary assessment.

Visit website

Dr. Aiden Doherty
University of Oxford
Insights from wearable sensing at scale in large-scale international biobanks

Aiden Doherty is a Wellcome Trust Senior Research Fellow and Professor of Biomedical Informatics at the University of Oxford. His team of approximately 20 researchers develop reproducible methods to analyse wearable sensor data in very large health studies to better understand the causes and consequences of disease.

Visit website

Dr. Juan Rivera
National Institute of Public Health
Using dietary intake data in Mexico for policy design and evaluation

Juan Rivera is an emeritus researcher at the National Institute of Public Health and professor at the School of Public Health of Mexico. Formerly the general director of the National Institute of Public Health of Mexico, he founded and directed the Centre for Nutrition and Health Research for 15 years. Dr. Rivera's research interests include the epidemiology of poor nutrition and the generation of evidence to inform policy for the prevention of obesity and non-communicable diseases.

Visit website

Dr. Melody Ding
University of Sydney
Steering physical activity research in ever-changing landscapes

Melody Ding is a Professor of Epidemiology and Behavioral Science at the University of Sydney's School of Public Health. Her research spans a diverse yet interconnected range of public health topics, including physical activity, social well-being, behavioral epidemiology, and chronic disease prevention. Ding spearheaded the influential 2016 and 2021 Lancet Series on Physical Activity and is a passionate advocate for equitable access to active lifestyles. Her current work employs causal inference methods to strengthen the evidence base in chronic disease epidemiology and applies systems approaches to address major public health challenges, particularly physical inactivity.

Visit website

Quick links
Symposia
Oral Sessions
Poster Session 1
Poster Session 2

Sunday, April 27

8.00am – 9.30am **WORKSHOP REGISTRATION**
Location: *Convention Level Foyer*

Pre-conference workshops

9.00 – 4.30pm **WORKSHOP 1** (OWN LUNCH BETWEEN 12.00PM AND 1.30PM)NUTRIENTS/COMPONENTS OF FOODS USED IN DEFINING NATIONAL FOOD, NUTRITION, AND HEALTH POLICY
Location: *Varley*

9.00 – 4.30pm **WORKSHOP 2** (OWN LUNCH BETWEEN 12.00PM AND 1.30PM) NOVEL SUBJECTIVE AND OBJECTIVE METHODS TO MONITOR FOOD INTAKE
Location: *Jackson*

9.30am – 12.30pm **WORKSHOP 4** THEORY AND APPLICATION OF INTAKE-BALANCE ASSESSMENTS USING CRITERION AND SURROGATE MEASURES
Location: *Carmichael*

1.30pm – 4.30pm **WORKSHOP 5** DEVELOPING A COMPREHENSIVE FOOD SYSTEM PROFILE
Location: *Carmichael*

4.30pm – 6.30pm **CONFERENCE REGISTRATION**
Location: *Convention Level Foyer*

5.00pm – 6.30pm **WELCOME RECEPTION**
Location: Convention Level Foyer

Monday, April 28

8.00am – 5.30pm

CONFERENCE REGISTRATION
Location: *Convention Level Foyer*

9.00am – 9.15am

WELCOME

9.15am – 10.15am

KEYNOTE: EVOLUTION IN AND KEY DIRECTIONS FOR ADVANCING DIETARY ASSESSMENT METHODS
Marian Neuhouser, Fred Hutchinson Cancer Center, USA

Chair: Sharon Kirkpatrick
Location: *Toronto 1*

10.15am – 10.45am

REFRESHMENT BREAK AND NETWORKING
Location: *Convention Level Foyer*

10.45am – 12.15pm

SYMPOSIUM 1 SHARING DIETARY DATA AS A GLOBAL PUBLIC GOOD: CHALLENGES AND OPPORTUNITIES
Chair: *Bridget Holmes*
Location*: Toronto 1*

S1.1 FAO DIETARY DATA DISSEMINATION PLATFORMS AS A GLOBAL PUBLIC GOOD
Agnieszka Balcerzak, Food and Agriculture Organization of the United Nations

S1.2 DIETARY DATA SHARING: ADDRESSING OPPORTUNITIES AND CHALLENGES IN DATA COLLECTION AND ANALYSIS
Sandra Crispim, Federal University of Paraná

S1.3 COMPLEMENTARITIES OF DIFFERENT TYPES OF DIETARY DATA: FROM NATIONAL FOOD SUPPLY DATA THROUGH TO HOUSEHOLD AND INDIVIDUAL LEVEL DATA
Carolina Batis, National Institute of Public Health, Mexico

S1.4 TOWARDS GLOBAL MONITORING OF DIETS: EVALUATING THE VALIDITY AND CROSS-CONTEXT EQUIVALENCE OF DIETARY METRICS USING OPEN ACCESS DIETARY INTAKE DATA ON FAO/WHO GIFT
Giles Hanley-Cook, Food and Agriculture Organization of the United Nations

Monday, April 28

10.45am – 12.15pm

SYMPOSIUM 2 TOWARDS PRECISION 24-HOUR MOVEMENT BEHAVIOUR RECOMMENDATIONS – REVOLUTIONIZING GUIDELINES
Chair: *Mark Tremblay*
Location: *Toronto 2*

S2.1 SUPPORTING EVIDENCE FOR A MORE INDIVIDUALIZED MOVEMENT BEHAVIOUR APPROACH
Diego Augusto Santos Silva, Federal University of Santa Catarina

S2.2 WHAT IS A PRECISION 24-HOUR MOVEMENT APPROACH AND WHAT COULD IT LOOK LIKE?
Markus Duncan, ParticipACTION

S2.3 INTRODUCING THE IDEA OF AN INDIVIDUALIZED, INTEGRATED MOVEMENT INDEX IN MAKING THE CASE TO REVOLUTIONIZE 24-HOUR MOVEMENT GUIDELINES
Nicholas Kuzik, Children's Hospital of Eastern Ontario Research Institute

S2.4 DISCUSSANT
Mark Tremblay, Children's Hospital of Eastern Ontario Research Institute

10.45am – 12.15pm

SYMPOSIUM 3 INTAKE24 FOR ALL: A MULTI-CULTURAL TOOL FOR DIETARY ASSESSMENT
Chair: *Tracy McCaffrey*
Location: *Toronto 3*

S3.1 INTAKE24 – ADVANCED CUSTOMISATION FOR NUTRITIONAL SURVEILLANCE: MEETING DIVERSE DATA REQUIREMENTS FOR SURVEY POPULATIONS
Polly Page, MRC Epidemiology Unit, Cambridge University and Sandrine Carrillo, French Agency for Food, Environmental and Occupational Health & Safety (Anses)

S3.2 INTAKE24 - CLINIC: INFORMED DIETARY FEEDBACK TO AUGMENT INTAKE24 FUNCTIONALITIES
Anu Ivaturi, Monash University Australia

12.15pm – 1.15pm

FIRST ANNUAL GENERAL MEETING, INTERNATIONAL SOCIETY FOR DIET AND ACTIVITY METHODS (OPEN TO ALL, LUNCH PROVIDED)
Chair: *Pedro Saint-Maurice*
Location: *Toronto 1*

Monday, April 28

1.15pm - 2.45pm

SYMPOSIUM 4 DIETARY INTAKE ASSESSMENT ACCORDING TO THE NOVA FOOD CLASSIFICATION SYSTEM: TOOLS AND TECHNOLOGICAL INNOVATION
Chair: *Maria Laura Louzada*
Location: *Toronto 1*

S4.1 PANEL 1: NOVA-BASED SCREENERS: AN EASY-TO-OPERATE LOW-COST INSTRUMENT FOR DIET QUALITY MONITORING
Leandro Cacau, School of Public Health, University of São Paulo

S4.2 PANEL 2: FOOD FREQUENCY QUESTIONNAIRE AND 24-HOUR DIETARY RECALL ACCORDING TO FOOD PROCESSING
Evelyn Frade, School of Public Health, University of São Paulo

S4.3 PANEL 3: TECHNOLOGICAL INNOVATION FOR DATA COLLECTION ACCORDING TO NOVA: THE CASE OF QUESTNOVA PLATFORM
Thays Souza, School of Public Health, University of São Paulo

S4.4 DISCUSSANT
Camille Lassale, Barcelona Institute for Global Health

1.15pm - 2.45pm

SYMPOSIUM 5 WHEN 24-HOUR DIETARY RECALLS ARE YOUR ASSESSMENT METHOD – STRATEGIES, CONTEXTUAL CONSIDERATIONS, AND ADVANCED MODELING TECHNIQUES
Organized by Kevin Dodd
Chair*: Sharon Kirkpatrick*
Location: *Toronto 2*

S5.1 A COMPARISON OF DENSITY-BASED DIET QUALITY INDEX SCORES GENERATED BY DIFFERENT SCORING APPROACHES AND DAYS OF INTAKE DATA
Joy Hutchinson, Université Laval

S5.2 A MODIFIED POPULATION RATIO APPROACH TO ADJUST DENSITY-BASED DIET QUALITY SCORES FOR COVARIATES
Alyssa Milano, University of Waterloo

Monday, April 28

S5.3 A STATE-OF THE ART TOOL TO ANALYZE DATA FROM 24-H DIETARY RECALLS: THE MULTIVARIATE NATIONAL CANCER INSTITUTE METHOD
Didier Brassard, McGill University

S5.4 A NOVEL APPLICATION OF THE MULTIVARIATE NCI METHOD: EXAMINING USUAL DIET QUALITY IN RELATION TO THE PROBABILITY OF CONSUMING LOW- AND NO-CALORIE SWEETENERS AMONG INDIVIDUALS IN CANADA
Lesley Andrade, University of Waterloo

1.15pm - 2.45pm

SYMPOSIUM 6 ADVANCING WEARABLE SENSOR VALIDATION: FRAMEWORKS, MEASUREMENT THEORY, AND STATISTICAL APPROACHES FOR STANDARDIZING PHYSICAL BEHAVIOR ASSESSMENT
Chair: *Sarah Keadle*
Location: *Toronto 3*

S6.1 (DIS)AGREEMENTS IN FRAMEWORKS FOR CONDUCTING ACTIVITY MONITOR VALIDATION STUDIES: HOW TO MOVE FORWARD?
Myles O'Brien, Université de Sherbrooke

S6.2 NEXT STEPS FOR HARMONIZING THE DEVELOPMENT AND TESTING OF WEARABLE SENSORS TO MEASURE PHYSICAL ACTIVITY AND RELATED BEHAVIORS
Sarah Keadle, Cal Poly

S6.3 COMPARING TWO WRIST-WORN ACCELEROMETERS (AXIVITY AX3 VERSUS MATRIX 003) FOR MEASURING MOVEMENT BEHAVIOURS IN BOTH BRITISH AND CHINESE OLDER ADULTS
Laura Brocklebank, University of Oxford

2.45pm - 4.15pm

POSTER SESSION AND REFRESHMENTS
Location: *Convention Level Foyer*

Monday, April 28

4.15pm - 5.15pm

ORAL SESSION 1 ADVANCING 24-HOUR DIETARY RECALL METHODOLOGY
Chair: *Megan McCrory*
Location: *Toronto 1*

OS1.1 DEVELOPMENT OF A SELF-ADMINISTERED, WEB-BASED 24-HOUR DIETARY RECALL FOR MEXICO
Tania Aburto, National Institute of Public Health, Mexico

OS1.2 INTAKE24: PRAGMATIC ADAPTATIONS TO INCREASE ACCESSIBILITY OF DIETARY ASSESSMENT IN DIVERSE LOCATIONS
Anila Farooq, University of Cambridge

OS1.3 EXPLORING USER EXPERIENCES OF INTAKE24-NZ: A MIXED METHODS USABILITY STUDY
Berit Follong, University of Auckland

Early Career Researcher Oral Presentation Award Nominee

OS1.4 INTRODUCTION OF DIETAI24, AN AUTOMATED DIETARY ASSESSMENT TOOL USING FOOD IMAGES WITH CUSTOMIZING MULTIMODAL LANGUAGE MODELS
Terry Hartman, Rollins School of Public Health

4.15pm - 5.15pm

ORAL SESSION 2 DATABASE ENHANCEMENTS AND PREDICTIVE ANALYTICS
Chair: *Marga Ocké*
Location: *Toronto 2*

OS2.1 IMPROVING ETHNIC FOOD REPRESENTATION IN UK DIETARY ASSESSMENT: A MULTI-PHASE APPROACH TO EXPANDING INTAKE24'S FOOD DATABASE
Birdem Amoutzopoulos, University of Cambridge

OS2.2 USING AI TO EXTRACT AND ANALYSE INGREDIENT LISTS FROM PACKAGED FOODS AND BEVERAGES ACROSS EUROPE: AN APPLICATION WITHIN FABLE – FOOD AND BEVERAGES LABELS EXPLORER
Joana Dias, European Commission

Early Career Researcher Oral Presentation Award Nominee

OS2.3 USING PREDICTIVE ANALYTICS TECHNIQUES TO IMPUTE MISSING DATA IN FOOD COMPOSITION TABLES
Beulah Pretorius, University of Pretoria

Monday, April 28

OS2.4 THE OPPORTUNITIES OF HYPERSPECTRAL IMAGING AND MACHINE LEARNING FOR DIETARY ASSESSMENT: PREDICTION OF MACRONUTRIENTS IN CHEESES
Esther Kok, Wageningen University & Research

Trainee Oral Presentation Award Nominee

4.15pm - 5.15pm

ORAL SESSION 3 ASSESSING PHYSICAL ACTIVITY AND PLAY
Chair: *Sarah Keadle*
Location: *Toronto 3*

OS3.2 UTILITY OF AN ONLINE PARTICIPANT PORTAL TO COLLECT PHYSICAL ACTIVITY DATA IN A U.S. COHORT STUDY
Erika Rees-Punia, American Cancer Society

OS3.3 CLASSIFICATION OF PHYSICAL BEHAVIOURS USING HIP- AND WRIST-WORN ACCELEROMETRY
Christoph Buck, Leibniz Institute for Prevention Research and Epidemiology – BIPS

OS3.4 DEVELOPING AN APPROACH FOR MEASURING PRESCHOOL-AGED CHILDREN'S ACTIVE OUTDOOR PLAY
Yeongho Hwang, University of Alberta

5.30pm - 7.00pm

EARLY-CAREER RESEARCH PATHWAYS: PERSPECTIVES AND CONVERSATIONS
Location: *Varley*
Panel: Gabrielle Rochefort, Keren Papier, DA (Desiree) Lucassen, Erika Rees-Punia, and Kati Karinharju

5.30pm - 6.15pm

THE MID-CAREER PIVOT: INSIGHTS AND REFLECTIONS
Location: *Toronto 1*
Panel: Melody Ding, Aiden Doherty, Marian Neuhouser, Juan Rivera
Moderated by Rebecca Leech

6.30pm

MID-CAREER RESEARCHER NETWORKING *Registration only*

7.30pm

EARLY-CAREER RESEARCHER NETWORKING *Registration only*

Tuesday, April 29

8.00am – 5.30pm

CONFERENCE REGISTRATION
Location: *Convention Level Foyer*

8.30am – 9.30am

KEYNOTE: INSIGHTS FROM WEARABLE SENSING AT SCALE IN LARGE-SCALE INTERNATIONAL BIOBANKS
Aiden Doherty, University of Oxford

Chair: Pedro Saint-Maurice
Location: *Toronto 1*

9.30am – 9.45am

TRANSITION BREAK

9.45am - 11.00am

ORAL SESSION 4 ADVANCES IN DIETARY ASSESSMENT METHODS
Chair: *Keren Papier*
Location: *Toronto 1*

OS4.1 ECOLOGICAL MOMENTARY DIETARY ASSESSMENT: EXPLORING THE USE OF RANDOMLY DISTRIBUTED 2-HOUR RECALLS TO ASSESS LONG-TERM DIETARY INTAKE
Desiree Lucassen, Wageningen University & Research

OS4.2 A MIXED-METHODS STUDY OF TRAQQ-Z: EVALUATING ACCURACY, USABILITY, AND USER PERSPECTIVES OF A SMARTPHONE DIETARY ASSESSMENT APPLICATION AMONG DUTCH ADOLESCENTS (AGES 12-18)
Lieke Kennes, Wageningen University & Research

OS4.3 TESTING OF ACCELEROMETER-BASED ALGORITHMS FOR DETECTION OF EATING EPISODES IN FREE-LIVING YOUNG ADULTS: A FORMATIVE STUDY
Leanne Wang, University of Sydney

Trainee Oral Presentation Award Nominee

OS4.4 ADAPTATION OF THE INDDEX24 APP FOR EVALUATING THE IMPACT OF THE BRAZILIAN SCHOOL FEEDING PROGRAM
Sandra Crispim, Federal University of Paraná

OS4.5 JOINT USE OF FOOD SUPPLY, HOUSEHOLD-LEVEL APPARENT INTAKE, AND/OR INDIVIDUAL-LEVEL DIETARY INTAKE DATA: A SCOPING REVIEW
Carolina Batis, National Institute of Public Health, Mexico

Tuesday, April 29

9.45am - 11.00am

ORAL SESSION 5 BIOMARKERS AND OMICS
Chair: *Edith Feskens*
Location: *Toronto 2*

OS5.1 PLASMA ALKYLRESORCINOLS - AN OBJECTIVE BIOMARKER OF GLUTEN INTAKE IN YOUNG CHILDREN
Elin *M. Hård Af Segerstad, Lund University*
Presented by: Carin Andrén Aronsson, Lund University

Early Career Researcher Oral Presentation Award Nominee

OS5.2 SELF-REPORTED VS BIOMARKER-BASED TOTAL SUGARS INTAKE: MISREPORTING TOTAL SUGARS IN THE "STUDY OF LATINOS: NUTRITION AND PHYSICAL ACTIVITY ASSESSMENT STUDY (SOLNAS)"
Natasha Tasevska, Arizona State University

OS5.3 THE CARBON ISOTOPE RATIO OF ALANINE AS A BIOMARKER OF ADDED SUGARS OR SUGAR-SWEETENED BEVERAGE INTAKE: A POOLED ANALYSIS OF FOUR STUDIES
Jessica Johnson, University of Alaska at Fairbanks

OS4.4 FOLATE STATUS IN THE UK – RED BLOOD CELL FOLATE DATA FROM UK NATIONAL DIET AND NUTRITION SURVEY (NDNS)
Kerry Jones, University of Cambridge

OS5.5 ACCOUNTING FOR PROXIMAL AND HABITUAL DIETARY INTAKE IN DIET-MICROBIOME RESEARCH
Nicole Simm, University of Newcastle

Trainee Oral Presentation Award Nominee

9.45am - 11.00am

ORAL SESSION 6 USUAL INTAKE MODELING AND ESTIMATION
Chair: *Sharon Kirkpatrick*
Location: *Toronto 3*

OS6.1 EXAMINING IMPROVEMENTS FOR AGE-DEPENDENT HABITUAL INTAKE MODELLING
Jeroen Rodenburg, National Institute for Public Health and the Environment (RIVM), Netherlands

OS6.2 COMING UP SHORT: NUMBER OF DAYS OF DIETARY DATA NEEDED TO ASSESS TOTAL DAILY ENERGY INTAKE IN PREGNANT INDIVIDUALS
James Pleuss, Stevens Institute of Technology

Tuesday, April 29

OS6.3 OVERCOMING THE CHALLENGES OF HABITUAL VITAMIN A INTAKE ESTIMATION
Marjolein De Jong, National Institute for Public Health and the Environment (RIVM), Netherlands

OS6.4 CHRONONUTRITION BEHAVIORS IN RELATION TO DIET QUALITY AND ADIPOSITY MEASURES: DO DIETARY ASSESSMENT METHODS AND ENERGY INTAKE MISREPORTING MATTER?
Kentaro Murakami, University of Tokyo

OS6.5 LOW-ENERGY REPORTERS: WHO ARE THEY? WHAT DO THEY EAT? HOW DO THEY MOVE? FINDINGS FROM THE GUYACONSO PROJECT
Edwige Landais, French National Research Institute for Sustainable Development

9.45am - 11.00am

ORAL SESSION 7 INTEGRATING DIET QUALITY AND ENVIRONMENTAL SUSTAINABILITY
Chair: *Benoît Lamarche*
Location: *Varley*

OS7.1 IS THE DIETARY QUALITY INDEX OF THE DIETARY GUIDELINES FOR THE BRAZILIAN POPULATION ASSOCIATED WITH ENVIRONMENTAL FOOTPRINTS?
Thays Souza, School of Public Health, University of São Paulo

OS7.2 DIETARY PATTERNS CONSISTENT WITH THE 2019 CANADA'S FOOD GUIDE RECOMMENDATIONS ON HEALTHY FOOD CHOICES HAVE LOWER GREENHOUSE GAS EMISSIONS: RESULTS FROM THE NUTRIQUÉBEC PROJECT
Gabrielle Rochefort, Université Laval

OS7.3 TRANSITIONING TO DIETS ADHERING TO THE NEW NORDIC NUTRITION RECOMMENDATIONS (NNR2023): NUTRIENT ADEQUACY AND ENVIRONMENTAL IMPACTS
Maijaliisa Erkkola, University of Helsinki

Tuesday, April 29

OS7.4 DO EAT-LANCET-BASED INDICES REFLECT DIETARY HEALTHINESS AND SUSTAINABILITY EQUALLY? A COMPARISON OF MEASUREMENT PERFORMANCE
Agustin Miranda, French National Research Institute for Sustainable Development

Early Career Researcher Oral Presentation Award Nominee

OS7.5 CLIMATE-SMART FOOD AND NUTRITION RESEARCH INFRASTRUCTURE (FOODNUTRI): AN EXAMPLE OF A JOINT EFFORT TO FOSTER SUSTAINABLE FOOD SYSTEMS AND DIETS
Niina Kaartinen, Finnish Institute for Health and Welfare

11.00am - 11.30am

REFRESHMENT BREAK AND NETWORKING
Location: *Convention Level Foyer*

11.30am - 1.00pm

SYMPOSIUM 7 LESSONS LEARNED FROM INTRODUCING SELF-ADMINISTERED DIETARY ASSESSMENT IN NATIONAL FOOD CONSUMPTION SURVEYS
Chair: *Caroline Van Rossum*
Location: *Toronto 1*

S7.1 LESSONS LEARNED IN THE PATH TOWARDS SELF-ADMINISTERED DIETARY ASSESSMENT IN THE DUTCH FOOD CONSUMPTION SURVEYS
Marga Ocke, National Institute for Public Health and the Environment (RIVM), Netherlands

S7.2 KEY LEARNINGS ABOUT SELF-ADMINISTERED ONLINE DATA COLLECTION FROM THE NEW FRENCH ROLLING CONSUMPTION SURVEY
Sandrine Carrillo, French Agency for Food, Environmental and Occupational Health & Safety (Anses)

S7.3 INSIGHTS FROM DANISH 7-DAY SELF-ADMINISTERED DIETARY ASSESSMENT METHODS
Anja Biltoft-Jensen, National Food Institute, Technical University Denmark

Tuesday, April 29

11.30am - 1.00pm

SYMPOSIUM 8 APPLICATIONS OF METABOLOMICS IN DIET ASSESSMENT AND ANALYSIS
Chair: *Marji McCullough*
Location: *Toronto 2*

S8.1 METABOLOMICS AND DIETARY ASSESSMENT: BEYOND TRADITIONAL NUTRITIONAL BIOMARKERS
Johanna Lampe, Fred Hutchinson Cancer Center

S8.2 METABOLOMIC MEASUREMENT OF FOODS AND DIETARY PATTERNS: WHERE ARE WE NOW?
Ying Wang, American Cancer Society

S8.3 THE DIETARY BIOMARKER DEVELOPMENT CONSORTIUM: DISCOVERY, VALIDATION, AND FUTURE APPLICATIONS
Marian Neuhouser, Fred Hutchinson Cancer Center

S8.4 APPLICATION OF METABOLOMICS IN NUTRITION RESEARCH: CHALLENGES AND ASPIRATIONS
Catalina Caparencu, University of Copenhagen

S8.5 DISCUSSANT
Mary Playdon, University of Utah

11.30am - 1.00pm

SYMPOSIUM 9 LESSONS LEARNED FROM DEVELOPING TOOLS WITH CHILDREN AND YOUTH TO MEASURE FOOD CHOICES, EATING BEHAVIORS, AND FOOD LITERACY
Chair: *Clare Collins*
Location: *Toronto 3*

S9.1 DEVELOPMENT, FACE, AND CONTENT VALIDITY OF A FOOD INTAKE SCREENER FOR CANADIAN YOUTH
Claire Tugault-Lafleur, Université d'Ottawa

S9.2 DEVELOPMENT, FACE, AND CONTENT VALIDITY OF AN EATING PRACTICES SCREENER FOR CANADIAN YOUTH
Raphaëlle Jacob, University of Guelph

S9.3 DEVELOPMENT, FACE, AND CONTENT VALIDITY TESTING OF A FOOD LITERACY MEASURE AMONG CANADIAN YOUTH
Jess Haines, University of Guelph

S9.4 DISCUSSANT
Clare Collins, University of Newcastle

Tuesday, April 29

11.30am - 1.00pm

SYMPOSIUM 10 INTEGRATING GLOBAL POSITIONING SYSTEMS AND ACCELEROMETOR DATA IN HEALTH BEHAVIOR RESEARCH STUDIES
Chair: *Erika Rees-Punia*
Location: *Varley*

S10.1 INTEGRATING GLOBAL POSITIONING SYSTEMS AND ACCELEROMETER DATA IN HEALTH BEHAVIOR RESEARCH STUDIES
Marta Jankowska, City of Hope

S10.2 DISCUSSANT
Erika Rees-Punia, American Cancer Society

1.00pm - 2.00pm

LUNCH
Location: *Convention Level Foyer*

2.00pm - 3.00pm

KEYNOTE: USING DIETARY INTAKE DATA IN MEXICO FOR POLICY DESIGN AND EVALUATION
Juan Rivera, National Institute of Public Health, Mexico

Chair: *Jung Eun Lee*
Location: *Toronto 1*

3.00pm - 4.30pm

POSTER SESSION AND REFRESHMENTS
Location: *Convention Level Foyer*

4.30pm - 6.00pm

SYMPOSIUM 11 DIETARY ASSESSMENT AND APPLICATIONS IN THE NUTRITION FOR PRECISION HEALTH STUDY
Chair: *Megan McCrory*
Location: *Toronto 1*

S11.1 DIETARY ASSESSMENT TOOLS AND PROTOCOL IN THE NUTRITION FOR PRECISION HEALTH STUDY
Lynne Wilkens, University of Hawaii Cancer Center

S11.2 ALIGNING DIETARY INTAKE TIMING WITH GLYCEMIC RESPONSE: METHODOLOGICAL APPROACHES IN THE NUTRITION FOR PRECISION HEALTH STUDY
Mary Buschmann, UC San Diego Health

Tuesday, April 29

S11.3 THE HUMAN MICROBIOME IN PRECISION MEDICINE
Megan McCrory, Boston University

S11.4 DISCUSSANTS
Benoît Lamarche, Université Laval; Rachel Murphy, University of British Columbia; Deborah Kerr, Curtin University

4.30pm - 6.00pm

SYMPOSIUM 12 MEASUREMENT OF FOOD INSECURITY IN HIGH-INCOME COUNTRY CONTEXTS: CROSS-COUNTRY DIFFERENCES, DEBATES, AND AVENUES FOR FUTURE EXPLORATION
Chair: *Valerie Tarasuk*
Location: *Toronto 2*

S12.1 HOUSEHOLD FOOD INSECURITY MEASUREMENT IN THE UK
Rachel Loopstra, University of Liverpool

S12.2 INFLUENCING REGIONAL POLICY THROUGH ONGOING FOOD INSECURITY MEASUREMENT IN AUSTRALIA
Katherine Kent, University of Wollongong

S12.3 THE MEASUREMENT OF HOUSEHOLD FOOD INSECURITY IN CANADA: ONGOING MONITORING CHALLENGES AND THE POTENTIAL IMPACTS OF HIGH FOOD PRICE INFLATION
Andrée-Anne Fafard St-Germain, University of Toronto

4.30pm - 6.00pm

SYMPOSIUM 13 DIET AND PHYSICAL ACTIVITY ASSESSMENT IN OLDER ADULTS
Chair: *Stéphanie Chevalier*
Location: *Toronto 3*

S13.1 ASSESSING PHYSICAL ACTIVITY AND NUTRITION IN CLINICAL TRIALS AMONG OLDER ADULTS
Lora Giangregorio, University of Waterloo

S13.2 DIET ASSESSMENT IN MIDDLE AGE AND OLDER ADULTS – EXPERIENCES IN TAIWAN
Tina Hsueh-Ting Chiu, National Health Research Institute

S13.3 IMPROVING OBSERVATIONAL DATA ANALYSIS: AN APPLICATION OF THE TARGET TRIAL EMULATION FRAMEWORK TO DIET AND PHYSICAL ACTIVITY INTERVENTION
Didier Brassard, McGill University

Tuesday, April 29

S13.4 ASSESSING DIETARY INTAKE IN OLDER ADULTS IN CARE SETTINGS
Heather Keller, University of Waterloo

7.00pm - 10.00pm **TASTES OF TORONTO ICDAM 2025 DINNER** *Registration only*
Location: *Chefs Hall*

Wednesday, April 30

8.00am – 1.00pm **CONFERENCE REGISTRATION**
Location: *Convention Level Foyer*

8.30am – 9.30am **KEYNOTE: STEERING PHYSICAL ACTIVITY RESEARCH IN EVER-CHANGING LANDSCAPES**
Melody Ding, University of Sydney

Chair: Tracy McCaffrey
Location: *Toronto 1*

9.30am – 9.45am **TRANSITION BREAK**

9.45am - 10.45am **ORAL SESSION 8** DIET QUALITY, FOOD COSTS, AND FOOD INSECURITY
Chair: *Sandra Crispim*
Location: *Toronto 1*

OS8.1 AREA-LEVEL MATERIAL DEPRIVATION IS ASSOCIATED WITH LOWER DIET QUALITY IN THE NUTRIQUÉBEC PROJECT
Marianne Rochette, Université Laval

Trainee Oral Presentation Award Nominee

OS8.2 RESPONSES TO INDIVIDUAL U.S. HOUSEHOLD FOOD SECURITY SURVEY MODULE QUESTIONS ARE LINKED TO DIETARY QUALITY AND NUTRIENT EXPOSURE IN U.S. ADULTS WITH LOW-INCOMES, NHANES 2007-2018
Heather Eicher-Miller, Purdue University

OS8.3 IS THE SEVERITY OF EXPERIENCED FOOD INSECURITY LINKED TO THE QUALITY OF THE DIET? FINDINGS FROM 82 NATIONALLY REPRESENTATIVE SURVEYS
Adeeba Ishaq, Food and Agriculture Organization of the United Nations

Wednesday, April 30

OS8.4 COST OF A HEALTHY DIET: A POPULATION-REPRESENTATIVE COMPARISON OF THREE DIET COST METHODS IN CANADA
Gabriella Luongo, Dalhousie University

OS8.5 THE IMPACT OF A BASIC INCOME ON DIET QUALITY AND DIETARY INEQUITIES IN CANADA: AN AGENT-BASED COMPLEX SYSTEMS SIMULATION MODEL
Dana Lee Olstad, University of Calgary

9.45am - 10.45am

ORAL SESSION 9 HARMONIZATION, REPORTING, AND PROTOCOLS
Chair: *Pedro Saint-Maurice*
Location: *Toronto 2*

OS9.1 HARMONIZATION OF DIETARY DATA ACROSS EPIDEMIOLOGICAL STUDIES IN GERMANY
Franziska Jannasch, German Institute of Human Nutrition Potsdam-Rehbruecke

OS9.2 DIET ITEM DETAILS: REPORTING CHECKLIST FOR HUMAN FEEDING STUDIES MEASURING THE METABOLOME – A DELPHI STUDY CONSENSUS
Clare Collins, University of Newcastle

OS9.3 STUDY DESIGN AND LESSONS LEARNT FROM MENUCH-KIDS: THE SWISS NATIONAL NUTRITION SURVEY OF CHILDREN AND ADOLESCENTS, INCLUDING BIOBANKING
Aline Siegfried-Troxler, Swiss Government

OS9.4 FEASIBILITY OF A PROTOCOL MEASURING PHYSICAL ACTIVITY, DIET, AND SLEEP BEHAVIORS OF YOUNG CHILDREN WITH DOWN SYNDROME
Michaela Schenkelberg, University of Nebraska at Omaha

Early Career Researcher Oral Presentation Award Nominee

OS9.5 PRIORITIZING KEY INDICATORS FOR LARGE-SCALE SURVEILLANCE OF FOOD ENVIRONMENTS: GLOBAL EFFORTS FROM THE INFORMAS NETWORK
Lana Vanderlee, Université Laval

Wednesday, April 30

9.45am - 10.45am

ORAL SESSION 10 ACTIVITY, FITNESS, AND HEALTH
Chair: *Erika Rees-Punia*
Location: *Toronto 3*

OS10.1 CHANGES TO ACCELEROMETRY-DERIVED WAKING-HOURS MEASURES IN THE CANADIAN HEALTH MEASURES SURVEY
Janine Clarke, Statistics Canada

OS10.2 ASSOCIATIONS BETWEEN FRAILTY ASSESSMENTS AND PHYSICAL ACTIVITY PATTERNS USING WEARABLES IN PEOPLE WITH END-STAGE RENAL DISEASE
Kirsten Rennie, University of Cambridge

OS10.3 *SELECTING THE MOST APPROPRIATE DEVICE-BASED METHOD FOR MONITORING PHYSICAL ACTIVITY IN CHILDREN AND ADOLESCENTS WITH DISABILITIES BY USING A FALLA PROFILE FORM*
Kati Karinharju, Satakunta University of Applied Sciences

OS10.4 AN R PACKAGE FOR PROCESSING AND SUMMARIZING ACTIGRAPH-MEASURED ACCELEROMETRY DATA FROM THE CANADIAN HEALTH MEASURES SURVEY
Joel *Barnes, Statistics Canada*

OS10.5 DOES NEIGHBOURHOOD WALKABILITY AND BIKEABILITY IMPACT PARK USAGE?
Stephanie Prince Ware, Public Health Agency of Canada

10.45am - 11.15am

REFRESHMENT BREAK AND NETWORKING
Location: *Convention Level Foyer*

11.15am - 12.15pm

ORAL SESSION 11 DIETARY PATTERN INDICES AND CHRONONUTRITION
Chair: *Rebecca Leech*
Location: *Toronto 1*

OS11.1 DIETARY QUALITY INDICES: HETEROGENEITY OF DEFINITIONS AND HEALTH ASSOCIATIONS AMONG ADULTS
Christine El Khoury, German Institute of Human Nutrition Potsdam-Rehbruecke

Wednesday, April 30

OS11.2 EATING WINDOW PATTERNS OF ADULTS WITH OVERWEIGHT AND OBESITY ACROSS THE WEEK, ASSESSED OBJECTIVELY USING A WEARABLE CAMERA, AND THEIR ASSOCIATIONS WITH BODY MASS INDEX
Beatriz Dos Santos Bechara, Boston University

OS11.3 CHARACTERIZING THE TIMING OF EATING AND ENERGY INTAKE AMONG URBAN AND RURAL GHANIAN HOUSEHOLDS USING A WEARABLE CAMERA
Megan A. Mccrory, Boston University

OS11.4 EXTENT TO WHICH FOODS ARE CONSUMED REPEATEDLY OVER TIME AND IMPLICATIONS FOR DEVELOPMENT OF AN ECOLOGICAL MOMENTARY ASSESSMENT (EMA)-BASED DIET ASSESSMENT APP
Lisa Harnack, University of Minnesota

11.15am - 12.15pm

ORAL SESSION 12 ULTRA PROCESSED FOOD CONSUMPTION
Chair: *Carolina Batis*
Location: *Toronto 2*

OS12.1 DEVELOPMENT OF INDICATORS REFLECTING HEALTHY AND UNHEALTHY PLANT-BASED DIETARY PATTERNS INTEGRATING THE LEVEL OF FOOD PROCESSING AND THEIR LONGITUDINAL ASSOCIATION WITH THE RISK OF CARDIOVASCULAR DISEASES
Clémentine Prioux, Université Sorbonne Paris Nord

OS12.2 ULTRA-PROCESSED DIETARY PATTERN ADHERENCE AND IRRITABLE BOWEL SYNDROME: EVALUATING THE ASSOCIATION USING DIFFERENT DIETARY ASSESSMENT TOOLS
Giovanna Andrade, University of São Paulo

OS12.3 *ARE ULTRA-PROCESSED FOODS ASSOCIATED WITH MORTALITY IN THE PATHWAYS STUDY, A COHORT OF FEMALE BREAST CANCER SURVIVORS?*
Jennifer Cadenhead, Columbia University

OS12.4 LOCAIS-NOVA: A CLASSIFICATION SYSTEM FOR FOOD PURCHASE PLACES BASED ON THE BRAZILIAN DIETARY GUIDELINES
Marcos Anderson Lucas Da Silva, University of Sao Paulo

Wednesday, April 30

11.15am - 12.15pm

ORAL SESSION 13 DATA SCIENCES AND MODELING TO ADVANCE ASSESSMENT
Chair: *Marji McCullough*
Location: *Toronto 3*

OS13.1 ASSESSING MACHINE LEARNING METHODS FOR PREDICTING ENERGY EXPENDITURE IN PRESCHOOL CHILDREN ACROSS NATIONS: IMPACTS OF PREPROCESSING AND FEATURE SELECTION
Hannah Coyle-Asbil, University of Guelph

Trainee Oral Presentation Award Nominee

OS13.2 DECODING FOOD PURCHASE PATTERNS USING HIDDEN MARKOV MODELS: CHALLENGES AND INSIGHTS FROM LOYALTY CARD DATA
Jaakko Nevalainen, Tampere University

OS13.4 MODIFICATIONS OF THE 2018 WORLD CANCER RESEARCH FUND AMERICAN INSTITUTE FOR CANCER RESEARCH SCORE AND CANCER RISK IN THE UK BIOBANK
Fiona Malcomson, Newcastle University

12.15pm - 1.00pm

ICDAM 2025 CLOSING
Location: Toronto 1

All workshops take place on Sunday, April 27th at the Hilton Toronto.

- Registration for workshop participants will open at 8.00am
- Refreshment breaks will be provided for all workshop participants at the following times: 10.00am-10.20am and 2.30pm-2.50pm.
- Time has been allocated between 12.00pm and 1.30pm during the full day workshops for attendees to have lunch on their own. A list of nearby restaurants is available from the registration desk.

9.00am – 4.30pm | Location: Varley

W.01 NUTRIENTS/COMPONENTS OF FOODS USED IN DEFINING NATIONAL FOOD, NUTRITION, AND HEALTH POLICY

Alanna J Moshfegh, US Department of Agriculture; Marie-France Verreault, Health Canada, Food and Nutrition Directorate; Hidemi Takimoto, National Institute of Health and Nutrition; National Institutes of Biomedical innovation, Health and Nutrition; Cho-il Kim, Seoul National University; Birdem Amoutzopoulos, MRC Epidemiology Unit, University of Cambridge School of Clinical Medicine; Renee Sobolewski, Food Standards Australia New Zealand; Ilana Nogueira Bezerra, Graduate Program of Nutrition and Health, State University of Ceará (UECE); Dirce Maria Lobo Marchioni, Public Health Faculty, University of São Paulo (USP); Anja Biltoft-Jensen, National Food Institute, Technical University of Denmark; Marga Ocke, Centre for Prevention, Lifestyle and Health, Dutch National Institute for Public Health and the Environment; Caroline van Rossum, Centre for Prevention, Lifestyle and Health, Dutch National Institute for Public Health and the Environment.

A country's national nutrient database provides the basic infrastructure for all aspects of food and nutrition research, including dietary and nutrition monitoring. This workshop will focus on how several countries across the globe are maintaining their national nutrient database used in dietary assessment and beyond given today's challenges of limited resources, rapidly changing food supplies and markets, and increasing demands for characterizing food beyond traditional nutrients.

The data on the nutrient content of foods provide the fundamental information used in a country's food and health programs and policies. Food supplies and markets across the globe are continually changing, with new foods being added to the market and changes in existing foods that can impact the nutrient profile.

Changes to an existing food may include the amount or type of ingredient in a food or the addition of nutrients to a food. In addition to the basic established nutrients measured analytically, other components that cannot be analyzed in a laboratory have emerged as important factors. These include the processing level, the amount of free or added sugars, and the amount of whole grain in a food. Whether it be new foods on the market, changes in the nutrient content of an existing food, or other emerging components important to characterize a food, these elements present a host of challenges to maintaining the currency of national food databases.

Researchers from Australia, Brazil, Canada, Denmark, Japan, Korea, Netherlands, and United Kingdom will present an in-depth picture of their experience and strategies to enhance precision in composition databases and provide examples of how the data are applied in their country's food and health programs and policies. The presentations will converge through data sharing concepts with potential for harmonization.

Following the workshop, participants will be able to:

- define food, nutrition, and health programs and policies that utilize the national nutrient database;
- identify critical challenges and scientific and technological advances and strategies employed in maintaining national nutrient databases that represent a nation's typically consumed foods as well as foods specific to population subgroups; and
- describe national nutrient database resources available among countries and how they can be accessed.

9.00am – 4.30pm | Location: Jackson

W.02 NOVEL SUBJECTIVE AND OBJECTIVE METHODS TO MONITOR FOOD INTAKE

Christophe Matthys, KU Leuven; Bart Vanrumste, KU Leuven; Chunzhuo Wang, KU Leuven; Guido Camps, Wageningen University

Food records, 24-hour recalls, and food frequency questionnaires have been critiqued for their limitations. Health research needs improved dietary assessment methods with higher accuracy and greater feasibility that are user-friendly and low-cost for use on a large scale in research and clinical settings. This workshop will introduce and familiarize participants with a range of novel approaches to assess dietary intake.

In the search for a more accurate and, especially, a more feasible method, experience sampling methodology (ESM) could be a promising alternative. ESM, originating from the field of psychology, is a momentary diary technique to assess symptoms, behaviour, and their related contextual factors in real-life. ESM involves sending unannounced prompt messages requesting an individual to report on behaviour, thoughts, or feelings at random moments during the day.

The questions are sent through a mobile application to enhance feasibility. By completing a couple of momentary questions on dietary intake a couple of times a day, it is hypothesized that the burden for the participant is lower, the risk of recall bias is diminished, and accuracy is improved.

In addition to methods based in ESM, objective methods using new technologies could provide added value. A method of objectively measuring food-intake without relying on self-reporting tools is by using sensors that automatically capture eating activity. For example, wearables can be used to detect sounds or movements of the body that are associated with eating activity. Chewing activity can be detected with sensors worn in the ear or on the head or neck, while other body movements can be detected with wearables worn on the wrist or torso. In infants, smart textiles that sense belly extension can provide parents and healthcare providers with objective information on feeding behaviour and milk intake. Another approach is to use imaging techniques to detect and quantify types of food present on the plate. The advantage is the low entry point if a smartphone is used to take pictures. The disadvantage is that manually taking several pictures is inconvenient. Egocentric video solutions can be comfortable to use, but only provide an estimate of the consumed food. To accurately detect the amount of food consumed, weight sensors can be embedded in the kitchen or eating surface. Alternatively, smart plate-like solutions have been proposed.

By the end of the workshop, participants will be able to:

- define the four characteristics of ESM;
- identify which ESM can be applied, based on the existing two approaches;
- interpret the analytical complexity of ESM data;
- use an Inertial Measurement Unit (IMU) wristband to detect food intake gestures automatically based on IMU data preprocessing, machine learning model deployment, and results interpretation; and
- define at least two challenges to analyzing dietary assessment data using ESM and sensors.

9.30am – 12.30pm | Location: Carmichael

W.04 THEORY AND APPLICATION OF INTAKE-BALANCE ASSESSMENTS USING CRITERION AND SURROGATE MEASURES

Justin Jackson, University of Illinois Chicago
Organized by Paul Hibbing, University of Chicago

This workshop will focus on estimating energy intake via the "intake-balance" method, a technique that is maturing in the literature. The intake-balance method draws on the principles of energy balance and the First Law of Thermodynamics to estimate energy intake over time based on measured energy expenditure and change in body composition. Attendees will learn the basic theory of the method (including its strengths and limitations with respect to the energy balance framework itself), as well as how it can be implemented when using criterion measures and/or surrogate measures (with reference to the strengths and limitations of each approach).

Following the workshop, participants will have:

a. a working knowledge of the intake-balance method and relevant literature;
b. awareness of, and access to, open-source tools that facilitate the application of intake-balance assessments; and
c. examples to draw from when starting to use the tools themselves.

Related objectives include:

a. understanding the method's components (energy intake, expenditure, and storage) and subcomponents (e.g., sources of expenditure, energy content of fat mass versus fat-free mass), as well as how each can be measured and what the implications are for predicting energy intake.
b. understanding where open-source tools for the intake-balance method can be found (e.g., on GitHub), and where they are being used in the literature.
c. configuring a personal machine (e.g., laptop) to use open-source software for intake-balance assessments, then complete an assessment using sample data.

1.30pm - 4.30pm | Location: Carmichael

W.05 DEVELOPING A COMPREHENSIVE FOOD SYSTEM PROFILE

Anne Griffin, University of Limerick; Catherine Caball, PAUL Partnership, Limerick

This workshop will explore a mixed-methods approach to developing a comprehensive profile of the food system in Limerick city and county. Participants will learn how to combine quantitative geospatial data and household surveys with qualitative insights from in-depth interviews. This integrated methodology aims to identify and address food-related issues by engaging with the community and stakeholders. The session will focus on the development and use of the Food Finder mapping tool, informed by academic-community partnerships. By sharing experience and practical applications, the workshop promotes capacity building and networking within the international community. Participants will gain valuable insights into developing comprehensive food system profiles, engaging stakeholders effectively, utilizing geospatial technology, and formulating policy recommendations to address food-related issues.

Following the workshop, participants will:
1) understand mixed-methods research design, describing the integration of quantitative and qualitative data in food system research relate directly to developing comprehensive food system profiles;
2) gain skills in stakeholder engagement by identifying effective strategies for involving diverse stakeholders in food system research which are essential for gathering diverse insights and ensuring project sustainability;
3) incorporating geospatial analysis techniques by using GIS technology to map and analyze food availability and accessibility which are crucial for visualising and understanding the food environment; and
4) develop capacity for policy recommendation formulation by creating evidence-based recommendations to improve food security which align with the goal of influencing food policy.

Symposium 1

SHARING DIETARY DATA AS A GLOBAL PUBLIC GOOD: CHALLENGES AND OPPORTUNITIES

Monday, April 28 | 10.45am – 12.15pm
Location: Toronto 1
Chair: Bridget Holmes

The symposium will be held in a format of a panel discussion. The topic of open data sharing will be introduced and panelists representing institutions using dietary data will share their experiences. The symposium will be concluded by an open discussion and Q&A session.

Learning outcomes:

- Increase knowledge of data dissemination platforms and sources of open access dietary data
- Increase knowledge on the importance of data sharing to support data use and inform actions to ensure healthy diets for all
- Recognize challenges faced when collecting, sharing, and re-using dietary data
- Showcase prominent uses of dietary data for global monitoring of diets
- Increase knowledge on the complementarities and challenges of using different types of dietary data for evidence-informed action

Speakers: Agnieszka Balcerzak, Sandra Crispim, Carolina Batis, and Giles Hanley-Cook

S1.1 FAO DIETARY DATA DISSEMINATION PLATFORMS AS A GLOBAL PUBLIC GOOD

Agnieszka Balcerzak, Food and Agriculture Organization of the United Nations

Dietary surveys provide evidence that is crucial for the global community to respond to dietary transitions and to promote healthy diets. Yet, high quality individual-level quantitative dietary data is lacking in many countries, especially in low and middle income (LMICS). Where dietary data exists, it is often difficult to access, and is not harmonized, which hinders analysis and use. To address this, FAO created the FAO/WHO Global Individual Food Consumption Data Tool (FAO/WHO GIFT), which aims to maximize the use of existing dietary data. The platform facilitates sharing of harmonized individual-level quantitative dietary data as freely available microdata, and interactive infographics. Three hundred and ninety potentially suitable individual-level quantitative dietary surveys were identified based on literature searches, work with partner initiatives, and through a dietary data network. Data owners were approached and asked for permission to share their data publicly. Eligible datasets were harmonized and coded with the FoodEx2 food classification and description system. The platform currently includes 59 datasets and has, on average, 200 visits

per week from data users. Selected nationally representative datasets available on FAO/WHO GIFT are used to generate the statistics for a recently launched new domain on FAOSTAT sharing food and nutrient statistics from different types of dietary data, namely the FAOSTAT Food and Diet Domain (FDD). The FDD provides alternative, complementary sources of dietary data, where individual-level data may be limited. The types of data included in the domain measure different dimensions across the food supply chain, from supply through to consumption. Statistics on nutrient supply from SUA are available for 186 countries. Statistics on apparent nutrient intake are based on 38 HCES conducted in 30 countries. Five nationally representative individual-level quantitative dietary surveys from four countries provide information on nutrient intake. Statistics based on the Minimum Dietary Diversity for Women indicator are sourced from ten surveys in nine countries. The statistics are presented in English, French, and Spanish and are updated and expanded as new data become available. This presentation will introduce FAO open access data dissemination platforms and showcase how harmonizing and sharing dietary data expands the range of potential data uses and increases the number of stakeholders who may benefit.

S1.2 DIETARY DATA SHARING: ADESSING OPPORTUNITIES AND CHALLENGES IN DATA COLLECTION AND ANALYSIS

Sandra Crispim, Federal University of Paraná

Data sharing is an essential part of current global research, creating opportunities for collaboration, better data quality, and the broader reach and usefulness of findings. However, it also introduces significant challenges, particularly in the areas of data collection and analysis. This presentation will explore both the opportunities and the challenges associated with the sharing of individual-level quantitative dietary intake data collected through population surveys. Using examples from national food consumption surveys conducted in Brazil, Saint Kitts and Nevis, and Saint Vincent and the Grenadines, the presentation will highlight how shared data can enhance data comparability, and lead to improved dietary indicators. Key issues such as achieving data harmonization across different datasets, managing the need for recipe disaggregation in some dietary indicators, and ensuring data privacy will also be addressed. Ultimately, this talk aims to be useful for researchers and other stakeholders who are involved in the development and use of dietary data and indicators. Understanding these opportunities and challenges can be helpful for advancing the field of dietary assessment worldwide, particularly in terms of data consistency and comparability across populations.

S1.3 COMPLEMENTARITIES OF DIFFERENT TYPES OF DIETARY DATA: FROM NATIONAL FOOD SUPPLY DATA THROUGH TO HOUSEHOLD AND INDIVIDUAL LEVEL DATA

Carolina Batis, National Institute of Public Health, Mexico

Monitoring dietary data is crucial for policymaking aimed at improving the nutritional intake of the population. The FAOSTAT Food and Diet Domain (FDD) was created to house harmonized statistics from different types of dietary data, from national level FAO supply utilization accounts (SUA), through to household consumption and expenditure surveys (HCES) and individual-level quantitative and qualitative dietary intake data. Mexico is one of the few countries with available data from three of the four types of data on the FDD (SUA, HCES, and individual-level 24hr dietary recall). This presentation will focus on a use-case study conducted with Mexican data and highlight the differences, complementarities, and scope of each type of data. As background, results from a scoping review of the scientific literature with analysis on at least two types of dietary data will be presented. A summary of the most frequent data combinations, the purpose of their combination, as well as the main take-aways from different data sources of these previous experiences will be given. For the Mexico use case, differences between data sources regarding the comparability of the food groups, the per capita values of food groups and nutrients, as well as food groups' share of nutrient intakes will be presented. The implications of these differences will be discussed, reflecting on the conclusions that would be reached about the food groups and nutrients that should be prioritized by policies if only one of the data sources were available. Furthermore, the presentation will highlight the complementaries of the three types of data and the potential of using multiple sources of data combined to obtain a comprehensive picture of a population's dietary intake.

S1.4 TOWARDS GLOBAL MONITORING OF DIETS: EVALUATING THE VALIDITY AND CROSS-CONTEXT EQUIVALENCE OF DIETARY METRICS USING OPEN ACCESS DIETARY INTAKE DATA ON FAO/WHO GIFT

Giles Hanley-Cook, Food and Agriculture Organization of the United Nations

A healthy diet is commonly understood to encompass six universal properties: nutrient adequacy without excess, macronutrient balance, dietary diversity, nutrient density, moderation of dietary components associated with greater risks of non-communicable disease, and food safety. To effectively monitor diets on a global scale, dietary metrics that are low burden, validated, sensitive to change over time, and equivalent across distinct contexts are needed. The Healthy Diets Monitoring Initiative (HDMI), a partnership among FAO, UNICEF, and WHO, identified four healthy diet metrics as potentially suitable for global monitoring: Global Diet Quality Score (GDQS), Global Dietary Recommendations

score, Minimum Dietary Diversity for Women (MDD-W), and NOVA ultra-processed food (UPF) score. This presentation will demonstrate how open access, individual-level quantitative dietary intake data from more than 55 surveys from over 35 countries, available on the FAO/WHO Global Individual Food Consumption Data Tool (GIFT), are being used to assess the comparative validity of these priority healthy diet metrics against quantitative reference metrics of nutrient adequacy, macronutrient balance, and moderation across World Bank country income classifications. In addition, this presentation will explore whether the GDQS, GDR score, MDD-W, and NOVA UPF score can effectively differentiate country-level adherence to the various sub-constructs of a healthy diet using data available on FAO/WHO GIFT. The findings from this work will help inform recommendations for a minimum set of metrics to monitor healthy diets globally.

Symposium 2

TOWARDS PRECISION 24-HOUR MOVEMENT BEHAVIOR RECOMMENDATIONS – REVOLUTIONIZING GUIDELINES

Monday, April 28 | 10.45am – 12.15pm
Location: Toronto 2
Chair: Mark Tremblay

The symposium will consist of talks by multiple presenters followed by comments from a discussant.

Learning outcomes:

- Provide evidence supporting an individualized approach to movement behavior recommendations.
- Explain what a precision health approach to movement behaviors would look like.
- Provide working examples of our current operational conceptualizations of an individualized approach to movement behavior recommendations.
- Generate discussion from attendees around the creation, implementation, and adoption of a precision health approach to guidelines.

Speakers: Diego Augusto Santos Silva, Markus Duncan, and Nicholas Kuzik
Discussant: Mark Tremblay

S2.1 SUPPORTING EVIDENCE FOR A MORE INDIVIDUALIZED MOVEMENT BEHAVIOUR APPROACH

Diego Augusto Santos Silva, Federal University of Santa Catarina

Background: Children and adolescents who accumulate adequate amounts of sleep and physical activity while minimizing recreational screen time and sitting tend to report better health status across multiple domains, but the health benefits vary substantially by age, sex, gender, race, maturation, and other characteristics.

Purpose: The purpose of this presentation is to present evidence on whether the association between adherence to 24-hour movement behaviours and physical and mental health indicators is modified by age, sex, gender, race, and maturation.
Methods: Selected reviews and individual studies will be summarized. For example, direct measure and self-report data from the Canadian Health Measures Survey; the Cannabis, Obesity, Mental health, Physical activity, Alcohol, Smoking, and Sedentary behaviour (COMPASS) study; and the Brazilian National Health Survey will be presented.
Results: Inequities were identified between Black and White adolescents, especially for the group that does not comply with any of the movement behaviours. Additionally, adolescents with early maturation need to attend to at least two of the movement behaviours targets to reduce depressive symptoms to the level of adolescents without early maturation. Analyses of continuous movement data found that regardless of gender or race, compositions consisting of more moderate-to-vigorous physical activity (MVPA) and sleep while minimizing screen use were associated with better mental health status; however, among youth from socially marginalized groups such as racialized (non-White) youth, cisgender girls, and gender diverse youth, stronger associations were found for MVPA or screen use, especially at lower levels of behaviour.
Conclusions: Health benefits of compliance with 24-hour movement behaviors are modified by age, sex, gender, race, maturation and other non-modifiable characteristics. Existing movement behaviour public health guidelines fail to recognize these variations.
Practical implications: Future efforts should explore how 24-hour movement behaviour guidelines can be adapted to individual characteristics for optimal health benefits.Funding: This project was funded through the CHEO Precision Child and Youth Mental Health Initiative.

S2.2 WHAT IS A PRECISION 24-HOUR MOVEMENT APPROACH AND WHAT COULD IT LOOK LIKE?

Markus Duncan, ParticipACTION

Background: Recommendations for the treatment and prevention of disease are often based on the “average” individual. Precision or personalized medicine recognizes that individual differences may contribute to variation in responses compared to this “average” and seeks to use information to create better plans to manage health for the individual.
Policy components: Existing guidelines for 24-hour movement behaviours already vary between age categories. As additional factors may modify dose association curves, broad public health recommendations could be further tailored to individuals based on factors such as gender, race, maturation, and current health status.

Similar tailored guidelines exist for categorizing waist circumference and alcohol consumption risk.
Evaluation: We present various conceptual problems with "one-size-fits-all" recommendations for 24-hour movement behaviours and expand on literature and data presented in the first segment of the symposium to further illustrate how similar positive health outcomes can be achieved through various combinations of movement behaviours and how these differ based on personal characteristics.
Conclusions: Personalized movement behaviour recommendations could take the form of modifications to broader movement behaviour guidelines that are tailored to individual demographics, characteristics, and current lifestyles, employing compositional analyses. Web-based applications and other interactive technologies could be used to help individuals access tailored recommendations based on personalized profiles and current movement behaviour habits, operationalized through an evidence-informed intelligent algorithm.
Potential implications: E-health services are likely essential to communicate and track these tailored recommendations. Given that similar outcomes may be achievable through various combinations and compositions of behaviours, an integrated approach that provides a holistic view of the overall "healthiness" of an individual's movement patterns may be warranted. Tailored recommendations based on demographic factors may help close existing health gaps amongst marginalized individuals.
Funding: This project was funded through the CHEO Precision Child and Youth Mental Health Initiative.

S2.3 INTRODUCING THE IDEA OF AN INDIVIDUALIZED, INTEGRATED MOVEMENT INDEX IN MAKING THE CASE TO REVOLUTIONIZE 24-HOUR MOVEMENT GUIDELINES

Nicholas Kuzik, Children's Hospital of Eastern Ontario Research Institute

Background: Movement guidelines have progressed from isolated recommendations of sleep, sedentary behaviours, and physical activity towards integrated recommendations leveraging the importance of all 24-hour movement behaviours. Nevertheless, individuals still only exist in synthetic dichotomies (e.g., meeting versus not meeting generic recommendations, child versus adult), instead of the reality of individual probabilities. The next step in movement behaviour guidelines could enhance integrated recommendations with individually tailored components and metrics.
Purpose: The concept of an integrated Movement Index will be presented as a model of individualized and integrated movement behaviour guideline recommendations.
Methods: Previous literature and research conducted for this project will be summarized. Techniques to generate the Movement Index score will be explored, with an emphasis on important effect modifiers (e.g., gender, geography) that would generate evidence-informed

individualized scores. Formative and qualitative research examining the receptivity of the Movement Index concept and an app-based scoring and tracking mechanism will be presented.
Results: Conceptual examples illustrate the architecture of individualized and integrated 24-hour guideline recommendations based on existing literature, and studies conducted within this project. Movement Index scores for hypothetical individuals will demonstrate the importance and variation of individualized messaging for public health. The typical dichotomies of meeting guidelines will be contrasted with the Movement Index scores that demonstrate incremental individual efforts. Public reception of the Movement Index concept will be presented.
Conclusion: Applying precision medicine to movement behaviours could create recommendations with improved adoption. Further, a personalized approach could serve marginalized/underrepresented groups relying on general population guidelines. The lessons from Artificial Intelligence biases (e.g., trained with limited input from marginalized communities) should be heeded to ensure the Movement Index remains relevant across the intersections of identity.
Potential implications: Future movement behaviour guideline developments should engage with the challenges and benefits of an individualized guideline revolution.
Funding: This project was funded through the CHEO Precision Child and Youth Mental Health Initiative.

Symposium 3
INTAKE24 FOR ALL: A MULTI-CULTURAL TOOL FOR DIETARY ASSESSMENT

Monday, April 28 | 10.45am – 12.15pm
Location: Toronto 3
Chair: Tracy McCaffrey

Attendees will have the opportunity to ask questions and learn more by engaging with a diverse discussion panel of international researchers who have experience in deploying and advancing Intake24 for different cultures and settings.

Learning outcomes:

- Gain an overview of Intake24 and the main adaptation approaches and opportunities
- Understand different requirements to create a "localised" population version of an online dietary capture tool
- Identify key considerations for assessing diet in culturally diverse groups4. Learn about the customisability of the Intake24 functionality for data collection and dietary feedback

Speakers: Polly Page, Sandrine Carrillo, and Anu Ivaturi

S3.1 INTAKE24 – ADVANCED CUSTOMISATION FOR NUTRITIONAL SURVEILLANCE: MEETING DIVERSE DATA REQUIREMENTS FOR SURVEY POPULATIONS

Polly Page, MRC Epidemiology Unit, University of Cambridge and Sandrine Carrillo, French Agency for Food, Environmental and Occupational Health & Safety (Anses)

Introduction: Intake24 is an open-source online dietary assessment tool used extensively for research internationally and has been adopted for national nutrition surveys, including in the UK and France. Drawing on recent advances for the French national Albane survey and UK National Diet and Nutrition Survey (NDNS), we demonstrate the scope and flexibility for adapting Intake24 to meet diverse data needs including evaluation and monitoring, risk assessment, and research.
Method: Modifications were driven by researchers' needs, informed by specific national survey data requirements, including continuity with previous surveys, and reference guidance (European Food Safety Authority). Design processes considered the unique data structure and requirements of the UK and France food databases, and compatibility of modifications in the wider Intake24 system. Solutions were developed through collaborative co-design involving nutritionists, software developers, and project researchers. Following implementation, researchers led user testing and pilot work.
Results: Adaptation for France Albane required full translation, enhancements to search functionality for language relevance, and customisation of dietary feedback to reflect national guidelines. "Major new features included design of a facet-descriptor system (based on GloboDiet software) to incorporate prompts for additional data capture at the food level (purchase, preparation and cooking method). A new API interface with Open Food Facts allows participants to search, find, and retrieve brand data for manufactured foods using search terms or scanning a barcode. Added salt is captured through a new custom prompt question. An option to switch from recall to record format now allows data collection throughout the day to limit recall bias in children. For the UK NDNS, refinements to portion estimation pathways for commonly consumed foods and a new recipe builder function are available. All features are accessible and setting-controlled by researchers, at question, study, and database levels accordingly.
Conclusion: Intake24 can be readily customised for an increasing diversity of data needs. Co-design has proved efficient and effective and is recommended. Ongoing studies will provide usage data and opportunity for refinement. Features are available to other Intake24 users, although work may be required to support implementation, including localisation and translation for different populations.

S3.2 INTAKE24 - CLINIC: INFORMED DIETARY FEEDBACK TO AUGMENT INTAKE24 FUNCTIONALITIES

Anu Ivaturi, Monash University

Introduction: Despite the evidence supporting the value of dietary assessment, education, and counselling by clinicians, data have shown gaps in the proportion of patients that receive clinician-delivered dietary counselling/advice. The aim was to co-create a versatile, highly adaptable open-source platform (Intake24-Clinic) that empowers healthcare providers (HCPs) to conduct robust dietary assessments and design interventions within clinical settings using 24-hr dietary recall data captured by Intake24 (https://intake24.com).
Methods: Using a low-fidelity prototype, ideation workshops were conducted with specialist dietitians in obesity (child and adult), diabetes, and gastroenterology (UK and Australia). Thematic analysis was performed to arrive at user statements that informed the design and development of wireframes to depict the user flow and architectural blueprints of the Intake24-Clinic, including the key functionalities to achieve a seamless user experience. A cohesive list of functionalities was mapped to create a high-fidelity prototype that was tested in workshops and subsequently refined. A developed version has now been provided to the Obesity Clinic at the Cambridge University Hospitals NHS Foundation Trust as part of a service evaluation.
Results: An Intake24-clinic dashboard with patient and HCPs profiles was created with the option for HCPs to create unique accounts and set passwords. Since Intake24 was used to capture dietary data and perform dietary assessment, the country-specific locales including food databases and default dietary feedback were integrated into the Intake24-Clinic. Generation of a dietary recall URL from within the Intake24-Clinic and automated feedback based on the recall were enabled. Feedback modules were created for intake of carbohydrates including sugars, protein, saturated fat, dietary fibre, water, fruit and vegetables, and calcium. Classic and child friendly themes for dietary feedback were designed. An option to send email reminders to patients to submit recalls was added along. In the subsequent critique workshops, the wireframes were refined to remove the automated feedback instead allowing the HCPs to review the dietary recall data and choose specific nutrients to provide feedback on based on the patient's clinical condition along with space for the HCP to cÅompose tailored feedback for each chosen module to enable a patient-centred approach. Classic and child friendly themes for dietary feedback were designed. An option to send email reminders to patients to submit recalls was added. In the subsequent critique workshops, the wireframes were refined to remove the automated feedback instead allowing the HCPs to review the dietary recall data and choose specific nutrients to provide feedback on based on the patient's clinical condition along with space for the HCP to compose tailored feedback for each chosen module to enable a patient-centred approach.
Conclusion: Codesign with nutritionists and specialist dietitians led to

the creation of Intake24-Clinic, a patient-centred tool to enable HCPs to tailor dietary feedback relevant to the unique condition of their patients. A pilot service evaluation is underway and is expected to provide feedback about core aspects of the system's functionality to further enhance its usability and effectiveness in clinical settings.

Symposium 4

DIETARY INTAKE ASSESSMENT ACCORDING TO THE NOVA FOOD CLASSIFICATION SYSTEM: TOOLS AND TECHNOLOGICAL INNOVATION

Monday, April 28 | 1.15pm – 2.45pm
Location: Toronto 1
Chair: Maria Laura Louzada

The symposium will be held in a format of a panel discussion. Two specialists in food consumption methods will comment and provide their critical perspectives on the panels.

Learning outcomes:

- Enhance understanding and application of the NOVA food classification system in dietary assessment, contributing to more accurate data collection in epidemiological research and food consumption studies.

Speakers: Leandro Cacau, Evelyn Frade, and Thays Souza
Discussant: Camille Lassale

S4.1 PANEL 1: NOVA-BASED SCREENERS: AN EASY-TO-OPERATE LOW-COST INSTRUMENT FOR DIET QUALITY MONITORING

Leandro Cacau, School of Public Health, University of São Paulo

This panel will present a low-cost and easy-to-operate dietary assessment tool designed to capture food consumption according to the level of food processing: the NOVA screener. This instrument features simple yes/no questions regarding a list of 33 unprocessed or minimally processed foods and 23 ultra-processed foods. The unprocessed or minimally processed plant-based foods are categorized into six groups: fruits (excluding fruit juices, 10 items); leafy vegetables (9 items); other vegetables (excluding roots and tubers such as potatoes and cassava, 9 items); whole grains (3 items); legumes (1 item); and nuts (1 item). The ultra-processed foods are grouped into three categories: beverages (6 items); ready-to-eat products designed to replace meals (10 items); and snack foods (7 items). Two diet quality scores can be derived from the NOVA screener based on the simple sum of the marked items in each food group: the NOVA score for unprocessed or minimally processed plant foods (NOVA-WPF, ranging from zero to 33) and the NOVA score for ultra-processed foods (NOVA-UPF, ranging from zero to 23). oth the NOVA-UPF and NOVA-WPF scores have shown satisfactory performance when compared to the percentage of energy derived

from ultra-processed foods and unprocessed or minimally processed plant foods, respectively, as assessed by a 24-hour dietary recall (R24h), which is considered the gold standard method. Additionally, these scores have been predictors of weight gain among participants in the NutriNet-Brasil study. Following Brazil's example, other countries, including Ecuador, Colombia, India, Senegal, and Canada, have also validated the NOVA screener and its scores for use in their populations. More recently, validation studies are underway in Peru, alongside adaptations for other age groups, such as children under five years old, which are currently in progress in Brazil, Peru, and Ecuador. The NOVA screener aligns with the call to action launched by the Healthy Diet Monitoring Initiative (HDMI), established by the Food and Agriculture Organization of the United Nations (FAO). In collaboration with the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO), these organizations have emphasized the need for the development of dietary assessment tools that are brief, low-cost, and easy to implement for monitoring healthy diets at regional, national, and global levels. In their latest report, they recognized the importance and potential of the NOVA-UPF score for monitoring dietary quality on various scales.

S4.2 PANEL 2: FOOD FREQUENCY QUESTIONNAIRE AND 24-HOUR DIETARY RECALL ACCORDING TO FOOD PROCESSING

Evelyn Frade, School of Public Health, University of São Paulo

This panel will present two dietary intake measurement tools designed to capture comprehensive and detailed information on food processing: the NOVA24h, a 24-hour dietary recall, and the NOVAFFQ, a Food Frequency Questionnaire. Both tools were developed for the Brazilian context, focusing on the most commonly consumed foods and beverages according to data from the 2017-2018 Brazilian National Food Survey. Validation studies were conducted within the NutriNet-Brazil study, using a gold standard measurement for comparison. The NOVA24h is a closed-ended tool that records all foods consumed on the previous day. It consists of 57 key "yes" or "no" questions addressing the consumption of specific foods. Affirmative responses prompt additional questions about the type and quantity of food consumed, the method of preparation, added ingredients, and details to distinguish foods by their degree of processing. Completing NOVA24h takes approximately 15 minutes. The validation study demonstrated a moderate to strong correlation between the average estimates from the NOVA24h and those obtained from a 24-hour recall conducted by an interviewer. It also showed substantial to nearly perfect agreement in the tool's ability to classify individuals into energy intake quintiles according to the NOVA groups. Based on the validation study, adjustments were made to improve the tool’s performance in estimating items that showed lower agreement (e.g., refining the question on the addition of olive oil to prepared foods). The NOVAFFQ assesses habitual food consumption

over the past twelve months. Composed of a list of 96 foods, it takes approximately 20 minutes to complete. A validation study found that the average caloric intake estimates for the NOVA groups, as measured by the NOVAFFQ, were moderately correlated with those obtained from the average of two 24-hour recalls. Substantial agreement was also observed in classifying individuals into energy intake quantiles for all NOVA groups. Following these results, minor adjustments were made to enhance the accuracy of food group estimates with moderate correlations (e.g., adjusting the reference portion sizes and decreasing the number of fruits listed in the questionnaire). In summary, both tools are valid and useful for collecting dietary intake data according to the NOVA food classification system. These tools have been made widely available in Brazil through QuestNOVA, a web-based platform for dietary intake data collection and processing, which can be freely accessed by researchers in Brazil. Although developed and validated for the Brazilian context, the format and methodological approach may serve as a model for other countries interested in developing similar tools.

S4.3 PANEL 3: TECHNOLOGICAL INNOVATION FOR DATA COLLECTION ACCORDING TO NOVA: THE CASE OF QUESTNOVA PLATFORM

Thays Souza, School of Public Health, University of São Paulo

Since 2010, when the NOVA classification system was proposed, a growing number of epidemiological studies have been published, using it to evaluate food consumption according to the degree of industrial processing. To overcome the common limitation of these studies, namely, the use of non-specific instruments to collect dietary consumption data based on industrial processing, researchers from the Center for Epidemiological Research in Nutrition and Health (NUPENS/USP) developed and validated three instruments: the Screener-NOVA, the NOVA 24-hour Food Recall (NOVA24h), and the NOVA Food Frequency Questionnaire (FFQ-NOVA). At this point, a new challenge emerged: how to make the instruments available, considering that they were developed to be self-administered digitally. The application of the instruments requires complex software programming, and in this context, QuestNOVA arises, an online and completely free platform. The objective of the QuestNOVA platform is to make the three instruments available to the scientific community and facilitate the collection of dietary consumption data. To collect data, researchers need to register on the platform. Then, the researcher can select the instrument of interest and send a unique link to their participants in the study, who will answer it autonomously. After the participants fill out the questionnaire, a dataset is generated and synchronized with the researcher's Google Drive, with complete security and privacy of the collected data. The QuestNOVA interface is designed to be used via mobile phone/tablet, as well as computer. For data collected using the Screener-NOVA, two scores are generated: NOVA-WPF and NOVA-UPF, which are markers of the consumption of plant-based unprocessed or minimally processed

foods and ultra-processed foods, respectively. For data collected from the NOVA24h and FFQ-NOVA, total energy consumed and consumption indicators (in grams, energy, and participation percentages) for each of the groups and subgroups in the NOVA are provided. The data are synchronized on the researcher's Google Drive, already processed and ready to be analyzed. The QuestNOVA platform represents a technological innovation for the assessment of dietary consumption according to the NOVA classification system. The platform simplifies the collection and analysis of data, saving researchers time and technological resources. The availability of the QuestNOVA democratizes access to the Screener-NOVA, NOVA24h, and FFQ-NOVA, enhancing Brazilian studies on the impact of food processing on health. Furthermore, the QuestNOVA can serve as a model for other countries to develop similar platforms that incorporate instruments to assess food consumption based on the NOVA classification system.

Symposium 5

WHEN 24-HOUR DIETARY RECALLS ARE YOUR ASSESSMENT METHOD – STRATEGIES, CONTEXTUAL CONSIDERATIONS, AND ADVANCED MODELING TECHNIQUES

Monday, April 28 | 1.15pm – 2.45pm
Location: Toronto 2
Organized by Kevin Dodd
Chair: Sharon Kirkpatrick

This symposium is structured as four presentations linked by a common theme: using 24-hour dietary recall data to investigate questions related to usual, or long-term, intake in Canada.

Learning outcomes:

- Recognize limitations on inferences supported by short-term assessments of dietary intake, such as the 24-hour dietary recall (24HR)
- Be aware of statistical methods and software to support analysis of 24HR data
- Valuate specific case studies applying advanced methods to examine hypotheses about dietary patterns

Speakers: Joy Hutchinson, Alyssa Milano, Didier Brassard, and Lesley Andrade

S5.1 A COMPARISON OF DENSITY-BASED DIET QUALITY INDEX SCORES GENERATED BY DIFFERENT SCORING APPROACHES AND DAYS OF INTAKE DATA

Joy Hutchinson, Université Laval

Density-based diet quality indices, made up of multiple components expressed as ratios, are commonly used to assess intake relative to dietary guidance. Component and total scores for such indices can be estimated in different ways, partly dependent on the number of days of intake data that are available. Dietary guidance applies to the long

term; however, many dietary assessment instruments refer to the short term. When replicate recalls are available for at least a subsample, multivariate measurement error modeling has been developed to simulate the joint distribution of long-term averages of recalls, which are assumed to adequately correspond to distributions of usual intake of the relevant dietary constituent. Scoring algorithms are then applied to calculate the ratios and diet quality scores based on the simulated distributions. When only a single recall is available per person, the modeling approach is not possible, so scoring algorithms are applied directly to the observed data, with the understanding that only the mean of the score distribution can be approximated. Mean diet quality scores for a population or subgroup may be based on the mean of individual scores, the mean of individual ratios, or the population ratio. The population ratio has been shown to be less biased than the other two methods, when compared to the modeling approach using replicated recalls.Understanding how scores may differ depending on the scoring approach used can help researchers to appropriately contextualize their findings and can help policymakers to understand whether differences in scores between studies are likely to be meaningful or are methodologic artifacts. Drawing upon the Healthy Eating Food Index-2019, which assesses alignment of intake with the healthy eating food choices recommendations within the 2019 Canada's Food Guide, this presentation will provide a comparison of mean component and total scores (and their standard errors) by scoring approach and number of days of intake data used. Dietary intake data collected by 24-hour recall are drawn from the 2015 Canadian Community Health Survey-Nutrition (n=20,487), with comparisons of diet quality scores in the full sample of adults and in subgroups defined by income and education.

S5.2 A MODIFIED POPULATION RATIO APPROACH TO ADJUST DENSITY-BASED DIET QUALITY SCORES FOR COVARIATES

Alyssa Milano, University of Waterloo

Diet quality indices are often used to assess alignment of intake with dietary guidance. For example, the Healthy Eating Food Index-2019 (HEFI-2019) can be applied to 24-hour dietary recall data to yield scores reflecting alignment with the 2019 Canada's Food Guide healthy food "choice recommendations, which are intended to be met over time, rather than on each day. While statistical modeling methods can be used to model long-term averages of 24-hour dietary recalls and subsequently estimate the distribution of HEFI-2019 scores applied to long-term (assumed to be "usual") consumption, these methods require replicated 24-hour recalls. When data from only a single 24-hour dietary recall are available, analyses generally focus on estimating only the mean of the score distribution. For density-based indices such as the HEFI-2019, for which the components are expressed as ratios, the mean score can be calculated in different ways. Scoring the population ratio has been shown to more closely approximate the mean of the

theoretical distribution of scores than other methods such as the mean of individual scores or the mean of individual ratios. The population ratio involves summing the amounts consumed for the numerator (e.g., vegetables and fruit) and denominator (e.g., total food intake) for each component of the index across the full population or subgroup of interest and then taking the ratio. The scoring standards for the component are then applied, resulting in a single component score for the population or subgroup. Component scores are summed to arrive at the total diet quality score. In some situations, researchers may wish to generate diet quality scores using the population ratio with adjustment for covariates. For example, in examining diet quality over time among a population, it may be relevant to adjust for factors such as sex, age, or season. Using data from a single 24-hour recall for adults in Canada, this presentation will illustrate the application of a modified population ratio approach to examine trends in diet quality over five consecutive years. Diet quality scores estimated using the population ratio were adjusted for sex, age group, perceived income adequacy, educational attainment, and racial/ethnic identity. Diet quality scores were also estimated for subgroups, allowing, for example, examination of changes in diet quality among females independent of income and racial/ethnic identity. To apply this approach, it was necessary to identify episodically consumed dietary components and to account for both the probability of consumption and the consumption day amount for such components. Only the consumption day amounts were considered for non-episodically consumed components. The modified population ratio approach is an additional tool in the toolkit for researchers interested in characterizing diet quality.

S5.3 A STATE-OF THE ART TOOL TO ANALYZE DATA FROM 24-H DIETARY RECALLS: THE MULTIVARIATE NATIONAL CANCER INSTITUTE METHOD

Didier Brassard, McGill University

The National Cancer Institute (NCI) method is a statistical technique used to adjust for the effects of random measurement error in short-term dietary assessments (e.g., 24-h dietary recalls). "SAS software to implement the technique has evolved over time, with the Markov Chain Monte Carlo (MCMC) multivariate method being the latest tool available from the NCI. While the NCI method has been widely applied over the last decade, the rationale for employing the multivariate method remains less well understood. In addition, the capabilities of the multivariate method deserve further attention, especially in epidemiological studies aiming to estimate diet-outcome relationships. This presentation provides an overview of the NCI multivariate method including the rationale for its use, potential applications, and the capabilities of the recent adaptation into an R package. In the surveillance setting, the multivariate method can estimate distributions of complex dietary exposures such as diet quality scores (e.g., HEFI-2019, HEI) applied to “usual intakes”. The multivariate method can also

accommodate simpler use cases such as univariate and bivariate analyses that estimate the proportion of individuals at risk of nutrient inadequacy or excess. In the epidemiologic setting, the multivariate method provides major advances compared with older methods. First, the NCI method can consider multiple correlated dietary components, including both daily and episodically consumed foods. Second, relationships based on complex dietary exposures that depend on other dietary components can be generated. For example, one could use the NCI method to estimate the relationship between a diet quality score and an outcome. Third, the estimation process also allows users to directly apply flexible modelling to dietary exposures in the outcome model (e.g., splines), rather than only assuming linearity. Finally, the release of an R version should increase accessibility by a wider audience, encourage code sharing, and contribute to reproducibility of research findings, thus supporting more robust research worldwide. In conclusion, the NCI multivariate method is a flexible tool for measurement error correction adaptable to a wide range of applications, from simple to complex, in both surveillance and epidemiology.

S5.4 A NOVEL APPLICATION OF THE MULTIVARIATE NCI METHOD: EXAMINING USUAL DIET QUALITY IN RELATION TO THE PROBABILITY OF CONSUMING LOW- AND NO-CALORIE SWEETENERS AMONG INDIVIDUALS IN CANADA

Lesley Andrade, University of Waterloo

Nutrition surveillance data are often collected using 24-hour dietary recalls. However, given that dietary guidance is intended to be adhered to over time and not every day, there is interest in estimating usual or long-term average intake among populations. Usual intake can be conceptualized as the probability of consuming a dietary constituent on any given day multiplied by the average amount consumed on a consumption day. The multivariate Markov Chain Monte Carlo (MCMC) method is a modeling technique that uses data from replicate short-term assessments such as dietary recalls to estimate distributions of usual intake. This method jointly models multiple correlated dietary constituents and can handle non-episodically and episodically consumed constituents. The method typically requires information on both probability and amount consumed for each constituent of interest. In some circumstances, however, the amount of a dietary constituent consumed is unavailable. In such cases, it may be desirable to model exposure (versus no exposure) to the dietary constituent. This presentation will draw upon an examination of the association between overall diet quality and exposure to low- and no-calorie sweeteners among individuals in Canada to illustrate a novel application of the multivariate method. Using Canada's food composition database, it is possible to categorize food codes pertaining to foods, beverages, and tabletop sweeteners as likely sources of low- and no-calorie

sweeteners (or not) but it is not possible to estimate the amounts consumed. Given this limitation, the multivariate method was applied to dietary recall data from the 2015 Canadian Community Health Survey—Nutrition to model diet quality, measured using the Healthy Eating Food Index-2019 (HEFI-2019), conditional on the probability of consuming one or more sources of low- and no-calorie sweeteners. The multivariate method jointly modeled the dietary constituents considered in the HEFI-2019, including a binary indicator of consuming any source of low- and no-calorie sweeteners. The resulting output enabled the examination of HEFI-2019 scores based on simulated distributions of usual intakes conditional on the probability of consuming sweeteners. This novel application of the multivariate method can be applied to other sources of data for which it is not possible to quantify low- and no-calorie sweetener consumption and may be relevant to other dietary constituents and additives.

Symposium 6

ADVANCING WEARABLE SENSOR VALIDATION: FRAMEWORKS, MEASUREMENT THEORY, AND STATISTICAL APPROACHES FOR STANDARDIZING PHYSICAL BEHAVIOR ASSESSMENT

Monday, April 28 | 1.15pm – 2.45pm
Location: Toronto 3
Chair: Sarah Keadle

This symposium is structured as three presentations. The session will conclude with a discussion focused on the best way to move forward with improving existing frameworks and the quality of research in the field.

Learning outcomes:

- Compare and contrast existing frameworks and recommendations for wearable sensor validation
- Explain how core concepts from measurement theory can be applied to standardize reference procedures for physical behavior assessment
- Examine different statistical approaches to evaluate the performance of a wearable device algorithm
- Formulate strategies to incorporate best practice into standardized framework for the field

Speakers: Myles O'Brien, Sarah Keadle, and Laura Brocklebank

S6.1 (DIS)AGREEMENTS IN FRAMEWORKS FOR CONDUCTING ACTIVITY MONITOR VALIDATION STUDIES: HOW TO MOVE FORWARD?

Myles O'Brien, Université de Sherbrooke

Multiple groups consisting of researchers and/or industry partners have developed and published guidelines/frameworks designed to be helpful

resources for those planning an activity monitor validation study. However, problems arise for those planning validation studies when inconsistencies among these recommendation papers exist. This poses a challenge in the design and analysis strategies for researchers, as well as for journal reviewers in evaluating whether published guidelines were followed. The purpose of this talk is to highlight some of the consistent and divergent recommendations for conducting activity monitor validation studies. The information presented in this talk is a call to action for wearable researchers to acknowledge these inconsistencies and work towards recommendations that advance the activity monitoring field. Rather than researchers establishing recommendations in silos with their colleagues, the establishment of a set of harmonized guidelines that incorporate a more extensive number of experts across the world is needed to adopt a consistent set of experimental and analytical guidelines.

S6.2 NEXT STEPS FOR HARMONIZING THE DEVELOPMENT AND TESTING OF WEARABLE SENSORS TO MEASURE PHYSICAL ACTIVITY AND RELATED BEHAVIORS

Sarah Keadle, Cal Poly

Wearable devices have become essential tools for measuring physical activity and health, informing national and international guidelines regarding the amount and intensity of physical activity linked to better health outcomes. This advancement has benefited method developers, leading to the creation of numerous classification algorithms that convert sensor signals into behavioral metrics (e.g., MVPA, sedentary time, step counts). Unfortunately, the output values from individual algorithms often vary significantly when comparing results between methods. While there are many causes for this issue, the lack of standardized protocols for method development and limited testing in real-world environments has been underestimated until recently. This presentation will outline the extent of this problem and its negative impact on estimating dose-response relationships, the prevalence of meeting physical activity recommendations, and clinical applications. It will also examine recent efforts to promote greater standardization in algorithm development and testing procedures, as well as describe additional measures that could be taken to enhance future initiatives by integrating lessons learned from other fields and key aspects of measurement theory.

S6.3 COMPARING TWO WRIST-WORN ACCELEROMETERS (AXIVITY AX3 VERSUS MATRIX 003) FOR MEASURING MOVEMENT BEHAVIOURS IN BOTH BRITISH AND CHINESE OLDER ADULTS

Laura Brocklebank, University of Oxford

Two nationally representative cohorts that recently introduced

accelerometry to objectively measure movement behaviours are the English Longitudinal Study of Ageing (ELSA) and the China Health and Retirement Longitudinal Study (CHARLS). However, they used different brands (Axivity AX3 versus Matrix 003), potentially hindering data harmonisation. Therefore, this study aimed to establish whether free-living physical activity (PA) outcomes can be considered equivalent between these two brands in both countries. Eighty-five British adults and 117 Chinese adults aged ≥50 years wore both accelerometers in a random positional order on their dominant wrist 24 hours/day for eight consecutive days. Data were processed using an open-source machine learning model (UK Biobank Accelerometer Analysis Tool) to generate PA outcomes, including average acceleration (mg) and time (hours/day) spent in moderate-vigorous PA (MVPA), light PA (LPA), being sedentary, and in bed. Equivalency was assessed using 95% equivalence tests (±10% equivalence zone). In both countries, average acceleration, sedentary time, and time spent in bed were equivalent between the two brands; whereas time spent in MVPA was not, particularly in China (within ±17.7% and 28.2%, respectively). Time spent in LPA was equivalent between the two brands in the UK (within ±6.2%) but only borderline equivalent in China (within ±10.3%). The cross-country differences observed are most likely due to the UK Biobank model being better able to identify walking and cycling than farm or construction work, whereas manual labour is a lot more common among Chinese adults; highlighting the importance of population-specific validation processes.

Symposium 7

LESSONS LEARNED FROM INTRODUCING SELF-ADMINISTERED DIETARY ASSESSMENT IN NATIONAL FOOD CONSUMPTION SURVEYS

Tuesday, April 29 | 11.30am – 1.00pm
Location: Toronto 1
Chair: Caroline Van Rossum

The format of this symposium is three presentations, including Q&A, featuring country-specific case studies. The symposium concludes with closing remarks from the chair, highlighting key points and announcing a potential scientific publication based on the discussions.

Learning outcomes:

- Identify at least three effective strategies for implementing self-administered dietary assessments in national surveys.
- Be aware of practical examples and tools that can be adapted to various national contexts.
- Identify challenges and feasible solutions.

Speakers: Marga Ocké, Sandrine Carrillo, Anja Biltoft-Jensen

S7.1 LESSONS LEARNED IN THE PATH TOWARDS SELF-ADMINISTERED DIETARY ASSESSMENT IN THE DUTCH FOOD CONSUMPTION SURVEYS

Marga Ocké, National Institute for Public Health and the Environment (RIVM), Netherlands

Rationale: The Dutch national food consumption surveys (DNFCS) provide important information to support safe, healthy, and sustainable food policies. Declining response rates, high costs associated with 24-hour diet recall interviews, and innovations in dietary assessment methods were the driving forces behind the development of the smartphone food diary app DitEetIk! for DNFCS. Some lessons learned during this process are shared in this presentation.
Method: Based on the objectives of the DNFCS, specifications for the new app were listed and the app was developed using an agile approach. Focus groups among different subgroups of the population discussed several preliminary versions of the app. In parallel, the DNFCS data platform was developed, i.e. a data pipeline that organised the stream of data necessary for the app as well as the output data of the app for further analyses. This included the branded food composition database (FCDB) LEDA matched to the generic FCDB NEVO using a machine learning approach. The matched data allows relevant follow-up questions for branded foods in the app to be defined at the generic food level and to supplement the calculation of the nutrient intake. Moreover, a web scraping method was developed to supplement the low coverage of dietary supplements in LEDA. The first version of the DitEetIk app was compared with interview-based 24-hour diet recalls in 227 adults. Based on the results, an improved version of the app was developed.
Results: A meal based food diary app Diteetik-app was developed with barcode scanning functionality for detailed food specifications. Focus groups gave lessons for improvement of the app. For example, text search often resulted in a high number of hits, which was perceived negatively. Barcode scanning was evaluated as user-friendly, but was not frequently used. The recipe function of the app was rarely used and evaluated as complex. Compared to the 24-h dietary recalls, the mean intakes reported with the app were similar for most food groups and nutrients. Underestimations of more than 10% occurred for food groups Added fats, Sauces, and Drinks. At the nutrient level, this was the case for four or three vitamins used in food fortification ($p<0.05$) depending on only using the NEVO FCDB or also using the LEDA FCDB as supplementary information, respectively. Automated food matching and webscraping processes were successfully developed, but experts are needed in the process to check for mistakes and inconsistencies.
Conclusions: The development and testing of the new DitEetIk!-app for DNFCS was an extensive process that took several years and considerable resources. Its implementation also required a redesign of the entire DNFCS data pipeline and related resources and collaborations. In 2025, the 3rd version of the DitEetIk!-app and its related data pipeline will be piloted before being implemented in DNFCS.

S7.2 KEY LEARNINGS ABOUT SELF-ADMINISTERED ONLINE DATA COLLECTION FROM THE NEW FRENCH ROLLING CONSUMPTION SURVEY

Sandrine Carrillo, French Agency for Food, Environmental and Occupational Health & Safety (Anses)

Introduction: Since 1999, the data required for dietary risks and nutrition policies in France has been collected through the INCA studies every 7 years. For the next survey (Albane), the scope extends to biomonitoring and health status, on a rolling program of 2-year rounds. Facing declining response rates and high cost of data collection per interviewer, an online self-administered 24HR tool was considered to reduce survey costs and the burden for both participants and researchers.
Method: An inventory of existing tools and a User Experience (UX) design analysis, to study the user's expectations and needs, allowed select ion of a tool as a starting point (Intake24) that proved to combine an optimised user path, relevant functionalities, and criteria like experience in national studies, being open source, autonomy in administration and customisation, and facilitation of data processing (e.g. link with composition data). The collaboration with Cambridge University resulted in adding new features for the Albane survey, such as a facet system to describe foods (e.g. cooking method or preparation place), a link to a database of branded foods (openfoodfacts) accessible via barcode scanning or brand searching, and a module to assess added salt. The French version of Intake24 was tested in the Albane pilot study (September-December 2024). While intended to be self-administered online on any electronic device (computer, tablet, smartphone), people with low computer skills or access could ask for telephone-led interviews with dieticians. The tool performances and acceptability were assessed based on completion rates, data quality analysis, feedback from dieticians and a usability questionnaire.
Results: The optimisation of an existing tool was of major interest in offering a functional tool, already tested in the field, and benefiting from the experience of previous users. The new functionalities allowed meeting the needs of the Albane survey. The tool and its acceptability for self-administration were evaluated (rates of participants choosing online self-administration, people switching from self- to dietician-led administration, use of the hotline, usability evaluation) as well as a comparison of data quality with the previous INCA survey (numbers of foods per recall, under-reporting rate, rate of unspecified responses).
Conclusions: The adaptation of a self-administered 24HR tool for Albane survey was an extensive process over several years. It required a search for the best compromise between the needs of researchers' (data quality, tool management, data handling) and participants' (user-friendliness). The pilot study gave insights on its ability to perform in a continuous data collection system.

S7.3 INSIGHTS FROM DANISH 7-DAY SELF-ADMINISTERED DIETARY ASSESSMENT METHODS

Anja Biltoft-Jensen, National Food Institute, Technical University Denmark

Introduction: Response rates in national dietary surveys, including the Danish National Survey of Diet and Physical Activity (DANSDA), have notably declined in recent years. Denmark has utilized a self-administered 7-day food diary (7dFD) since 1995, switching to a web-based version between 2021-2024. In both cases, an interviewer visited participants to conduct background interviews, give reporting instructions, and take anthropometric measurements. Declining response rates may be linked to increased demands for detailed data, stricter data protection regulations that foster public distrust, and the growing popularity of lifestyle-tracking apps that provide instant feedback, making time-consuming surveys less appealing. The objectives of this study were to understand participant experiences with self-administered dietary reporting and to inform strategies for improving response rates and ensuring reliable data collection.
Methods: Two focus group interviews were conducted in 2014 (5 males, 3 females) and 2017 (3 males, 3 females), with dietary survey participants with varying educational levels. Strategies to increase participation have included in-person interviews to build trust, monetary incentives (lottery), and collecting paper diaries from participants' homes (2003-2013). Additionally, participants kept pedometers after use (2011–2013, 2021-2024), and a survey assessed the effect of providing feedback on physical activity and anthropometry.
Results: Despite the increased burden, participants generally preferred the 7dFD over the 24-hour diet recall, valuing flexibility and perceived accuracy. The focus groups indicated that the diary heightened awareness of eating habits, sometimes prompting behavioral changes. Participants occasionally hesitated to report unhealthy items but the personal connection with interviewers increased reporting honesty. Additionally, participants found the paper diary more convenient than an online version, as it was always accessible and served as a visible reminder which helped track overlooked details. The paper diary also led to more food entries and reduced underreporting.Interviewers collecting paper diaries in person reduced dropout rates by 10%, and feedback on physical activity and anthropometry improved response rates by 2%. However, a moderate lottery prize (650 EUR) did not significantly affect response rates. Participants saw their participation as a civic duty.
Conclusion: The self-administered 7dFD is valued for its flexibility but may prompt changes in eating habits. The physical diary is preferred for its visibility and prompts reporting, while the personal connection with interviewers fosters accountability and encourages honest reporting. Thus, interviewer skills remain crucial in ensuring accurate data collection.

Symposium 8

APPLICATIONS OF METABOLOMICS IN DIET ASSESSMENT AND ANALYSIS

Tuesday, April 29 | 11.30am – 1.00pm
Location: Toronto 2
Chair: Marji McCullough

The format of this symposium is four presentations, including Q&A. After the presentations, there will be a 20-30 minute panel discussion, moderated by a discussant.

Learning outcomes:

- Define metabolomics and articulate how the study of metabolomics might advance diet assessment
- Describe general approaches to identify food biomarkers using metabolomics in an observational and feeding study setting
- Learn concepts for correcting for measurement error using metabolomics
- Describe challenges and opportunities in applying biomarkers of food intake in nutrition research

Speakers: Johanna Lampe, Ying Wang, Marian Neuhouser, and Catalina Caparencu
Discussant: Mary Playdon

S8.1 METABOLOMICS AND DIETARY ASSESSMENT: BEYOND TRADITIONAL NUTRITIONAL BIOMARKERS

Johanna Lampe, Fred Hutchinson Cancer Center

Application of biomarkers to dietary assessment is not new. Nutrient biomarkers have been used for decades for population surveillance and individual nutritional status assessment to monitor deficiencies and excesses; however, more recent shifts to assessment of intake of particular foods, classes of foods, and dietary patterns has found standard nutrient biomarkers limiting. Metabolomics, the high-throughput study of substrates and products of metabolism in biological samples using mass spectrometry and/or nuclear magnetic resonance spectroscopy, provides an innovative approach to expanding the dietary biomarker field. Metabolomics data have been used not only to generate novel biomarker signatures of diet but to expand and improve on methodologic approaches, yielding new protocols for dietary biomarker discovery, validation, and calibration of self-reported dietary assessment tools.

S8.2 METABOLOMIC MEASUREMENT OF FOODS AND DIETARY PATTERNS: WHERE ARE WE NOW?

Ying Wang, American Cancer Society

While still a growing field, metabolomics technology has enabled the identification of numerous dietary biomarkers associated with specific foods, food groups, and dietary patterns in both observational and intervention studies involving humans. This presentation will highlight key findings from two large cohort studies maintained at the American Cancer Society and discuss the complementary and important roles of both observational and intervention studies in biomarker discovery and validation. Moving forward, well-designed intervention studies will be essential for assessing the pharmacokinetics of these biomarker candidates and establishing dose-response relationships.

S8.3 THE DIETARY BIOMARKER DEVELOPMENT CONSORTIUM: DISCOVERY, VALIDATION, AND FUTURE APPLICATIONS

Marian Neuhouser, Fred Hutchinson Cancer Center

Self-reported dietary assessment is prone to both random and systematic measurement error, both of which contribute to distorted exposure assessment. Scientific advances are needed to improve exposure assessment of diet, which is one of the most important modifiable risk factors for chronic disease prevention. On-going interdisciplinary endeavors leverage nutrition science, chemistry, metabolomics, and biostatistics to improve dietary assessment and reduce measurement error. The Dietary Biomarkers Development Consortium, sponsored by NIDDK/NIH and USDA-NIFA, is leading efforts to improve dietary assessment through discovery, validation, and application of metabolomics-based biomarkers of commonly consumed foods. Three US-based Consortium Centers are conducting controlled feeding trials that include both pharmacokinetic testing and dose-response testing of foods where the responses are measured with targeted blood and urine derived metabolomics. Validation will be conducted using independent and free-living cohorts. Metabolomics signatures of specific food ingestion could be used instead of self-report or to correct the measurement error in self-report as a means of providing more accurate dietary exposure data than self-report alone.

S8.4 APPLICATION OF METABOLOMICS IN NUTRITION RESEARCH: CHALLENGES AND ASPIRATIONS

Catalina Caparencu, University of Copenhagen

Nutrition research is particularly challenged by uncertainties regarding food intake. Reliable biomarkers are needed for assessing compliance in experimental studies and for more precise dietary recording in

epidemiology. A vast majority of currently known blood and urine food intake biomarkers are short-lived. This is fine for compliance measurements, but it is an issue for measuring food intakes over time. To overcome this caveat, there is a need for additional biomarkers with different kinetics, use of biomarker combinations to better cover food groups, collection of multiple samples during longer-term studies, and consideration of additional sample types. A strategy to meet these challenges and to improve biomarker validation, thereby taking nutrition research to the next level, will be discussed.

Symposium 9

LESSONS LEARNED FROM DEVELOPING TOOLS WITH CHILDREN AND YOUTH TO MEASURE FOOD CHOICES, EATING BEHAVIORS, AND FOOD LITERACY

Tuesday, April 29 | 11.30am – 1.00pm
Location: Toronto 3
Chair: Clare Collins

The format of this symposium is three presentations, followed by a round table discussion. The symposium will provide an opportunity for researchers to exchange on best practices, challenges, and opportunities when developing dietary assessment tools for young people.

Learning outcomes:

- Summarize key methodological considerations and lessons learned from developing diet assessment tools among children and youth populations.
- Discuss best practices for meaningfully engaging children and youth in diet assessment research.

Speakers: Claire Tugault-Lafleur, Raphaëlle Jacob, Jess Haines
Discussant: Clare Collins

S9.1 DEVELOPMENT, FACE, AND CONTENT VALIDITY OF A FOOD INTAKE SCREENER FOR CANADIAN YOUTH

Claire Tugault-Lafleur, Université d'Ottawa

Assessing Canadian children's and youth's dietary intakes and food choices is a critical component to food and nutrition surveillance efforts in Canada. A brief food intake screener informed by guidance in Canada's Food Guide was recently developped and validated among adults but to date, no such questionnaire has been developped for children and youth. The objective of this project was to develop a brief self-administered screener to rapidly assess dietary intake among English and French youth age 10-17 years living in Canada. Following a scoping review of existing measures and the creation of guiding principles for questionnaire development, a 14-item draft questionnaire was created. The face and content validity of the draft screener were

assessed by an expert panel holding expertise in nutrition, public health, and questionnaire validation (English n=13, French n=6) and cognitive interviews among 15 English- and 14 French- speaking youth. Youth were recruited through posts on social media, email, and word-of-mouth, and a quota sampling approach was used to ensure variation in sociodemographic characteristics (both younger and older youth, balanced genders). Cognitive testing was conducted iteratively in two phases to assess understanding of questions and incorporate feedback from youth to improve the clarity and wording of the items at each phase. The screener was reduced from 14 to 11 items following the expert panel. While some modifications were made to improve the comprehension of the items, youth found the items easy to understand and no items were dropped. Once the wording of the items was finalised, two focus groups were held with English- and French-speaking youth to provide feedback on various design aspects of the screeners (e.g. formatting, graphics) and ways of promoting engagement when completing the questionnaire in an online format. The resulting screener includes 11 items designed to rapidly assess food choices of youth that is easily understood and engaging to complete. Further research is needed to assess construct validity and reliability of the screener. This screener will help support nutrition surveillance efforts in Canada in situations where comprehensive dietary assessment methods are not feasible.

S9.2 DEVELOPMENT, FACE, AND CONTENT VALIDITY OF AN EATING PRACTICES SCREENER FOR CANADIAN YOUTH

Raphaëlle Jacob, University of Guelph

In addition to guidance on food choices, the 2019 Canada's Food Guide (CFG) provides recommendations to support healthy eating habits. A brief self-administered eating practices screener informed by CFG recommendations was recently developed and validated among adults, but no such measure is available for children and youth. The objective of this study was to develop and assess the content and face validity of a self-administered screener to measure eating practices informed by CFG recommendations among English- and French-speaking youth aged 10 to 17 years. Following a scoping review of existing measures and the creation of guiding principles for questionnaire development, a 26-item draft questionnaire was created. The face and content validity of the draft screener were assessed by an expert panel holding expertise in nutrition, public health, and questionnaire validation (English n=13, French n=6) and through two rounds of cognitive interviews among youth (English n=18, French n=13). During this process, the number of items was reduced from 26 to 12 following the expert panel and to 11 following the cognitive interviews with youth. Minor wording changes were made to some items to improve clarity. The screener format and design were subsequently assessed through two focus groups conducted in both English-speaking (n=18) and French-speaking (n=11)

youth. These focus groups led to improvements to the screener format and design. This study resulted in the development of an 11-item eating practices screener informed by CFG recommendations designed for use among youth aged 10 to 17 years. Further work is needed to test the screener for construct validity and reliability. After which, this measure will be useful for research and nutrition surveillance of eating practices among Canadian children and youth.

S9.3 DEVELOPMENT, FACE, AND CONTENT VALIDITY TESTING OF A FOOD LITERACY MEASURE AMONG CANADIAN YOUTH

Jess Haines, University of Guelph

Developing food literacy skills during childhood and adolescence is important to support lifelong healthy eating habits. Existing food literacy measures for youth focus on nutrition and food skills and typically do not assess food systems and socio-environmental aspects of food literacy. The objective of this study was to develop and examine the face and content validity of a brief self-administered measure, in French and English, designed to assess multiple dimensions of food literacy among youth, ages 10-17 years, living in Canada. The 20-item Canadian Youth Food Literacy Measure/Questionnaire court sur la littéracie alimentaire des jeunes canadiens was developed through an iterative process that included review of existing measures and assessment of face and content validity through expert review (n=13 English-speaking and 6 French-speaking) and cognitive interviews conducted with youth living in Canada (n = 18 English-speaking and 13 French-speaking). While some modifications were identified to improve relevance, clarity/comprehension, and to reduce redundancy across items, the experts and youth found the survey items to be relevant and easy to understand. Once the wording of the items was finalized, 18 English-speaking youth and 11 French-speaking youth participated in two focus groups to guide the survey format, design, and functionality. Further research is needed to assess the construct validity and reliability of the measure. This measure can help support surveillance efforts to track food literacy as well as research to explore how food literacy is associated with diet and health outcomes among youth.

Symposium 10

INTEGRATING GLOBAL POSITIONING SYSTEMS AND ACCELEROMETOR DATA IN HEALTH BEHAVIOR RESEARCH STUDIES

Tuesday, April 29 | 11.30am – 1.00pm
Location: Varley
Chair: Erika Rees-Punia

Speaker: Marta Jankowska
Discussant: Erika Rees-Punia

S10.1 INTEGRATING GLOBAL POSITIONING SYSTEMS AND ACCELEROMETER DATA IN HEALTH BEHAVIOR RESEARCH STUDIES

Marta Jankowska, City of Hope

Recent advancements in wearable technology and geospatial analytics have provided unprecedented opportunities to examine the spatial and contextual determinants of health behaviors. This session will explore the integration of Global Positioning System (GPS) data with accelerometer-based measures of physical activity (PA) to enhance methodological rigor and comparability across studies. We will present an R-based tool designed for the rapid deployment of time-weighted spatial averaging approaches to measure exposures to environments in accelerometry studies that include GPS devices. This tool enables researchers to efficiently process and analyze GPS data in conjunction with accelerometry, allowing for replicable and streamlined assessments of movement patterns and environmental exposures. In addition, we will discuss our efforts to establish research community-approved reporting standards for the use of GPS in health-related research. Standardizing reporting practices is critical for ensuring transparency, reproducibility, and cross-study comparability. By establishing consensus guidelines, we aim to improve methodological consistency and facilitate the broader adoption of best practices in geospatial and accelerometer-based health research. This session will be relevant for researchers interested in the application of geospatial technologies to health behavior studies, methodological advancements in GIS-accelerometer integration, and the development of standardized reporting practices to enhance study reproducibility and comparability.

Symposium 11

DIETARY ASSESSMENT AND APPLICATIONS IN THE NUTRITION FOR PRECISION HEALTH STUDY

Tuesday, April 29 | 4.30pm – 6.00pm
Location: Toronto 1
Chair: Megan McCrory

The format of this symposium will be three presentations followed by discussant presentations, each asking thought-provoking questions to stimulate discussion.

Learning outcomes:

- Understand the main objective of the Nutrition for Precision Health Study
- Understand the dietary assessment tools used in the Nutrition for Precision Health Study and main characteristics of each, including pros and cons/advantages and disadvantages
- Gain knowledge about methodological approaches to aligning dietary intake variables captured by the different dietary assessment tools with 24h glucose patterns measured by continuous glucose monitoring

- Gain knowledge about the methodological approaches to examining relationships of different dietary intake variables captured by the different dietary assessment tools with the microbiome

Speakers: Lynne Wilkens, Megan McCrory, and Mary Buschmann
Discussants: Benoît Lamarche, Rachel Murphy, and Deborah Kerr

S11.1 DIETARY ASSESSMENT TOOLS AND PROTOCOL IN THE NPH STUDY

Lynne Wilkens, University of Hawaii Cancer Center

Precision nutrition will require an understanding of the individual's current diet and monitoring of changes over time. Measurement of dietary information has proven difficult due to its variability day-to-day and across population and its complexity. There is interest in whether using technology could substantially increase the willingness to collect diet data and improve its accuracy. TANDAM, the dietary assessment center of the Nutrition for Precision Health study, is investigating traditional and novel dietary assessment tools for accuracy and for acceptability. The tools include the web-based ASA24 recall and record, and three methods that use images of food and beverages: the smart-phone based mFR (mobile food record), the wearable AIM-2 (Automatic Ingestion Monitor) and an image-assisted ASA24 recall. These methods will be evaluated against gold standards of monitored consumption and energy intake from doubly labeled water in feeding studies among a diverse group of participants. The goal is to gain an understanding of the best methods for obtaining accurate dietary data, which may vary by participant characteristics and dietary patterns.

S11.2 ALIGNING DIETARY INTAKE TIMING WITH GLYCEMIC RESPONSE: METHODOLOGICAL APPROACHES IN THE NUTRITION FOR PRECISION HEALTH STUDY

Megan McCrory, Boston University

The Nutrition for Precision Health (NPH) Powered by the All of Us Research Program aims to enhance our understanding of how individuals uniquely respond to foods and dietary patterns. A central focus of this work is the ability to predict personalized glycemic responses based on individual-level dietary data. This presentation will address the methodological challenges of aligning the timing of dietary intake from various dietary assessment tools with continuous 24-hour glycemic response data. I will discuss the development and application of techniques to integrate data from self-reported food logs, wearable technology, and other dietary assessment tools. The insights gained from these approaches have the potential to advance personalized nutrition by improving the precision of dietary recommendations based on individual glycemic responses.

S11.3 THE HUMAN MICROBIOME IN PRECISION MEDICINE

Mary Buschmann, University of California San Diego

The human microbiome is a high dimensional and dynamic part of our physiology that plays a key role in managing health and individualized responses to diet and medicine. The immune system controls our interaction with the microbial world, and the microbial communities in our bodies are central to modulating the immune response. Changes in the human microbiome and their metabolism have substantial influence on atopy, neurological disorders, metabolic disorders, and a range of complex conditions and disease states. Diet is incredibly important in shaping human health and the microbiome, altering both composition and metabolic activity, resulting in changes in immune, endocrine, and neurological systems. Measuring diet through surveys, apps, or photographs has become indispensable to our efforts to associate microbiome composition with physiological response to specific dietary components. Microbiome-Wide Association Studies (MWAS) combined with novel quantitative multi-omic approaches and automated at-home sampling devices are enabling us to use AI techniques to determine personalized responses to nutrition that drive diseases states and treatment efficacy. Through these innovations we are finally realizing the paradigm of precision medicine for facilitating patient care.

Symposium 12

MEASUREMENT OF FOOD INSECURITY IN HIGH-INCOME COUNTRY CONTEXTS: CROSS-COUNTRY DIFFERENCES, DEBATES, AND AVENUES FOR FUTURE EXPLORATION

Tuesday, April 29 | 4.30pm – 6.00pm
Location: Toronto 2
Chair: Valerie Tarasuk

This symposium will involve three presentations on measurement and associated details, followed by a moderated discussion and Q&A.

Learning outcomes:

- Understand critical challenges relating to measurement of food insecurity and key cross-country differences.
- Consider how measurement issues may influence their own analysis or interpretation of survey data on food insecurity in their own contexts.Identify barriers and opportunities for more standardized measurement of food insecurity in research settings.
- Identify common measurement issues across country contexts and use discussion from the session to generate ideas for potential analysis and knowledge exchange actions to overcome these.

Speakers: Rachel Loopstra, Katherine Kent, and Andrée-Anne Fafard St-Germain

S12.1 HOUSEHOLD FOOD INSECURITY MEASUREMENT IN THE UK

Rachel Loopstra, University of Liverpool

The USDA Adult Food Security Survey Module (AFSSM) was adopted by the UK Government for regular monitoring of food insecurity across the UK in 2019-20. However, significant interest preceded adoption of this monitoring, which meant that other government bodies (i.e. devolved governments, local governments) and agencies (e.g. Food Standards Agency, Food Foundation) had already adopted other measurement and monitoring approaches. These continue to be in place today. A significant time lag from when data from the UK Government's monitoring are collected to when they are reported also mean that "unofficial" figures have a timelier release pattern than the UK Government's data. As a result, there is a mixture of prevalence figures available from different survey sources and measurement instruments, contributing to a lack of clear conceptualisation of the problem and its scale. This presentation will highlight differences in the various ways food insecurity is defined and measured in the UK. Analyses of survey data that have used different approaches to respondent selection, USDA scale items, and recall timeframes will be shared to show how methodological differences affect estimates of the magnitude of the problem and who is affected. Further, there has also been recent emphasis on physical access to food and cooking and storage facilities. Some argue for the need to capture these dimensions in food insecurity measurement. It is not clear whether data support these assertions. To explore the intersection of physical accessibility and financial accessibility issues, a novel analysis of survey data that examined intersections of different food access issues (i.e. disability, transport, availability and appropriateness of cooking facilities) with classification of food insecurity based on the USDA food security module will be shared. To close, reflections will be made on the positives and negatives in the growth of food insecurity monitoring in the UK and how crucial it is to understand survey methodologies for understanding the nature and scale of the problem.

S12.2 INFLUENCING REGIONAL POLICY THROUGH ONGOING FOOD INSECURITY MEASUREMENT IN AUSTRALIA

Katherine Kent, University of Wollongong

Australian governments conduct infrequent data collection on food insecurity, using inadequate tools, hindering policymakers' understanding of the issue and limiting effective responses. Academics fill this gap, by conducting targeted studies to provide localised data on food insecurity to support advocacy. The aim of this ongoing study, conducted through The Tasmania Project (TTP), was to document the prevalence and impact of food insecurity to inform evidence-based policymaking at a regional level in Tasmania, Australia. Between 2020 to 2024, TTP conducted six cross-sectional surveys using the USDA

Household Food Security Screening Module to investigate the persistence of high levels of food insecurity and the impact of external events such as the COVID-19 pandemic and rising cost-of-living due to sustained inflation. The prevalence of food insecurity ranged from 26%-52% of the population. Demographic groups at risk of food insecurity were identified to inform targeted interventions, including young adults and people receiving inadequate government support payments. Analysis of coping strategies adopted by food insecure household demonstrated that alongside reducing food quality and quantity, food insecure households reduce expenditure on essentials, draw on savings and assets, and access unfavourable credit to buy food. Significantly lower diet quality was evident across increasing categories of food insecurity severity, as well as among those living in geographic areas of high relative disadvantage. Significant barriers to emergency food relief such as stigma, lack of awareness, and accessibility was documented, revealing a need for improved service delivery, community education, and policy changes to increase access to necessary support. Our results highlight that frequent data collection on the dynamic nature of food insecurity and its impacts can inform region-specific approaches to address food insecurity. TTP engaged with stakeholders across policy, programs and services and the general community through media, short reports, and submissions to government inquiries to ensure the research findings and potential implications were communicated and informed actions. This resulted in greater awareness of food insecurity at a regional level, informed regional policy, and increased government investment to address food insecurity.

S12.3 THE MEASUREMENT OF HOUSEHOLD FOOD INSECURITY IN CANADA: ONGOING MONITORING CHALLENGES AND THE POTENTIAL IMPACTS OF HIGH FOOD PRICE INFLATION

Andrée-Anne Fafard St-Germain, University of Toronto

Canada has been using the 18-item Household Food Security Survey Module (HFSSM) to monitor household food insecurity for nearly two decades. Throughout this period, multiple measurement and monitoring challenges have emerged and impacted research capacity, data interpretation, and knowledge translation. In this presentation, I will first demonstrate how three important methodological elements, namely differences in the classification of the HFSSM to determine the presence and severity of household food insecurity, the selection of the unit of analysis, and changes in survey designs and survey vehicles, can influence the comparability of estimates produced in different country contexts, by different organizations using the same survey data, and over time. Examples of how these methodological elements continue to challenge data users when estimating, reporting, and interpreting household food insecurity prevalence estimates in Canada will be discussed. Then, I will present ongoing research examining changes in

the response patterns to the items of the HFSSM in the context of sustained, high food price inflation in Canada. The psychometric model underpinning the development and validation of the HFSSM in the mid-1990s relies on a modal response pattern that represents household food insecurity as a managed process that moves along a severity continuum; the less severe experiences of worrying about running out of food and compromising diet quality due to a lack of money generally occur before more severe experiences of quantitative compromises in food consumption and disrupted eating patterns. In addition to measuring food insecurity along a severity continuum, the HFSSM measures the frequency of certain experiences in the past 12 months, allowing the determination of the chronicity of household food insecurity. The rapid increases in food prices in recent years may have impacted how households manage food resources and how frequently they experience food insecurity. In this ongoing research, we leverage Canadian data from before and during the period of high food price inflation to explore whether there have been changes i) in households' propensity to answer affirmatively to the less severe items focused on worries about running out of food and compromises in diet quality, ii) in the overall modal response pattern to the HFSSM, and iii) in the chronicity of household food insecurity. The implications of the results for the measurement of household food insecurity using the HFSSM, for public health, and for future research will be discussed.

Symposium 13
DIET AND PHYSICAL ACTIVITY ASSESSMENT IN OLDER ADULTS

Tuesday, April 29 | 4.30pm – 6.00pm
Location: Toronto 3
Chair: Stéphanie Chevalier

This symposium consists of four presentations and a panel discussion (15 minutes) and will address the challenges and currently available tools for assessing diet and physical activity in the aging population. The symposium encompasses speakers from both Western and Eastern countries to ensure comprehensiveness of tools and methods that may be applied to diverse ethnic origins.

Learning outcomes:

- Participants will be able to distinguish between tools for diet and activity, and choose appropriate tools for different measurement purposes.
- Participants will be able to judge the use of novel assessment tools and methods to enhance their practice in research, clinical and community settings.
- Participants will be able to locate appropriate tools for assessing diet and activity under resource-constrained situations and in various groups.

Speakers: Lora Giangregorio, Tina Hsueh-Ting Chiu, Didier Brassard, and Heather Keller

S13.1 ASSESSING PHYSICAL ACTIVITY AND NUTRITION IN CLINICAL TRIALS AMONG OLDER ADULTS

Lora Giangregorio, University of Waterloo

Lessons learned in implementing nutrition and physical activity questionnaires and monitoring tools in clinical trials of older adults, including pros and cons of selected tools, and examples of challenges experienced and strategies implemented to address the challenges will be discussed.

S13.2 DIET ASSESSMENT IN MIDDLE AGE AND OLDER ADULTS – EXPERIENCES IN TAIWAN

Tina Hsueh-Ting Chiu, National Health Research Institute

Asian cuisines often consist of stir-fries or stews of a variety of ingredients that could be combined in unlimited ways. In the traditional way, family often eat the meals together from a table of dishes rather than set portions for each individual. Thus, recalling dietary intakes can be challenging. In the Nutrition and Health Survey in Taiwan, food models of different shapes that could represent any ingredients within dishes have been developed, to assist 24-hour dietary recalls. In older adults, diet recall could be challenging due to decline in memory. Biomarkers (including both nutrient biomarkers and metabolomics) could be used to assess diet assessment. Noninvasive skin carotenoids are reasonably correlated with serum biomarkers of carotenoids, a good biomarker for fruits and vegetables. Urinary metabolites such as 1-methyl-histidine, 3-methyl-histidine, anserine, and carnosine are biomarkers for meat and poultry intakes. However, metabolomics is not routine and cannot be used for direct calculation of exact consumption. This talk will share our experience and lessons learned in dietary and biomarker assessment in our previous studies in Taiwan and plan for assessing diet and nutrition in senior.

S13.3 IMPROVING OBSERVATIONAL DATA ANALYSIS: AN APPLICATION OF THE TARGET TRIAL EMULATION FRAMEWORK TO DIET AND PHYSICAL ACTIVITY INTERVENTION

Didier Brassard, McGill University

The effect of dietary patterns, foods, or physical activity regimens would ideally be investigated using randomized controlled trials (RCT). However, conducting long-term RCTs involving changes in diet and physical activity is challenging. The adherence and commitment needed may limit the participation of older adults. In turn, the lack of RCTs examining lifestyle interventions in older population limits the evidence base needed to inform dietary recommendations. As an alternative, the target trial emulation framework is a novel approach to improve the analysis of observational data. In community-dwelling

older adults, our objective was to estimate the effect of adhering to Canada's Food Guide and exercise recommendations and reformulation on muscle strength and function. The following hypothetical interventions were considered: adherence to Canada's Food Guide 2019 recommendations (CFG), enhancements with additional protein foods (CFG-PRO), exercise (EXE) and both (CFG-PLUS). Longitudinal data from the NuAge study (n=1753, mean [SD] age, 74 [4], 52% females) were used to emulate a target trial based on four annual measurements of dietary intakes and covariates. Dietary intakes were measured using up to three interviewer-administered 24-hour recalls each year. Physical activity was measured using the Physical Activity Scale for the Elderly (PASE) questionnaire. End of follow-up outcomes included handgrip, arm, and leg strength, Timed-Up-and-Go and walking speed. The intervention strategies were modelled using the parametric g-formula to account for confounding (individual factors, propensity to health-seeking behaviours, disease burden) and loss to follow-up. 1561 participants were eligible for the target trial emulation. Compared with no change, CFG would have increased elbow flexor strength by 0.7 kg (95%CI: 0.2, 1.3), quadriceps strength by 0.7 kg (95%CI: -0.1, 1.7), normal walking by 0.03 m/s (95%CI: 0.00, 0.06). The effect estimates of the CFG-PRO intervention were larger than those of CFG alone for walking speed, but imprecision limited clear conclusion. The CFG-PLUS intervention would have further amplified these differences, especially for normal walking speed (vs. CFG, +0.06 m/s; 95%CI: 0.03, 0.08). Only EXE and CFG-PLUS improved Timed-Up-and-Go time. The hypothetical interventions had no meaningful effect on handgrip strength. In conclusion, emulating a target trial can help bridge the gap between nutritional epidemiology and RCTs, and support a causal interpretation of findings. Our results support the paradigm of increasing both the intake of protein foods and the amount of physical activity in older adults.

S13.4 ASSESSING DIETARY INTAKE IN OLDER ADULTS IN CARE SETTINGS

Heather Keller, University of Waterloo

Older adults in care settings are a unique population that requires different dietary assessment methods and modifications to traditional methods used in community or research settings. This presentation will provide an overview of acceptable methods for use in research and clinical practice to understand the food and fluid intake of older adults. Challenges and benefits of aggregated weighed food intake, pre- post weighed food intake, post-only consumption, staff report and recording, including using standardized forms, as well as resident self-report will be discussed. With increased interest and research in food and fluid intake in care settings, the panel discussion will provide an opportunity for considering strategies to improve food and fluid intake of older adults in care settings.

Oral Session 1

ADVANCING 24-HOUR DIETARY RECALL METHODOLOGY

Monday, April 28 | 4.15pm – 5.15pm

Location: Toronto 1

Chair: Megan McCrory

OS1.1 DEVELOPMENT OF A SELF-ADMINISTERED, WEB-BASED 24-HOUR DIETARY RECALL FOR MEXICO

Tania Aburto [1], Erick Angulo [1], Rocio Castañon [1], Zugey Hernandez [1], Giezi Olivares [1], Yosimar Mendez-Huicochea [1], Carolina Batis [1], Lilia Pedraza [1], Simón Barquera [1]

[1] *National Institute of Public Health, Mexico*

Introduction: Accurate dietary assessment tools are crucial for understanding population-level food consumption patterns, particularly in light of Mexico's public health challenges related to nutrition and chronic diseases. However, many dietary assessment tools are either costly or time intensive. We aimed to develop a self-administered, web-based, low-cost 24-hour dietary recall instrument. This tool incorporates brand-level products and aims to improve accuracy and user experience while reducing the time required for completion.
Methods: The developed instrument includes detailed information on 2,407 food and beverage items, accounting for 22,466 individual units, and around 2,200 photographs for portion size estimation. It also includes specific weights, portion sizes, and factors for weight adjustment (e.g., density, non-edible portions, yield). To address the complexity of reporting mixed dishes, we implemented a novel method called "customizable recipes." This feature will allow respondents to disaggregate complex recipes in a time efficient manner, retaining the rich detail needed for accurate nutritional assessment. A pilot study was conducted with 120 parents, using the instrument in interviewer-assisted mode to evaluate its feasibility, duration, and user satisfaction.
Results: The median time to complete the recall with an interviewer was 20 minutes (IQR: 17–25 minutes). All participants agreed or strongly agreed that the questionnaire duration was appropriate, and that the foods consumed by their child were well captured. However, 5.8% of participants found the questionnaire tedious, indicating an area for potential improvement.
Conclusion: The development of this low-cost, self-administered, web-based 24-hour recall instrument represents a significant advancement in dietary assessment tools for Mexico. The inclusion of brand-level products and a "customizable recipes" feature allows for a more precise and user-friendly experience. The instrument has shown high acceptability among parents of school-aged children and is a promising tool for large-scale dietary assessments in Mexico.

OS1.2 INTAKE24: PRAGMATIC ADAPTATIONS TO INCREASE ACCESSIBILITY OF DIETARY ASSESSMENT IN DIVERSE LOCATIONS

Toni Steer [1], Anila Farooq [1], Suzanna Abraham [1], Ivan Poliakov [1], Lukas Hroch [1], Birdem Amoutzopoulos [1], Polly Page [1]

[1] University of Cambridge,

Introduction: Technology based dietary assessment tools offer considerable potential for nutrition research but can be costly, complex, and time-consuming to adapt for new settings. However, pragmatic approaches can offer measurement in circumstances where it may be missed, particularly where time, funding, staff availability and/or a rapidly emerging health situation impose constraints. We illustrate the potential of Intake24, an open-source online dietary assessment tool, with case study examples of pragmatic application for island populations and minority ethnic groups.
Methods: Each adaptation was researcher-led, informed by individual requirements, and enabled through exploitation of existing Intake24 resources and local knowledge. Steps varied but generally included identification of a suitable existing Intake24 food database(s) and collation of a minimal set of key updates to ensure coverage of commonly consumed foods and suitability of portion estimation and food prompts. A new food data 'locale' was cloned and updated; recall wording was updated for cultural/local contexts. Research teams specified and provided food data (descriptions, recipe detail, portion size, food composition) and undertook testing. Following implementation, intake data were screened for missing foods with opportunity for further tool updates.
Results: Adaptation to the food databases varied, from as few as 30 to up to 1000 new foods added to an existing suitable food database available on Intake24. Food data were initially populated in Excel templates, informed by literature, local knowledge, external datasets and testing. Local nutrition teams provided expertise in relevant foods and portion size estimates. Overall project timelines were typically less than 4 months, facilitating rapid deployment of Intake24 in the field.
Conclusion: Rapid, cost-effective adaptation of Intake24 is increasingly feasible and offers an effective solution for research, with examples ranging from evaluation of farming interventions to understanding gestational diabetes. As Intake24 food data and language options grow, its relevance and accessibility for a broader range of population settings increases providing scope for wider application. Success relies on local team engagement, knowledge, and appetite for pragmatic approaches to assessment. In addition, incorporation of techniques to evaluate the pragmatic adaptations of Intake24 should be considered.

OS1.3 EXPLORING USER EXPERIENCES OF INTAKE24-NZ: A MIXED METHODS USABILITY STUDY

Berit Follong [1], Caitlin Haliburton [1], Sally Mackay [1], Maria Maiquez [1], Jacqueline Grey [1], Cliona Ni Mhurchu [1]

[1] *University of Auckland*

Introduction: Online 24-hour dietary recall tools are widely used in national surveys and nutrition research to assess food and nutrient intakes. Intake24, a 24-hour recall tool originally developed in the United Kingdom, was adapted for use in the New Zealand population. Given these modifications and the tool's use in a new context, usability testing was considered essential. Usability testing can provide valuable insights to improve a tool's features and functions by exploring any challenges users experience and their underlying causes. Therefore, usability testing of a New Zealand version of Intake24 (Intake24-NZ) was undertaken to enhance user experience and maximise the quality of dietary intake data collected.
Methods: The usability study consisted of completion of 1) a single 24-hour dietary recall using Intake24-NZ and 2) an online feedback survey. Quantitative survey data was supplemented by detailed qualitative data from screen observation recordings and participants thinking aloud whilst completing the recall.
Results: Thirty-seven participants aged 11 years or older completed the dietary recall and survey (male n=14, female n=23; Māori (Indigenous people of New Zealand) n=10, non-Māori n=27). While most participants found Intake24-NZ easy to use and navigate (n=31, 74%) and provided positive feedback about the portion size images, some challenges were identified. Key usability issues related to the use of correct search terms, types and order of foods displayed in the search results, problems in estimating portion size, and confusion with some associated food prompts.
Conclusion: This study provided helpful data on some challenges encountered by users of Intake24-NZ. The findings will inform an iterative process to improve tool usability and maximise the quality of dietary data collected. Future enhancements planned for Intake24-NZ include increasing the number of New Zealand foods in the food list, optimising the search function and the ordering of search results, adding additional portion size images, and providing clearer instructions to users.

OS1.4 INTRODUCTION OF DIETAI24, AN AUTOMATED DIETARY ASSESSMENT TOOL USING FOOD IMAGES WITH CUSTOMIZING MULTIMODAL LANGUAGE MODELS

Runze Yan [1], Hanqi Luo [1], Jiaying Lu [1], Darren Liu [1], Hannah Posluszny [1], Terry Hartman [1], Xiao Hu [1]

[1] *Emory University*

Introduction: Traditional diet assessment methods, such as 24-hour dietary recalls or food diaries, typically involve manually matching reported foods to predefined food codes from standard food composition tables to estimate nutrient content, a process that is labor-intensive and prone to human error.

Methods: To overcome these challenges, we developed DietAI24, an innovative AI-driven tool that accurately estimates up to 65 nutrients from food images captured on mobile phones. DietAI24 used the US FNDDS as its food and nutrition database and uses the advanced GPT-4 Turbo as the MLLM to analyze food images. Upon receiving a food image, DietAI24 generates a descriptive analysis of the food item, and then matches it with detailed descriptions from FNDDS, including food codes and portion sizes. DietAI24 can precisely assign food codes from among the 5,624 items from the FNDDS as well as portion sizes from over 23,000 predefined options. We evaluated the performance of DietAI24 using two public datasets, ASA24 and Nutrition5K, which contains 17,000 and 3,500 standardized food images respectively, each detailed with nutrition composition and food group information. We compared DietAI24's performance against three commercial dietary tracking apps (Calorie MAMA, Foodvisor, and SnapCalorie) and an advanced computer vision model (ViT).

Results: Using the ASA24 dataset, DietAI24 achieved errors of 47.7 kcal for calories, 1.67 g for fat, 6.95 g for carbohydrates, 1.38 g for protein, and 49.4 g for dish mass. The represents a better performance of 76-83% in calorie, 80-86% in fat, 71-78% in carbohydrates, and 67-88% in protein, compared to apps like ViT, Calorie MAMA, and Foodvisor. Using the Nutrition5k dataset, DietAI24 demonstrated similar outperformance, reducing error by 60-93% for calories, 51-72% for fat, 73-80% for carbohydrates, and 70-76% for protein.

Conclusion: DietAI24 makes a substantially advancement in automated dietary assessment using images captured on mobile phones. It combines cutting-edge AI technologies with standardized nutrition database, bypassing the need for manual entry and self-reporting. DietAI24's ability to accurately estimate a comprehensive range of nutrients, including micronutrients, from food images holds promise for large-scale dietary studies and clinical dietary interventions.

Oral Session 2
DATABASE ENHANCEMENTS AND PREDICTIVE ANALYTICS
Monday, April 28 | 4.15pm - 5.15pm
Location: Toronto 2
Chair: Marga Ocké

OS2.1 IMPROVING ETHNIC FOOD REPRESENTATION IN UK DIETARY ASSESSMENT: A MULTI-PHASE APPROACH TO EXPANDING INTAKE24'S FOOD DATABASE

Birdem Amoutzopoulos [1], Suzanna Abraham [1], Anila Farooq [1], Angela Mulligan [1], Toni Steer [1], Itse Olaoye [2], Sara L White [3], Polly Page [1]

[1] University of Cambridge, [2] St Mary's University, [3] King's College London,

Introduction: Intake24, a widely used digital 24hr-recall system designed to provide reasonable generalised coverage of foods, is extensively used for population-representative research and nutritional surveillance, such as the UK National Diet and Nutrition Survey (NDNS). While the tool comprehensively covers many foods, it may underrepresent those consumed by minority ethnic groups within a population. This study aimed to review and expand Intake24's UK food databases to improve representation of ethnic foods, enhancing inclusivity and accuracy for the diversity of the UK population.
Methods: The first three of five phases focused on food identification ahead of practical implementation. Following a literature review of food composition data for ethnic foods commonly consumed by the UK minority ethnic groups, phases two and three examined foods reported as missing in two key datasets: the UK National Diet and Nutrition Survey (NDNS 2019-2023) and the West African UK Women's study (St Mary's University). Phase four involved online research to survey East and Southeast Asian foods (Chinese, Japanese, Thai) available in UK out-of-home eating environments. Finally, a UK South Asia database was developed to support the assessment in South Asian populations living in the UK. The identified foods were compared with those in the existing UK Nutrient Databank; missing foods were added, and nutrient data were generated for selected items.
Results: Across the phases, 65 previously unrepresented foods were identified and added to the Intake24 2024 UK database. New nutrient composition data were generated for 27 of these foods. A South Asia UK version of Intake24 was created and deployed, and early data on food coverage and usability for this ethnic group are currently being collected. New foods will be included in the next round of NDNS and the upcoming database release for broader research.

Conclusion: This work enhances ethnic food coverage in Intake24 UK databases, improving utility for diverse sub-populations. By leveraging smaller targeted studies, we addressed gaps in ethnic food representation. Future efforts will focus on developing ethnic-specific Intake24 databases for other groups, contributing to more accurate and inclusive dietary research. All Intake24 databases and software are open source benefitting a wide range of users.

OS2.2 USING AI TO EXTRACT AND ANALYSE INGREDIENT LISTS FROM PACKAGED FOODS AND BEVERAGES ACROSS EUROPE: AN APPLICATION WITHIN FABLE – FOOD AND BEVERAGES LABELS EXPLORER

Joana Dias [1], Evangelia Grammatikaki [2], Michele Rovera [2], Jan Wollgast [1]

[1] European Commission, Joint Research Centre, Ispra, Italy, [2] European Dynamics, Milan

Introduction: The lack of an efficient and not resource-exhaustive approach to analyse ingredient lists of packaged foods and beverages hinders the regular assessment of ingredients in the food supply. Researchers and policy-makers must rely mainly on the analysis of nutrient declaration on-pack to monitor the evolution of the nutrition quality of the food supply, and of food industry reformulation efforts, through time. The aim was to create a new streamlined procedure to extract and analyse data from the ingredients lists present on packaged products.
Methods: We explored the use of artificial intelligence (AI) for the disaggregation of ingredient lists into separate ingredients. The Llama 3.70b instruct model was used within the GPT@JRC environment. The use of other data processing tools in combination was also explored. Prompt engineering was based on a sub-sample of 200 products in different languages, from different European countries and different food groups.
Results: Good results were obtained in terms of AI understanding ingredient names regardless of the language or even when there were typographic errors. However, the use of other data processing tools, i.e., KNIME, was necessary to reduce errors due to syntax and structural problems of the ingredient lists, such as missing parentheses in sub-ingredient lists. The final procedure was applied to the products collected through the Joint Action Best-ReMaP for five food categories (bread products, delicatessen meats, soft drinks, breakfast cereals, and dairy products) across 19 European countries. The visualisation of these results for the presence of sugars and sweeteners in the products is scheduled to be available in FABLE (FABLE – Food and Beverages Labels Explorer https://food-labels-explorer.jrc.ec.europa.eu) in 2025.

Conclusion: A new procedure using AI and other processing tools was created for extracting and analysing data from ingredient lists on packaged food and beverages. It will make easier the analysis of ingredient lists, including in countries with less resources or technical capacity. In addition, it can unlock the potential for a more comprehensive assessment of the quality and healthiness of foods available, across Europe and worldwide, looking at food quality as more than just the sum of specific nutrients. Ultimately, this can incentivise reformulation efforts and lead to an improved food supply, making healthier choices more available to consumers.

OS2.3 USING PREDICTIVE ANALYTICS TECHNIQUES TO IMPUTE MISSING DATA IN FOOD COMPOSITION TABLES

Beulah Pretorius [1]

[1] *University of Pretoria*

Introduction: High-quality food composition data are indispensable for decision-making in several health, agricultural, and nutrition-related activities. Analytical data are the most accurate type of food composition data (FCD). Yet, most food composition databases (FCDBs) compiled in Sub-Saharan Africa only contain a small amount of analytical data collected from foods consumed in this region. Most of the data are either borrowed/copied from FCDBs collected in other parts of the world, calculated, imputed, or presumed. The research question was how does the quality of imputed FCD generated using predictive analytics techniques compare to the data generated using traditional imputing methods.
Methods: Due to the high cost of their chemical analysis, data on vitamins are most likely to be missing from FCDBs. For that reason, a model that predicts vitamin values when there are only non-vitamin nutrients available in the dataset was developed. Weka and R Commander linear regression analysis was used for the imputation of missing FCD. The Training data used were from the UK Food Composition database (McCance and Widdowson) and the test data included nutrient information for beef derived from PhD datasets.
Results: For most vitamin predictions, summary statistics given by Weka demonstrate that the linear regression models have strong explanatory power, significant relationships, and reasonable accuracy in predicting the dependent variable based on the given independent variables. Statistical significance with reasonably high F-statistic and p-value below 0.05 were seen. In most cases, the variance percentage between the imputed value and the expected value is considered quite low and within tolerance.

Conclusion: The model developed is not only statistically significant, but also practically useful. The formula it produces, is accurately enough to impute missing vitamin values in Sub-Saharan African FCDBs, provided that data on certain nutrients are available and can be used as input variables.

OS2.4 THE OPPORTUNITIES OF HYPERSPECTRAL IMAGING AND MACHINE LEARNING FOR DIETARY ASSESSMENT: PREDICTION OF MACRONUTRIENTS IN CHEESES

Esther Kok [1], Mercedes Bertotto [1], Meeke Ummels [1], Hajo Rijgersberg [1], Guido Camps [1], Edith Feskens [1], Rosalba Calvini [2]

[1] Wageningen University & Research, [2] University of Modena and Reggio Emilia

Introduction: To create an objective measure of actual intake for dietary assessment, automated detection of macronutrients in food is very valuable. Hyperspectral imaging (HSI) is emerging as a relevant imaging technology and can provide information about food chemical composition. Detection of macronutrients in these images could be facilitated by use of machine learning (ML), but currently, traditional chemometrics methods are still the baseline method of choice. This work compares traditional chemometric methods with ML methods on how well they predict protein and fat content in a variety of cheeses.
Methods: In this study, HSI data (941.1-1723.94 nm spectral range) of 76 cheese samples were processed and analysed to predict their fat and protein content. After calibrating the images and segmenting cheese samples from the background, chemometric and ML analysis were conducted using R and Python, respectively. Chemometrics involved data visualization and exploration, and data splitting into training and validation sets, randomly. Then, PLS regression models were trained on the calibration set, tested on the validation set, and evaluated in terms of RMSEP and R2. Several preprocessing (SNV, derivatives, ESMC) and feature selection methods (CovSel, IPW-PLS, UVE-PLS, among others) were compared. ML results were achieved based on neural networks on full spectral data and using variable selection. To compare with chemometrics, similar preprocessing steps were performed.
Results: Chemometrics: For protein prediction, the UVE-PLS model stands out with an R2Pred of 0.98 and an RMSEP of 1.41, utilizing SNV and EMSC preprocessing. For fat prediction employing IPW-PLS with 15 variables and SNV resulted in an R2Pred of 0.94 and an RMSEP of 2.15. ML: For prediction of protein content, the best model had an R2Pred of 0.94 with a RMSEP of 2.14, which was based on preprocessing with EMSC. For fat prediction, the best performing model was also EMSC pre-processed, with an R2Pred of 0.97 and a RMSEP of 1.88.

Conclusion: We conclude that both methods have similar excellent performance when it to prediction of fat content and protein content in different cheese types. Notable is that ML achieved similar performance without variable selection. The interpretation of which spectral bands contribute to the prediction outcome, however, cannot be completed without chemometrics. To adopt HSI for dietary assessment, a toolkit of both chemometrics and ML is recommended.

Oral Session 3
ASSESSING PHYSICAL ACTIVITY AND PLAY
Monday, April 28 | 4.15pm - 5.15pm
Location: Toronto 3
Chair: Sarah Keadle

OS3.2 UTILITY OF AN ONLINE PARTICIPANT PORTAL TO COLLECT PHYSICAL ACTIVITY DATA IN A U.S. COHORT STUDY

Erika Rees-Punia [1], Aileen Artus [1], Maria Moore [1], Alpa Patel [1]

[1] *American Cancer Society*

Introduction: Measuring physical activity and sedentary behavior in large epidemiologic cohorts remains a challenge. Online portals are regularly used in healthcare settings for administering intake surveys and messaging patients, but portals have only more recently been leveraged to survey and engage participants in research studies. Portals provide the opportunity to collect novel data, particularly in the space of physical activity behaviors.
Methods: The American Cancer Society Cancer Prevention Study-3 (CPS-3) is a prospective cohort of over 303,000 participants, aged 30 to 65 years at baseline, who were recruited at community events across the U.S. and Puerto Rico between 2006 and 2013. In 2020, an online CPS-3 participant portal was developed and tested in a subgroup of CPS-3 participants. Some of the first CPS-3 participant portal surveys included: 1) a video-guided 30 second sit-to-stand (STS) test, 2) a grid for reporting 24-hour time use, and 3) questions assessing commercial device use. Participants joined the portal on a rolling basis, and at the end of October 2023, there were 67,517 CPS-3 participants actively using the portal.

Results: In 2021, 34,024 participants were invited to take the STS test, and 56% of invited participants completed the test. Men (n = 4,152) reported an average of 15.2 complete stands (SD = 4.7) and women (n = 14,928) reported 14.5 stands (SD = 4.1). Less than 1% of participants reported potentially implausible scores above 50. In early 2023, 52,303 participants completed the 24-hour time use grid, though 6% of these participants showed evidence of misreported daily time (e.g., <18hr./day or >30 hr./day). Participants spent most of their waking time sedentary (8.2 hr./day, SD = 3.2) and reported 1.5 hours/day of moderate-vigorous intensity physical activity (SD = 3.8). Preliminarily, 50% of participants reported using a wearable commercial device, with Fitbit and Apple watch being the most common devices. Most participants who wear a device reported that they use it most (26%) or all the time (64%).
Conclusion: The portal enabled administration of the STS test, which is typically difficult to assess in a large geographically broad cohort. Future data collection plans include the development of a tool to import commercial device data and repeated measures of 24-hour time use and the STS test.

OS3.3 CLASSIFICATION OF PHYSICAL BEHAVIOURS USING HIP- AND WRIST-WORN ACCELEROMETRY

Annika Swenne [1], Antje Hebestreit [1], Luis Sigcha [2], Jean-Michel Oppert [3], Richard Cimler [4], Steriani Elavsky [4], Tomas Vetrovsky [5], Alan Donnelly [2], Christoph Buck [1]

[1] Leibniz Institute for Prevention Research and Epidemiology – BIPS, [2] University of Limerick, [3] Sorbonne Paris North University, [4] University of Hradec Králové, [5] Charles University

Introduction: Accelerometer-based wearables are extensively employed in health research to objectively measure physical behaviours (PB). Traditionally, researchers have relied on intensity cut points to categorize PBs from accelerometer data. However, in recent years, machine learning (ML) models have emerged as a promising alternative for behaviour classification. In this talk, we show the potential of ML models to classify PBs from both hip- and wrist-worn sensor devices.
Methods: In 2023, the WEALTH study (WEarable sensor Assessment of physicaL and eaTing beHaviours) collected data from 627 participants aged 18 to 71 years in Ireland, Germany, Czechia, and France. The study design included a 75-minute semi-structured protocol where participants performed specific PBs, e.g., sitting, walking, running or exercising. During a one-week monitoring phase, Fitbit trackers were used to trigger ecological momentary assessment (EMA) prompts for data labeling. Tri-axial accelerometer recordings were generated using an ActiGraph GT3X-BT worn on the right hip at a resolution of 100 Hz and a LifeQ enabled smartwatch worn on the dominant wrist at a 25 Hz resolution. Random forest, extreme gradient boosting, and artificial

neural network models were trained separately for each device on the semi-structured protocol data to detect six behaviours: sitting, standing, walking, running, cycling, and exercising. For all models, the dataset was divided into training (60%), validation (20%), and test (20%) data based on individual participants. The final performance of each model was evaluated for the test data from the semi-structured protocol. Moreover, the performance of the trained models in a real-world setting was assessed with free-living data from EMA labels.
Results: Initial findings demonstrate 81% accuracy in classifying physical behaviours from hip-worn devices with machine learning algorithms. However, the accuracy varied considerably for the different activities. Accuracy was highest for running (96%), followed by exercising, sitting, and walking with accuracies around 90%. Cycling had an accuracy of 75% and standing had the lowest accuracy at 51%. Notably, standing was frequently misclassified as sitting.
Conclusion: Our results provide valuable insights into the applicability and generalizability of different machine learning models for behaviour classification in real-world contexts. Furthermore, they offer starting points for further enhancement of the model performance.

OS3.4 DEVELOPING AN APPROACH FOR MEASURING PRESCHOOL-AGED CHILDREN'S ACTIVE OUTDOOR PLAY

Yeongho Hwang [1], Valerie Carson [1]

[1] University of Alberta

Introduction: Literature suggests that physical activity (PA) in preschool-aged children (3-5 years) can be classified into four mutually exclusive domains: active play, early childhood educator-led PA, organized PA, and active transportation. Among them, active play that occurs outdoors is one of the most feasible and effective ways to help preschool-aged children move more, sit less, and achieve healthy development. Despite the importance of active outdoor play, research gaps remain in measuring this PA domain in this age group. The purpose of this study was to develop a comprehensive approach to measure active outdoor play in preschool-aged children.
Methods: Participants for this cross-sectional study were 106 families (preschool-aged children and their parents) from Alberta, Canada. Data were collected between August 2023 and February 2024. In this study, active outdoor play was defined as unstructured PA that takes place outdoors in home, neighbourhood, or childcare settings during waking hours, either alone or with others. Preschool-aged children were asked to wear an accelerometer and GPS monitor on their waist for seven consecutive days. Concurrently, parents were asked to complete a time-use diary detailing when, where, with whom, and what type of activities their child engaged in.

Results: An approach for measuring active outdoor play in preschool-aged children was developed using combinations of data from device-based (accelerometer and GPS monitor) and subjective (time-use diary) measures. Time-stamped data from the accelerometers and GPS monitors were merged and processed through PhysicalActivity, PhysActBedRest, and hbGPS packages written in R, which helped categorize different PA intensity levels into different outdoor locations. To identify active outdoor play from other PA domains, organized PA was separated by combining time-use diary data, while active transportation was separated using processed GPS data. This approach enabled the measurement of time spent engaging in active outdoor play by PA intensity levels (i.e., light PA, moderate-to-vigorous PA, and total PA) and outdoor locations (i.e., home, near home, away from home).
Conclusion: This work will help researchers measure active outdoor play in preschool-aged children, a demographic that has been relatively underexplored in this field.

Oral Session 4
ADVANCES IN DIETARY ASSESSMENT METHODS
Tuesday, April 29 | 9.45am - 11.00am
Location: Toronto 1
Chair: Keren Papier

OS4.1 ECOLOGICAL MOMENTARY DIETARY ASSESSMENT: EXPLORING THE USE OF RANDOMLY DISTRIBUTED 2-HOUR RECALLS TO ASSESS LONG-TERM DIETARY INTAKE

Desiree Lucassen [1], Elske Brouwer-Brolsma [1], Hendriek Boshuizen [1], Michiel Balvers [1], Edith Feskens [1]

[1] *Wageningen University & Research*

Introduction: Current dietary assessment methods are affected by memory-related bias and heavily burden respondents. To reduce respondent burden and associated measurement error, we recently developed an innovative smartphone-based 2-hour recall (2hR) method utilizing the ecological momentary assessment principles. Validation of repeated 2hRs on one day already showed more accurate dietary assessment as compared to traditional 24-hour recalls. This study takes a step further towards full ecological momentary dietary assessment, exploring the use of random 2hRs for assessing long-term dietary intake.
Methods: Dietary intake was assessed in 215 Dutch adults by repeated 2hRs on randomly selected days and times (i.e., equivalent to three full days of 2hRs) over a four-week period. At the end of the study period, participants completed a validated semi-quantitative FFQ as a

reference method. Sixty-five random participants also provided two fasting blood samples to assess plasma carotenoid and plasma n-3 poly unsaturated fatty acid (PUFA) concentrations.
Results: Intake estimates of energy (2,132±665 kcal vs. 2,017±572 kcal) were slightly higher with 2hRs than FFQ, while the percentage energy intake from macronutrients was similar (protein: 37±14 en% vs. 37±13 en%; fat: 35±6 en% vs. 44±7 en%; carbohydrates: 44±7 en% vs. 44±6 en%). For food groups, a larger variation in intake estimates was found, ranging from -65% (legumes) to 62% (pastry, cake and biscuits). Spearman correlations between 2hRs and FFQ ranged from 0.33 to 0.69 for energy and macronutrients, from 0.32 to 0.58 for micronutrients, and from 0.27 to 0.67 for food groups. For all nutrients and food groups, ≥70% of the participants were classified in the same/adjacent quartile and <10% were classified in the extreme quartile. Spearman correlations between 2hRs and plasma carotenoids and n-3 PUFA ranged between 0.34 and 0.57 and cross-classification ranged between 61% to 83% in the same/adjacent quartile.
Conclusion: Comparing 2hRs with FFQ and blood concentration markers showed good ranking ability for energy, most nutrients, and most frequently consumed foods. More variation was seen for episodically consumed foods and nutrients. Next steps include integration of a short food propensity questionnaire, specifically assessing habitual intake of episodically consumed foods, and sampling scheme optimalization, which will likely result in a more complete estimate of habitual dietary intake.

OS4.2 A MIXED-METHODS STUDY OF TRAQQ-Z: EVALUATING ACCURACY, USABILITY, AND USER PERSPECTIVES OF A SMARTPHONE DIETARY ASSESSMENT APPLICATION AMONG DUTCH ADOLESCENTS (AGES 12-18)

Lieke Kennes [1], Desiree Lucassen [1], Anouk Vaes [2], Annemarie Wagemakers [1], Indre Kalinauskaité [3], Edith Feskens [1], Elske Brouwer-Brolsma [1]

[1] Wageningen University & Research, [2] Vrije Universiteit Amsterdam, [3] UMC Utrecht Wilhelmina Children Hospital

Introduction: Accurate self-reported dietary assessment is essential for nutrition research, but challenging due to measurement errors, particularly in adolescents with irregular eating habits, meal skipping, and external influences. Therefore, tailored dietary assessment tools are needed. This study explores Traqq®, an ecological momentary dietary assessment app validated for Dutch adults, for use in adolescents (12-18 years). Traqq® uses repeated short recalls (2-hour and 4-hour) to assess dietary intake, offering a promising alternative to traditional methods. Traqq® was evaluated for accuracy, usability, and user experiences among Dutch adolescents.

Methods: Dietary intake data were collected from 102 adolescents during a four-week period. Intake was reported via Traqq® during four random (school)days; two days by repeated 2-hour recalls and two days by repeated 4-hour recalls. Reference methods included two 24-hour recalls and a Food Frequency Questionnaire. Traqq®'s usability was evaluated using the System Usability Scale and an evaluation questionnaire about experiences with the repeated short recalls and Traqq® app, followed by 23 in-depth interviews, in a subgroup, further exploring user experiences.
Results: Dietary data were collected from 98 adolescents via Traqq®, with 87 adolescents completing the evaluation questionnaire. The group consisted of 63% girls, with an average age of 15±2 years and a mean BMI of 19.9±3.3 kg/m^2. Traqq® was rated above average, scoring 68/100 on the System Usability Scale. Additionally, 74% preferred the Traqq® recall method over the 24-hour recalls, and 83% favored the Traqq® app over the Food Frequency Questionnaire. In-depth interviews were held with 22% (n=5) boys and 78% (n=18) girls.
Conclusion: This study uniquely combines quantitative and qualitative approaches to evaluate a novel dietary assessment tool for adolescents. The results will be used to refine the Traqq® app to facilitate more accurate and efficient dietary assessment in adolescents.

OS4.3 TESTING OF ACCELEROMETER-BASED ALGORITHMS FOR DETECTION OF EATING EPISODES IN FREE-LIVING YOUNG ADULTS: A FORMATIVE STUDY

Leanne Wang [1], Matthew Ahmadi [1], Raaj Kishore Biswas [1], Nicholas Koemel [1], Anna Rangan [1], Margaret Allman-Farinelli [1], Emmanuel Stamatakis [1]

[1] *University of Sydney*

Introduction: Passive detection of eating episodes (EE) facilitates real-time dietary pattern assessment, eliminating recall/memory bias. Researchers have utilised a range of wearable sensor fusion techniques to detect eating such as accelerometers, gyroscopes, and microphones worn on various locations of the body such as the wrist, neck, temple, jaw and ear. These devices can then trigger less burdensome methods of dietary assessment, such as switching on wearable cameras, ecological momentary assessment prompts, or reminders to take food images. To take advantage of the plethora of available data globally, this study sought to develop a wrist accelerometer-only algorithm for the detection of EE.

Methods: The accelerometer (Axivity AX6) was worn on the dominant hand and set to ±8 g with a sampling rate of 50 Hz. The Clemson cafeteria data set was used to train the algorithm. Participants consumed a main meal in pseudo-free-living settings and videos were simultaneously recorded to determine the ground truth times of eating. Data used to test the algorithm included participants eating and drinking in free-living settings for four days each. Participants self-reported dietary data including times of food and beverage ingestion via the 2016 Australian version of the Automated Self-Administered Dietary Assessment Tool (ASA24) as the ground truth.
Results: Two hundred and seventy-one participants from the training data (131 male; mean age 29±11 years) and 21 different participants from the test data (8 male; 25±10 years) were included. Training data showed sensitivity and precision for detecting bites (food pick-up gesture) of 75% and 89%, respectively. In the test data, AX6 detected a total of 208 (46%) prolonged EE (>15 min) and 246 (54%) short EE (≤15 min). ASA24 captured 175 (48%) main meals and 188 (52%) snacks and beverages. Prolonged EE were compared with main meals and detected with 63% sensitivity and 49% precision. Short EE were compared with snacks and beverages and detected with 45% sensitivity and 33% precision.
Conclusion: Results indicate moderate performance of the accelerometer-only algorithm tested. Further modifications are required for the algorithm to detect eating and drinking occasions in free-living settings with greater accuracy. However, the use of self-report of mealtimes as a reference is limiting. Further training on shorter bouts of eating and drinking, the incorporation of other sensor data, and the use of wearable cameras as ground truth are suggested to improve performance.

OS4.4 ADAPTATION OF THE INDDEX24 APP FOR EVALUATING THE IMPACT OF THE BRAZILIAN SCHOOL FEEDING PROGRAM

Debora Silva [1], Ana Clara Duran [2], Patricia Samofal [2], Adelia Pereira [2], Vanessa Elias [1], Lenine Garmus [1], Thiago Biscouto [1], Giovana Ferreira [1], Sandra Crispim [1]

[1] Federal University of Paraná, [2] State University of Campinas, São Paulo

Introduction: The INDDEX24 app is a dietary assessment tool that operates via the CommCare® platform on tablets or smartphones to conduct individual 24-hour dietary recalls (R24h) using the Multiple Pass Method, originally developed in the United States and administered by the Intake - Center for Dietary Assessment. This presentation aims to present the adaptation of the INDDEX24 app for evaluating the impact of the Brazilian School Feeding Program (ENAE study) on the food consumption of schoolchildren aged 8 to 10 years. The translation and adaptation of the INDDEX24 app for Brazil occurred from February to December 2023.

Methods: These modifications aimed to ensure that interviewers and ENAE participants could fully understand and engage with the R24h. National and local food consumption databases were consulted, and three pilot studies were conducted in three Brazilian cities to evaluate and refine the Brazilian version of the app. Furthermore, 100 R24h from two local surveys with children aged 8 to 10 years were entered into the app to test the food list and measurement methods.
Results: A comprehensive list of foods and beverages consumed in Brazil was developed and incorporated into the INDDEX24 via the Global Food Matters Database, completed during the app's adaptation and pilot tests. This list included 976 generic food items, with around 43% containing descriptors for key details such as food type, preparation method, salt/sugar addition, brand, fat content, and flavor, key descriptors of interest in the survey. As the main study progresses, new foods continue to be added. For portion size estimation, 15,445 quantification options were incorporated, including household measurements, standard units, and photographs tailored to the specific food items. A Manual of Food Portion Quantification for the School Environment was developed, featuring 44 household measurements and 73 food portions, all integrated into INDDEX24. When tests were performed with the R24h, new foods were identified, food description was improved and incorrect quantification measurements were corrected. The development of the Brazilian version required 5.5 person-months, involving five nutritionists experienced in dietary assessment.
Conclusion: Currently, we are assessing the usability of the app in the survey, while actively using it for data collection to gather detailed dietary information from schoolchildren aged 8 to 10 years. Insights from this adaptation will inform future improvements of INDDEX24 for use in Brazil.

OS4.5 JOINT USE OF FOOD SUPPLY, HOUSEHOLD-LEVEL APPARENT INTAKE, AND/OR INDIVIDUAL-LEVEL DIETARY INTAKE DATA: A SCOPING REVIEW

Carolina Batis [1], Sarahi Peña [1], Ana Carolina Ariza [1], Tania Aburto [1], Arlen Calzada [1], Ana Karen Pérez [1], Juan Rivera [1], Ana Moltedo [2], Aydan Selek [2], Pauline Allemand [3], Fernanda Grande [3], Bridget Holmes [3]

[1] National Institute of Public Health, Mexico, [2] Statistics Division, Food and Agriculture Organization of the United Nations, Italy, [3] Food and Nutrition Division, Food and Agriculture Organization of the United Nations

Introduction: Several sources of diet-related data can be used to inform food and nutrition policies, including national-level food supply, household-level consumption and expenditure, and individual-level dietary intake data. In 2023, FAO launched the Food and Diet Domain on FAOSTAT (FDD) to bring together these different data sources in a centralized location. Each type of data has its strengths and limitations, and in many cases, several sources are used together. To compile these experiences and inform users of the FDD, we conducted a scoping

review to examine the extent, range, and nature of prior research jointly using distinct dietary data sources to address questions related to nutrition and agri-food systems policies.
Methods: We followed the PRISMA-ScR guidelines. Searches were conducted in MEDLINE (PubMed), EMBASE, and Web of Science databases. Inclusion criteria were studies describing or documenting the use of at least two different dietary data sources, in English, from any country or publication year. Two independent reviewers screened the articles and conflicts were resolved by a third reviewer.
Results: Sixty scientific manuscripts were included in the review; 43% presented supply data and individual-level dietary intake data, 25% included household apparent and individual-level dietary intake data, 17% used all three data types, and 15% included supply and household apparent intake data. Forty studies included data collected from a single country (from 25 different countries), while 20 studies focused on more than one country. Half of the studies included data from Europe and Central Asia. About 40% of the studies presented some measure of comparison between the data sources (e.g., correlations, differences, % agreement). Food supply data were frequently used to present time trends. Among studies that presented comparable analysis of the three data sources, food groups were more frequently reported than nutrients, with fruits and vegetables most consistently reported.
Conclusion: Many studies lack clear rationale for using several types of diet-related data. Among studies with a clear rationale, a common aim was to compare between types with one of them considered as the standard. This scoping review highlights the wide range of joint uses of different dietary data sources. It provides insights into the scope of each data source and the possibilities for using these in a complementary way.

Oral Session 5
BIOMARKERS AND OMICS
Tuesday, April 29 | 9.45am - 11.00am
Location: Toronto 2
Chair: Edith Feskens

OS5.1 PLASMA ALKYLRESORCINOLS - AN OBJECTIVE BIOMARKER OF GLUTEN INTAKE IN YOUNG CHILDREN

Elin M. Hård Af Segerstad [1], Emelie Ericson-Hallström [2], Anna Bokström [2], Marina Armeni [3], Otto Savolainen [3], Carin Andrén Aronsson [4]

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Introduction: Assessing gluten intake using self-reported dietary assessment methods is costly and associated with the risk of several bias. The use of a biomarker for gluten intake may be beneficial to overcome measurement errors in self-reported dietary data and control adherence to gluten-free (GF) diet in intervention trials. Alkylresorcinols are found in wholegrain wheat and rye and have been validated as a biomarker of wholegrain intake as well as of gluten intake in adults. The study aim was to validate if alkylresorcinol concentrations reflect gluten intake in young children.
Methods: Non-fasting plasma alkylresorcinol concentrations were analyzed by normal-phase ultra-high pressure liquid chromatography-tandem mass spectrometry (UHPLC-MS/MS) in 65 (female n=33, 51%) children at-risk of celiac disease at the age of 18 months in a randomized controlled trial in Sweden. The intervention group was following a GF diet (n=21, 31.3%), while the diet was unrestricted in the control group (n=44, 65.7%). Alkylresorcinol concentrations were validated against simultaneously collected 3-day food records estimating total gluten intake.
Results: Gluten intake in controls was median 5.8 gram (g)/day (Inter quartile range [IQR] 2.8-9.4, max 17.1) compared to 0.0 g/day (IQR 0.0-0.0, max 0.7, $p<0.001$) in the intervention group. Wheat contributed mean 85% (0.1 SD) of gluten consumption in controls. Energy and dietary fiber intakes were similar in the two groups ($p>0.700$). The intervention group had lower alkylresorcinol levels (median 6.6 nmol/L, IQR 3.6-10.4) compared to controls (median 280.9, IQR 121.5-492.2 nmol/L, $p<0.001$). The correlation between alkylresorcinol concentrations and gluten intake was rho=0.685 ($p<0.001$), and with wheat intake rho=0.673 ($p<0.001$). For every g/day increase in gluten, alkylresorcinol concentrations increased by 12.6 % (95% confidence interval 3.9-22.1, $p=0.005$). There was a moderate agreement of alkylresorcinol concentration with gluten intake (quartile 1: 100%, quartile 4: 68.8%, gross misclassification: 6.4%, Cohens K=0.427, $p<0.001$).

Conclusion: Alkylresorcinol concentrations increased with gluten intake in young non-fasting children. The findings suggest that alkylresorcinol concentrations may be a useful biomarker to estimate and rank children's gluten intake in research or clinical settings.

OS5.2 SELF-REPORTED VS BIOMARKER-BASED TOTAL SUGARS INTAKE: MISREPORTING TOTAL SUGARS IN THE "STUDY OF LATINOS: NUTRITION AND PHYSICAL ACTIVITY ASSESSMENT STUDY (SOLNAS)"

Natasha Tasevska [1], Laurence Freedman [2], Douglas Midthune [3], Brian Barrett [4], Sprio Razis [5], Victor Kipnis [3], Robert Kaplan [6], Diane O'brien [7], Yikyung Park [8], Jeannette Beasley [9], Linda Van Horn [10], Martha Daviglus [11], Daniela Sotres-Alvarez [12], Yasmin Mossavar-Rahmani [6]

[1] Arizona State University, [2] Gertner Institute for Epidemiology, Israel, [3] National Cancer Institute, [4] Information Management Services, Inc., USA, [5] Information Management Systems, Inc., USA, [6] Albert Einstein College of Medicine, [7] University of Alaska at Fairbanks, [8] Washington University in St. Louis, [9] New York University, [10] Northwestern University, [11] University of Illinois Chicago, [12] University of North Carolina at Chapel Hill

Introduction: Measurement error (ME) in self-reported intake often leads to a significant attenuation in diet-disease associations. The Hispanic/Latino population in the US bears a disproportionate burden of diet-related chronic diseases. To study ME in this population, we apply the recently developed biomarker equation for 24-h urinary sucrose and fructose biomarker (24uSF) for total sugars (TS) to generate biomarker-based intake in the SOLNAS.
Methods: 478 men and women aged 18-74 years of Central American, Cuban, Dominican, Mexican, Puerto Rican, and South American origin living in four US communities participated in SOLNAS. All participants completed two 24-h recalls (24HR) and collected one 24-h urine for measurement of 24uSF using liquid chromatography-mass spectrometry. Doubly-labeled water (DLW) was administered once to estimate energy intake. All measures were repeated 6 months later in a reliability sub-sample (n=98). We report Pearson correlation for log 24HR vs. log biomarker-based TS intake, and attenuation factor (AF) and correlation with true intake for 24HR estimated from a sex, age and BMI-adjusted ME model.
Results: In this preliminary analysis, 24uSF biomarker-based TS intake (g/1000 $kcal_{DLW}$) was 72.5 (SE = 2.9) and 65.3 (SE= 5.5), in the main and reliability study, respectively, compared to self-reported TS (g/1000 kcal) of 49.9 (SE=1.3) and 50.6 (SE=1.2) from the two recalls in the main, and 50.4 (SE=2.6) and 52.3 (SE=2.8) in the reliability study. In the main study, biomarker-based TS density was weakly correlated with TS measured on the 24HR taken within a few days of biomarker collection (r=0.14; p=0.003), and no correlation was found for the 24HR taken 3 or 6 months before (r=0.03; p=0.54). In the reliability study, we observed similar patterns with somewhat stronger correlations; r=0.39 (p=0.0004) for the

24HR administered close to the urine collection, and r=0.22 (p=0.05) for the farther 24HR. Based on our ME model, we observed an AF for the 24HR (0.11; p=0.04) that would lead to serious risk attenuation and a weak correlation between 24HR and true TS density intake (0.11; p= 0.04). **Conclusion:** In this Hispanic/Latino population, we observed major misreporting of TS intake. Further investigation is needed to study the underlying structure of ME in 24HR-based TS and its determinants, and to identify approaches for revealing true disease risk related to TS intake in this underserved population.

OS5.3 THE CARBON ISOTOPE RATIO OF ALANINE AS A BIOMARKER OF ADDED SUGARS OR SUGAR-SWEETENED BEVERAGE INTAKE: A POOLED ANALYSIS OF FOUR STUDIES

Jessica Johnson [1], Sambit Ghosh [1], Pamela Shaw [2], Marian Neuhouser [3], Johanna Lampe [3], Lesley Tinker [3], Ross Prentice [3], Natasha Tasevska [4], Laurence Freedman [5], Bert Boyer [6], Scarlett Hopkins [6], Susanne Votruba [7], Jonathan Krakoff [7], Diane O'brien [1]

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Introduction: The alanine carbon isotope ratio (Ala CIR) has been positively associated with added sugars (AS) and/or sugar-sweetened beverage (SSB) intake in multiple studies from the USA. However, the strength of association has varied, for AS, or not been assessed, for SSBs, due to low intake in certain studies. The Ala CIR has also been associated with protein source, expressed as the animal protein ratio (APR, the ratio of animal to total protein), in certain studies. We pooled biomarker and dietary data from four independent studies to examine Ala CIR responses to AS or SSB intake and APR in a larger sample and across wider distributions of both intakes.
Methods: We pooled individual-level data from four published studies conducted in the USA (pooled n=346). These included a cross-sectional study of Alaska Native men and women (n=62), a 12-wk randomized controlled feeding study in men (n=32), a 2-wk habitual intake controlled feeding study in postmenopausal women (n=153), and a 15-d habitual intake controlled feeding study of men and women (n=99). We harmonized dietary variables and used new Ala CIR measures for two studies to keep sample types (plasma or serum) and methods consistent across studies. We determined Pearson correlations (95% CIs) between Ala CIR and intakes in the pooled sample. We performed multiple regression of Ala CIR on dietary intakes to determine the simultaneous effects of AS (g/d) or SSBs (servings/d) and APR. We included study as a fixed effect and study by intake interactions to allow for heterogeneity among studies. We used heteroskedasticity consistent standard errors and visualized models with interaction plots.

Results: There were positive correlations between Ala CIR and AS intake [r=0.54 (0.46, 0.61)], log-transformed SSB intake [r=0.63 (0.56, 0.69)], and APR [r=0.32 (0.22, 0.41)]. The partial correlations after adjusting for APR were r=0.57 (0.50, 0.64) for AS and r=0.65 (0.59, 0.71) for SSBs. In models of Ala CIR including both AS or SSB (adjusted R^2 = 0.62 for both models) and APR, there were positive associations with AS and SSB across all studies. Interaction plots showed that these positive associations remain consistent across varying levels of APR (-1 SD, mean, +1 SD).
Conclusion: The Ala CIR is sensitive to AS and SSB intake in study populations with diverse background diets. Depending on the population and application, the effect of APR on Ala CIR should be accounted for via additional biomarkers.

OS5.4 FOLATE STATUS IN THE UK – RED BLOOD CELL FOLATE DATA FROM UK NATIONAL DIET AND NUTRITION SURVEY (NDNS)

Kerry Jones [1], David Collins [1], Sarah Meadows [1], Albert Koulman [1], Polly Page [1]

[1] *University of Cambridge*

Introduction: Folate (vitamin B9) is essential for healthy growth and development. Folate deficiency can manifest as anaemia, and in pregnancy, is associated with a greater risk of neural tube defects (NTD). In the UK, folate status is measured as part of the National Diet and Nutrition Survey, a government-funded, population-representative, rolling cross-sectional survey of dietary and nutritional intake and status. Whilst currently there is no mandatory folic acid fortification, a programme to fortify non-wholemeal wheat flour is approved and awaiting implementation.
Methods: Venous blood specimens were collected from 5,395 adults and children aged >1.5 years between 2008 and 2019. RBC folate was calculated from whole blood folate measured using the microbiological method, haematocrit measured as part of a complete blood count, and serum folate measured by liquid chromatography tandem mass spectrometry. Data were weighted for sample selection and participant response and are therefore representative of the UK population. Multiple linear regression was used to investigate associations between folate concentration and status and participant and demographic characteristics.
Results: In the most recent set of results (2016 to 2019), the prevalence of folate deficiency (RBC folate <305 nmol/L) was 4% in younger children (4 to 10 y), 17 % in older children (11 to 18 y), 13% in adults aged 19 to 64 y, and 11% in older adults aged 65+ y. The proportion of women of reproductive age (WRA) below the cut-off for increased risk of NTD (RBC folate <748 nmol/L) was 89%. RBC folate concentration declined by around 3% per year in all groups between 2008 and 2019. Not smoking and higher income was associated with lower prevalence of folate deficiency.

Conclusion: The proportion of people with folate deficiency and the high proportion of WRA with RBC folate concentration below the NTD-risk cut-off is a concern. Continued monitoring of folate status in the UK is essential to determine the impact of the planned national folic acid fortification of non-wholemeal flour, especially for WRA.

OS5.5 ACCOUNTING FOR PROXIMAL AND HABITUAL DIETARY INTAKE IN DIET-MICROBIOME RESEARCH

Nicole Simm [1], Georgina Williams [1], Emily Hoedt [1], Shandelle Caban [1], Katie Tooley [2], Rosa Peterson [2], Kurt Mudie [2], Gene Tyson [3], Peter Sternes [3], Simon Keely [1], Nicholas Talley [4], Kerith Duncanson [1]

[1] University of Newcastle, [2] Defence Science and Technology Group, Department of Defence, Australia, [3] Centre for Microbiome Research, Queensland University of Technology, [4] NHMRC Centre for Research Excellence in Digestive Health, University of Newcastle

Introduction: Dietary intake of microbiome-accessible and digestible food components can modulate gut microbiome composition and function. Common dietary collection methods include food frequency questionnaires (FFQ) to assess 'habitual' intake, and food recalls to capture intake 'proximal' to sampling of microbiota. There is limited research on how choice of dietary collection methods affects diet-microbiome research findings. This study aimed to investigate the overlap in diet-microbiome associations between habitual and proximal dietary intake and propose a method to factor in both measures. It was hypothesised that diet-microbiome associations would be unique to the dietary collection method used.
Methods: Military trainees (n=35), and non-military junior doctors (n=21) were tracked across six timepoints over their respective 10-month training programmes. Participants provided self-reported dietary intake for 24 hours proximal to stool sampling. Habitual intake was measured with the Comprehensive Nutrition Assessment Questionnaire at baseline and 10-months. A 'proportional' value was calculated to quantify proximal intake as a percentage of habitual intake. Stool samples were collected for metagenomic shotgun sequencing and annotated against the Microba Life Sciences platform. MaAsLin2 identified linear associations between nutrients and microbial species relative abundance, controlling for energy intake, BMI, cohort, sex, and individual variation with repeated measures.
Results: Thirty nutrients were common to both dietary assessment methods. Significant species associations were found with nutrients measured by FFQ (n=126), 24-hr recall (n=79) and proportional values (n=57). Only three associations were shared between habitual and proximal measures. Microbial associations were most aligned with proximal intake of fibre and calcium, and habitual intake of fat, and sugar. Results from proportional nutrient intake aligned closer to proximal measures, but were unable to capture the range of associations from individual methods.

Conclusion: Unique species associations were identified using habitual or proximal values, with minimal overlap. This suggests both proximal and habitual dietary intake are relevant to microbiota, and both should be captured in research to comprehensively identify diet-microbe interactions. Further research is needed to develop and validate microbiome-relevant dietary collection methods to incorporate both habitual and proximal dietary intake.

Oral Session 6

USUAL INTAKE MODELING AND ESTIMATION

Tuesday, April 29 | 9.45am - 11.00am

Location: Toronto 3

Chair: Sharon Kirkpatrick

OS6.1 EXAMINING IMPROVEMENTS FOR AGE-DEPENDENT HABITUAL INTAKE MODELLING

Laurens Bogaardt [1], Jeroen Rodenburg [1], Marga Ocke [1], Janneke Verkaik-Kloosterman [1], Arnold Dekkers [1]

[1] National Institute for Public Health and the Environment (RIVM), Netherlands

Introduction: In national food consumption surveys, habitual dietary intake is often assessed using two non-consecutive 24-h diet recalls in combination with statistical modelling to eliminate within-person variation in intake. The Statistical Program to Assess habitual Dietary Exposure (SPADE) performs the habitual intake modelling as a function of age to make full use of the available data. However, empirical observations of some habitual intake distributions for subgroups of age were broader than theoretically expected, leading us to question the currently modelled age-dependency. The aim of this study was to explore how this aspect of SPADE can be enhanced.
Methods: Starting from the same theoretic model, different smoothing functions for the age-dependency of the model's parameters were explored. The model includes four parameters related to the skewness in the nutrient distribution, its average intake, its variance, and the proportion of this variance that is habitual. This resulted in seven functions that were tested on 14 daily consumed components from the Dutch national food consumption survey 2012-2016 including 4,313 participants aged 1-79 years. Various performance metrics were assessed, including the log likelihood, the out of sample deviance, the amount of shrinkage, and the computation time. These were averaged over the dietary components.

Results: Three functions gave similar and good performance and can be considered improvements of SPADE. The three functions not only allowed average intake but also its variance to vary over age.In one function, the proportion of the variance which is habitual was also a flexible function of age. The appropriate amount of flexibility was determined automatically by these functions using p-splines and cross-validation. Applying these three functions on the available data for 14 components gave habitual intake distributions which were consistent with the distributions for subgroups of age and the theoretically expected shrinkage.
Conclusion: Given the nature of dietary intake data, habitual intake modelling over a broad age range should also allow flexibility in the variance of intake, next to its average intake.

OS6.2 COMING UP SHORT: NUMBER OF DAYS OF DIETARY DATA NEEDED TO ASSESS TOTAL DAILY ENERGY INTAKE IN PREGNANT INDIVIDUALS

James Pleuss [1], Samantha Kleinberg [1], Andrea Deierlein [2]

[1] Stevens Institute of Technology, [2] New York University School of Global Public Health

Introduction: Nutrition studies commonly use a few days of 24-hour recalls or food logs to characterize individual diet. While minimizing the number of days assessed reduces participant burden, it raises questions as to how many days are needed to accurately characterize individual dietary intake during pregnancy.
Methods: Pregnant individuals were recruited from a New York City health system for the Temporal Research in Eating, Nutrition, and Diet during Pregnancy (TREND-P) study. Each participant provided dietary data during two 14-day rounds during the 2nd trimester of pregnancy using a mobile phone and custom app to log before/after photos of all eating occasions. We focus here on energy intake, examining how many days of data are needed to estimate mean total daily energy intake (TDEI). We bootstrapped each individual's days of energy intake to create a 95% confidence interval (CI) around the individual's true mean TDEI. We then resampled k days of dietary intake 2,000 times for each individual for k = 2 through the full 28 days of collection. The proportion of resampled days that lie within the confidence interval represents how often we can expect the mean of a k-day sample to be near the individual's true mean. We resampled each of the 150 participants in the TREND-P study to establish the proportion of individuals who meet each threshold.
Results: The required number of dietary days is based on two parameters: t, the threshold of the proportion of sampled means within the 95% CI; and p, the proportion of participants who met the threshold t. We present how p changes across potential cutoff points for t with number of days of intake, n. Notably, 59% more participants meet the t=0.8 threshold when increasing from 8 to 9 days of data.

Conclusion: Our results suggest that studies rarely collect enough daily dietary data to make confident claims about the mean TDEI during pregnancy. While similar analyses have been conducted for the general population, this is the first such work applied to pregnancy, an under-researched stage of life, and a time with significant dietary changes.

OS6.3 OVERCOMING THE CHALLENGES OF HABITUAL VITAMIN A INTAKE ESTIMATION

Marjolein De Jong [1], Jeroen Rodenburg [1], Arnold Dekkers [1], Alida Melse-Boonstra [2], Marianne Geleijnse [2], Janneke Verkaik-Kloosterman [1]

[1] National Institute for Public Health and the Environment (RIVM), Netherlands, [2] Wageningen University

Introduction: Liver consumption causes extreme, but realistic retinol (vitamin A) intakes. In Dutch National Food Consumption Surveys (DNFCS), liver consumption is rare and episodic. When modeling habitual vitamin A intake with Statistical Program to Assess Dietary Exposure (SPADE) based on the survey data, this rare and episodic consumption is problematic as the model checks showed that some model assumptions were not satisfied. This study aimed to improve habitual retinol modeling by exploring the use of the multipart model instead of the 1-part model SPADE.
Methods: Repeated 24h recall data from three DNFCS were used (2007-2010, 2012-2016 and 2019-2021). Habitual retinol intakes of men and women were modeled separately using the 1- and multipart models of SPADE. With the multipart model, the retinol intake was divided in several sources for which the habitual intake was estimated separately and thereafter combined to get the total retinol intake distribution. Performance of the models was checked, e.g., with visual inspection on normality of the Q-Q plots of the residuals and a low relative difference between the observed mean and the habitual mean intake. Further, habitual intake distributions and proportions above Upper Level (UL) were compared between the SPADE 1-part model and the multipart model.
Results: With the 1-part model the Q-Q plots of residuals showed an S-curve and there was large difference between mean observed and mean habitual intake. Both improved by using a multipart model. Habitual intake distributions calculated with the 1-part model and multipart model were comparable between the 25-90th percentiles. At the lower (<25) as well as higher percentiles (>90) the estimated habitual retinol intake was higher with a multipart model compared to a 1-part model; differences were seen up to 53%-point. The proportion above UL was slightly higher for multipart model.

Conclusion: We showed that a multi-part model improves the habitual retinol intake modeling diagnostics and alters the estimated intake distribution, especially at lower and higher percentiles. This method may also be a solution for other specific foods with high nutrient content, e.g., selenium in paranuts. Although in our case the effect on proportion above UL was limited, this may be different for other countries or nutrients. We recommend ensuring sufficient data on intake of rare foods that are extremely high in nutrient content to accurately estimate habitual intake distributions.

OS6.4 CHRONONUTRITION BEHAVIORS IN RELATION TO DIET QUALITY AND ADIPOSITY MEASURES: DO DIETARY ASSESSMENT METHODS AND ENERGY INTAKE MISREPORTING MATTER?

Kentaro Murakami [1], Nana Shinozaki [1], Tracy McCaffrey [2], Barbara Livingstone [3], Shizuko Masayasu [4], Satoshi Sasaki [1]

[1] University of Tokyo, [2] Monash University, [3] Ulster University, [4] Ikurien-naka

Introduction: Inconsistent epidemiologic findings on the associations of chrononutrition behaviors with diet quality and adiposity measures may be due to the use of different dietary assessment methodologies and a lack of consideration of dietary misreporting. We aimed to investigate the associations by using either questionnaires or diaries, with adjustment for energy intake (EI) misreporting.
Methods: This cross-sectional study included 1047 Japanese adults aged 20–69 y. We used the Chrono-Nutrition Behavior Questionnaire (CNBQ) or 11-d diaries to assess chrononutrition behaviors (meal frequency, snack frequency, total eating frequency, timing of first eating occasion, timing of last eating occasion, duration of eating window, and eating midpoint) for workdays and free days separately. Eating jetlag was defined as the eating midpoint difference between workdays and free days. Diet quality was assessed using the Healthy Eating Index-2020, based on the Meal-based Diet History Questionnaire (MDHQ) or 4-d weighed food diaries. General obesity and abdominal obesity were defined using body mass index (≥25 kg/m^2) and waist circumference (≥90 cm for males; ≥80 cm for females), respectively.
Results: Using questionnaire data (CNBQ and MDHQ), we found inverse associations of snack and total eating frequencies, timing of last eating occasion, eating midpoint, and eating jetlag with diet quality ($P < 0.05$), irrespective of adjustment for EI misreporting. We found positive associations of meal, snack, and total eating frequencies and duration of eating window with the prevalence of general obesity, abdominal obesity, or both; many of these associations were only evident ($P < 0.05$) after adjustment for EI misreporting. Conversely, using diary data, we found no associations between chrononutrition behaviors and diet quality, general obesity, or abdominal obesity, regardless of adjustment

for EI misreporting (except for inverse associations of timings of first and last eating occasions and eating midpoint on workdays with diet quality).
Conclusion: The associations of chrononutrition behaviors with diet quality and obesity differed considerably between the questionnaire- and diary-based analyses. Adjustment for EI misreporting radically changed only the associations with obesity in the questionnaire-based analysis. These findings suggest the importance of careful consideration of dietary assessment method selection and EI misreporting in chrononutrition research.

OS6.5 LOW-ENERGY REPORTERS: WHO ARE THEY? WHAT DO THEY EAT? HOW DO THEY MOVE? FINDINGS FROM THE GUYACONSO PROJECT

Edwige Landais [1], Paphaël Pelloquin [1], Sophie Manuel [1], Sarah Amiri [1], Astrid Van Melle [2], Célia Basurko [2], Yves Martin-Prével [1]

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Introduction: Misreporting and more particularly low-energy reporting is always a challenge in dietary surveys. Investigating Low Energy Reporters (LERs) characteristics is key to decide if these individuals should be excluded from analyses or how to account for their characteristics. The aim of the present study was to describe LERs in terms of socio demographic and anthropometric characteristics, morbidity and several lifestyle behaviours such as diet, physical activity level (PAL) and sedentarity.
Methods: Cross-sectional survey data were collected in 2022-2023 from 1532 adults (15y and over) living on the coast of French Guiana. The questionnaire was administered at participants' home by trained enumerators. Dietary data were collected through 24-hours dietary recalls, from which 13 FAO food groups were computed. LERs were identified using the Goldberg cut-off. PAL and sedentarity were assessed using the Global-Physical Activity Questionnaire. Participants' height and weight were measured to calculate BMI. Logistic regression models were used to assess the odds of being classified as a LER and linear regression models (adjusted on energy intake) to compare the amount of food consumed for each of the 13 FAO food groups between LERs and non-LERs.
Results: LERs represented 54.2% of the sample. There were higher odds of being classified as LER in participants born in Haiti (OR=1.55; [1.03-2.35]), with higher BMI (OR=2.54; [1.90-3.40]), having hypertension (OR=1.37; [1.07-1.75]), having a low level of PAL (OR=2.13; [1.63-2.79]) and skipping breakfast (OR=1.64; [1.17-2.30]) or dinner (OR=1.93; [1.15-3.24]). Conversely, eating out of home was negatively associated with being a LER (OR=0.59; [0.46-0.75]).

Compared to non-LERs, LERs significantly consumed lower quantities of dairy products (-20.3g/day; p<0.01), non-vitamin A rich fruits (-25.9g/day, p<0.05) and sweet foods (-12.4g/day; p<0.01), but higher quantities of meat/poultry/fish (+28.4g/day; p<0.001).
Conclusion: As reported in the literature, low-energy reporting was not randomly distributed in our sample and LERs exhibited specific profiles that might bias the results of any subsequent analysis if they were excluded. In addition, if we did so, the diversity of identified characteristics associated to low-energy reporting would make them quite challenging to account for in analyses. Finally, our results add to the evidence that not excluding LERs is preferable than trying to account for their exclusion.

Oral Session 7
INTEGRATING DIET QUALITY AND ENVIRONMENTAL SUSTAINABILITY
Tuesday, April 29 | 9.45am - 11.00am
Location: Varley
Chair: Benoît Lamarche

OS7.1 IS THE DIETARY QUALITY INDEX OF THE DIETARY GUIDELINES FOR THE BRAZILIAN POPULATION ASSOCIATED WITH ENVIRONMENTAL FOOTPRINTS?

Thays Souza [1], Camille Lassale [2], Maria Laura Louzada [3]

[1] School of Public Health, University of São Paulo, [2] Barcelona Institute for Global Health, [3] University of Sao Paulo

Introduction: The Dietary Quality Index of the Dietary Guidelines for the Brazilian Population (DQIBr) measures the adherence to the Brazilian Dietary Guidelines for the Brazilian Population. The Brazilian Guidelines promote both a healthy and sustainable diet. This study aims to assess the association between the DQIBr and environmental footprints.
Methods: Data from 26,370 participants from the web-based NutriNet-Brasil Cohort Study, who completed at least one of three dietary 24h recalls were used. The tool used for dietary data collection, NOVA24h, specifically collects information on food processing. The DQIBr includes 10 components and ranges from 0 to 100 points: legumes (0 – 15), fruits (0 –10), vegetables (0 – 10), variety (0 – 5), eggs, fish, milk, and poultry (0 – 5), red meat (0 – 5), processed foods (0 – 5), table sugar (0 – 2.5), table salt (0 – 2.5), and ultra-processed foods (0 - 40). Higher scores indicate greater adherence to the DGBP. Environmental footprints were estimated using the "Environmental Footprints of Food and Culinary Preparations Consumed in Brazil" database.

The average of greenhouse gas emissions (GHGE) and water footprint for each food item consumed was summed for each participant to get a total GHGE (CO2 equivalent) and water footprint (Litres) per day, adjusted for energy intake (1,000 kcal). We calculated means and SD of the environmental footprint indicators across quintiles of the DQIBr. Crude and multivariable (adjusted for age, gender, asset score, region of the country, and education) linear regression models were used to assess the association between the DQIBr total score (outcome) and carbon and water footprints (exposures).
Results: The average of footprints decreased across quintiles of DQIBr: for GHGE, from 2,245.8 in the first quintile to 2,023.0 gCO_2eq per 1,000 kcal/day in the last quintile and for water, from 2,055.5 to 1,737.5 L per 1,000 kcal/day. Adjusted analyses showed that an increase in ten points of the DQIBr total score was associated with a decrease of 72.7 gCO_2eq/1,000 kcal and 93.4 L/1,000 kcal of water footprints.
Conclusion: We found that a greater adherence to Dietary Guidelines for the Brazilian Population is associated with more favourable environmental footprints.

OS7.2 DIETARY PATTERNS CONSISTENT WITH THE 2019 CANADA'S FOOD GUIDE RECOMMENDATIONS ON HEALTHY FOOD CHOICES HAVE LOWER GREENHOUSE GAS EMISSIONS: RESULTS FROM THE NUTRIQUÉBEC PROJECT

Gabrielle Rochefort [1], Marianne Rochette [1], Catherine Laramée [1], Iris Gigleux [1], Véronique Provencher [1], Benoît Lamarche [1]

[1] *Université Laval*

Introduction: The deleterious impacts of food production and consumption on the planet's ecosystems highlight the need for governments to promote environmental sustainability as part of healthy dietary guidelines. The objective of this study was to assess the carbon footprint associated with a greater adherence to the 2019 Canada's Food Guide (2019-CFG).
Methods: Dietary intakes of 4694 adults from the prospective web-based NutriQuébec cohort were assessed on one to three occasions within a 30-day period using a validated web-based 24-hour recall. The database of Food Impacts on the Environment for Linking to Diets was used to derive estimates of greenhouse gas emissions (GHGE) from foods and beverages reported in NutriQuébec. The boundaries for GHGE estimates were primarily from cradle-to-farm gate, and for some processed foods, from cradle-to-processing gate. The Healthy Eating Food Index-2019 (HEFI-2019) was used to calculate the adherence to the 2019-CFG.

Associations between GHGE and HEFI-2019 scores were evaluated using linear regression models with restricted cubic splines.
Results: Mean HEFI-2019 score and dietary GHGE in the sample were 50.6/80 pts (95% CI, 50.2 to 51.0) and 3.6 kg carbon dioxide-equivalents (CO2eq) per person per day (95% CI, 3.5 to 3.7). A higher HEFI-2019 score (75th vs. 25th percentiles of score distribution) was associated with lower GHGE of 0.5 kg CO2eq (95% CI, -0.7 to -0.3) when adjusted for energy intake. Higher scores for the following components of the HEFI-2019 were associated with lower GHGE: Vegetables and fruits (-0.3 kg CO2eq, 95%CI, -0.5 to -0.2), Whole-grain foods (-0.6 kg CO2eq, 95%CI, -0.7 to -0.4), Grain foods ratio (-0.5 kg CO2eq, 95%CI, -0.6 to -0.3), Plant-based protein foods (-0.9 kg CO2eq, 95%CI, -1.1 to -0.8), Fatty acids ratio (-0.5 kg CO2eq, 95%CI, -0.7 to -0.3), and Saturated fats (-0.7 kg CO2eq, 95%CI, -0.9 to -0.6).
Conclusion: Results suggest that a greater adherence to recommendations on healthy food choices in the 2019-CFG, independent of energy intake, is associated with a lower individual carbon footprint. This highlights the compatibility of Canada's dietary guidelines with environmental sustainability.

OS7.3 TRANSITIONING TO DIETS ADHERING TO THE NEW NORDIC NUTRITION RECOMMENDATIONS (NNR2023): NUTRIENT ADEQUACY AND ENVIRONMENTAL IMPACTS

Maijaliisa Erkkola [1], Henna Peltonen [1], Niina Kaartinen [2], Heli Tapanainen [2], Venla Kyttä [3], Merja Saarinen [3], Satu Männistö [2], Liisa Korkalo [1], Jelena Meinilä [1]

[1] University of Helsinki, [2] Finnish Institute for Health and Welfare, [3] Natural Resources Institute Finland

Introduction: The Nordic countries envision becoming the world's most sustainable region by 2030, using NNR2023 with integrated environmental sustainability as one of the key tools. NNR2023 updates dietary reference values for 36 nutrients and expands food-based dietary guidelines (FBDG) to 17 food groups, providing the scientific foundation for national nutrition recommendations in Nordic and Baltic countries. Our study examined how adherence to NNR2023-recommended diets, adapted to the Finnish food environment, impacts both nutrient adequacy and environmental outcomes.
Methods: We developed NNR2023-compliant reference diets for men (10 MJ), women (8 MJ), and children (4.6 MJ for 1–3-year-olds, 6.3 MJ for 4–6-year-olds). Food group quantities were based on NNR2023 recommendations or estimated from national dietary surveys when no recommended amount was given. Two scenarios, 'Nearest to Present' and 'Environment Friendly,' were created to represent different extremes of recommended consumption ranges. Nutrient contents were calculated using the national food composition database, assessing compliance with average requirement (AR), recommended intake (RI), and upper intake limit (UL) for 38 nutrients.

Environmental impacts (GHGE, land use, biodiversity) were determined using the FoodMin model after converting food items to ingredients.
Results: All NNR2023-adherent diets improved fat quality and increased fibre intake in both adults and children, ensuring adequate nutrient intakes with few exceptions. When transitioning to the most environmentally friendly diet, women's diets required attention to vitamin B12, calcium, and riboflavin intake. Children's diets met most micronutrient requirements, with vitamin D being the notable exception. Moderating milk consumption highlighted the need for fortified plant-based alternatives. Adherence to NNR2023 reduced the climate impact of the average Finnish diet by over a third. In the reference diets, GHGE decreased in proportion to red meat reduction. Notably, poultry consumption emerged as a significant factor affecting biodiversity impact.
Conclusion: NNR2023 adherence generally ensures sufficient nutrient intake for adults and children while significantly reducing climate and biodiversity impacts. If successfully implemented, NNR2023 will be a valuable evidence-based tool when moving towards more sustainable food systems in Nordic and Baltic countries.

OS7.4 DO EAT-LANCET-BASED INDICES REFLECT DIETARY HEALTHINESS AND SUSTAINABILITY EQUALLY? A COMPARISON OF MEASUREMENT PERFORMANCE

Agustin Miranda [1], Florent Vieux [2], Matthieu Maillot [2], Eric Verger [1]

[1] French National Research Institute for Sustainable Development, [2] MS-Nutrition

Introduction: Measuring adherence to EAT-Lancet recommendations for healthy and sustainable diets is challenging, leading to diverse methods and a lack of consensus on standardized metrics. Available indices vary mainly in scoring systems, food components, units, energy adjustments, and cut-off points. The aim was to evaluate and compare the measurement performance of six dietary indices for assessing adherence to the EAT-Lancet reference diet.
Methods: Food consumption data for 1,723 adults were obtained from the Third French Individual and National Food Consumption Survey (INCA3). The six indices studied were: World Index for Sustainability and Health (WISH), Planetary Health Diet Index (PHDI), EAT-Lancet Diet Index (ELDI), EAT-Lancet Index (ELI), Healthy and Sustainable Diet Index (HSDI), and EAT-Lancet Diet Score (ELDS). The validity and reliability of these indices were assessed using sociodemographic data, nutritional measures (nutrient adequacy and diet quality), and environmental data (14 indicators of environmental pressure), with a statistical significance level of 0.05.

Results: The analysis revealed that the four indices assessing food components with quantitative scoring (WISH, PHDI, ELDI, ELI) captured dietary variability, were less dependent on energy intake, and converged to a large extent with nutritional indicators. While the two indices based on binary scoring systems (HSDI, ELDS) showed a stronger correlation with environmental indicators, one quantitative index (ELDI) converged with both domains. Indices had valid unidimensional structures, supporting the use of total scores. Also, indices differed between sociodemographic groups, demonstrating concurrent-criterion validity. Higher scores were associated with higher nutritional quality and lower environmental impact, but with unfavorable results for zinc intake, vitamin B12, and water use. A low concordance rate (from 32% to 43%) indicated that indices categorized individuals differently.
Conclusion: Researchers should select indices that align with their study objectives, considering the indices' applicability and assumptions. Quantitative indices provide a detailed view of dietary health and sustainability, useful for clinical and epidemiological research, while binary indices offer a simplified approach, ideal for surveys and public health/environmental evaluations. Understanding the strengths and limitations of each type of index is essential for a thorough evaluation of dietary impacts.

OS7.5 CLIMATE-SMART FOOD AND NUTRITION RESEARCH INFRASTRUCTURE (FOODNUTRI): AN EXAMPLE OF A JOINT EFFORT TO FOSTER SUSTAINABLE FOOD SYSTEMS AND DIETS

Niina Kaartinen [1], Marjukka Kolehmainen [2], Baoru Yang [3], Elina Säde [4], Mari Sandell [4], Merja Saarinen [5], Nesli Sözer [6], Marina Heinonen [4]

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Introduction: We are facing critical challenges concerning 1) food security and safety, 2) resource efficiency, 3) environmental deterioration, primarily climate change, biodiversity loss, and pollution of freshwater resources, and 4) access to nutritious food for all. The transition to sustainable food systems and diets is seen as a fundament to mitigate the challenges.
Aim: FOODNUTRI aims to maintain Finnish food availability and security during the changing climate and global politics, reduce the environmental burden of the food system and promote consumer acceptance of healthy and sustainable diets. To reach these goals an efficient research infrastructure (RI) facilitating both national and international research activities and active stakeholder collaboration is indispensable.
Methods: Altogether 12 partners including Finnish universities, research institutes and universities of applied sciences joined forces and

developed FOODNUTRI - a shared RI composing of seven knowledge-based platforms to provide facilities and expertise to study food characteristics, food safety, physiological responses to food, consumer acceptance, food consumption and nutrient intake of populations and environmental and health impacts.
Results: Currently, FOODNUTRI is in the stage of planning & construction and has received funding from the Research Council of Finland for 2020-2024. It is identified among the most viable national RIs and is well in line with the global strategic goals included in the UN's AGENDA 2030 and EU's FOOD 2030 policy.
Conclusion: FOODNUTRI serves as an example of a joint national effort to address critical challenges to population and planetary health and food system renewal. Through its capacity-building activities FOODNUTRI will not only strengthen food and nutrition science but have societal impact beyond the scientific community. The unique collaborative RI will play a significant role in renewal of food value chains, introduction of new sustainable food ingredients, green-processing technologies, promotion of resource sufficiency and food security to facilitate the shift towards sustainable plant-based diets across sociodemographic groups.

Oral Session 8
DIET QUALITY, FOOD COSTS, AND FOOD INSECURITY
Wednesday, April 30 | 9.45am - 10.45am
Location: Toronto 1
Chair: Sandra Crispim

OS8.1 AREA-LEVEL MATERIAL DEPRIVATION IS ASSOCIATED WITH LOWER DIET QUALITY IN THE NUTRIQUÉBEC PROJECT

Marianne Rochette [1], Gabrielle Rochefort [1], Iris Gigleux [1], Anne-Sophie Neyron [1], Catherine Laramée [1], Annie Lapointe [1], Simone Lemieux [1], Sophie Desroches [1], Ariane Bélanger-Gravel [1], Élise Carbonneau [1], Benoît Lamarche [1]

[1] *Université Laval*

Introduction: To inform future diet-focused public health policies, quantifying how neighborhood deprivation is associated with diet quality is essential. The present study aimed to assess relationships between social and material area-level deprivation and diet quality, accounting for other individual determinants of overall diet quality.

Methods: This cross-sectional study used data from 4430 participants of the NutriQuébec project. Area-level deprivation was computed from postal codes and derived from Québec's dissemination areas provided by Statistics Canada. Dissemination areas were classified into material and social deprivation quintiles. Material deprivation represents the deprivation of goods and conveniences, and social deprivation reflects poor social network within dissemination areas. Dietary intakes were assessed using a validated web-based 24h recall tool (R24W) completed one to three times by all participants. Diet quality was estimated using the Healthy Eating Food Index (HEFI-2019, scored on 80 points), which measures alignment of dietary patterns with the 2019 Canada's Food Guide recommendations on healthy food choices. Linear regression models were used to evaluate the relationships between area-level deprivation quintiles and HEFI-2019 scores (mean differences between quintiles and 95% CI). Sex, age, household income, and education level were further added as individual-level covariates in the model.
Results: HEFI-2019 scores were lower in the most deprived quintile compared to the least deprived quintile of material deprivation (-3.8 points, 95% CI: -4,9, -2.6). After adjustment for individual-level covariates, the relationship remained significant (Q5 vs Q1 difference -1.8 points, 95% CI: -2.9, -0.6). HEFI-2019 scores were also lower in the most deprived quintile compared to the least deprived quintile of social deprivation (-1.1 points, 95% CI: -2.1, -0.1) but this difference was greatly attenuated after adjustment for covariates (-0.0 points, 95% CI: -1.1, 1.0).
Conclusion: These results suggest that material deprivation at the neighborhood level may be an important determinant of diet quality, regardless of the socioeconomic status, age, and sex of individuals. This reinforces the influence of external barriers affecting particular subgroups of individuals in achieving healthier eating habits and that efforts at the environmental level in deprived neighborhoods are needed to reduce social inequalities in health in Québec.

OS8.2 RESPONSES TO INDIVIDUAL U.S. HOUSEHOLD FOOD SECURITY SURVEY MODULE QUESTIONS ARE LINKED TO DIETARY QUALITY AND NUTRIENT EXPOSURE IN U.S. ADULTS WITH LOW-INCOMES, NHANES 2007-2018

Heather Eicher-Miller [1], Aline Uwashimimana [1], Anali Morales-Juarez [1], Janet Tooze [2], Regan Bailey [3]

[1] Purdue University, [2] Department of Biostatistics and Data Science, Wake Forest School of Medicine, [3] Texas A&M Institute for Advancing Health Through Agriculture

Introduction: Food insecurity is when there is uncertain or not enough access to adequate food, assessed using the U.S. Household Food Security Survey Module (HFSSM), but the relationship of specific household situations of food insecurity queried within the HFSSM to dietary quality and nutrient exposure are unknown. The objective was to

evaluate the relationship of affirming questions within the U.S. HFSSM to diet quality using the Healthy Eating Index-2015 (HEI-2015)) which evaluates dietary alignment with the Dietary Guidelines for Americans and nutrient exposure using the Food Nutrient Index (FNI), among U.S. adults of households with and without children to inform their ability to indicate access to healthful food.
Methods: Backward regression was applied to individual questions of the U.S. HFSSM for both households with and without children from a cross-sectional sample of 15,977 low-income adults (≥18y) from the U.S. National Health and Nutrition Examination Survey (NHANES) 2007-2018 in separate models against the total and component HEI-2015 and FNI derived from ≤2 24-hour dietary recalls.
Results: Not eating despite being hungry (question (Q) 10) was associated with up to 3-points lower total HEI-2015 score in both household types and 1-point lower FNI for households without children (all $p<0.05$). Worrying about food (Q2) and not eating for a whole day often (Q12a) were associated with 3-points lower total HEI-2015 scor and up to 8-points lower FNI (all $p<0.05$) in households without children. Yet, children skipping meals frequently (Q14a) for households with children, food not lasting (Q3), and not eating for a whole day (Q12) for households without children were linked to up to a 4-point higher total HEI-2015 score, and Q12 was additionally linked to 2-point higher FNI in households without children (all $p\leq0.05$).
Conclusion: Saying "yes" to U.S. HFSSM questions, indicating a range of limited food access situations was related to lower dietary quality or nutrient exposure, whereas affirming other questions was related to higher dietary quality or nutrient exposure compared with the dietary quality of those who said "no", indicating a complex relationship of dietary quality and nutrient exposure with food access. Exposure to all nutrients evaluated was poorer in households without children who said "yes" to not eating for a whole day often (Q12a) and those who said "no". These questions may inform monitoring access to healthy food to facilitate nutrition security assessment.

OS8.3 IS THE SEVERITY OF EXPERIENCED FOOD INSECURITY LINKED TO THE QUALITY OF THE DIET? FINDINGS FROM 82 NATIONALLY REPRESENTATIVE SURVEYS

Adeeba Ishaq [1], Giles Hanley-Cook [1], Bridget Holmes [1], Anne Kepple [1], Simone M. Gie [1], Sara Viviani [1], Talent K. Manyani [1], Carlo Cafiero [1]

[1] *Food and Agriculture Organization of the United Nations*

Introduction: The link between food insecurity (FI) and dietary patterns is shaped by contextual factors and is therefore complex. In some cases, FI leads to lower consumption of all foods and increased reliance on staples, while in others, it results in reduced intake of nutritious foods and

higher consumption of energy-dense foods rich in fats, sugars, and salt. Differences in FI and dietary data collection make it challenging to explore associations between FI severity and diet quality.
Methods: Recent advancements in data collection offer new opportunities to explore this relationship. Since 2021, the Food Insecurity Experience Scale (FIES) and the Diet Quality Questionnaire (DQQ) have been included in the Gallup World Poll, gathering both types of data from the same respondents in 28 countries, and from different respondents in 52 countries. We analyzed the association between FI severity, measured by FIES, and diet quality using Minimum Dietary Diversity for Women (MDD-W), NCD-Protect and NCD-Risk scores, zero vegetable or fruit consumption (ZVF), and animal source food consumption (ASF).
Results: In 82 survey-years, moderate or severe FI was correlated with lower dietary diversity and a general lack of consumption of all food groups. In the 28 countries subset, 21 of which were low or LMICs, greater FI severity was linked to lower MDD-W, ASF, NCD-Protect and NCD-Risk scores, and higher ZVF. Pooled analyses showed unexpected results: higher fish, seafood, and dark-green leafy vegetable consumption among those with moderate or severe FI compared to those with mild FI or food secure. These findings were not seen in any single survey, indicating confounding (e.g., Simpson's paradox) Indeed, the direction of the association between the severity of FI and these food groups switched sign when controlling for country.
Conclusion: Our study suggests that, in LMICs, greater severity of food insecurity is associated with a lack of access to all food groups, healthy as well as unhealthy. This highlights the limitations of evaluating "healthy" and "unhealthy" food groups in isolation. Given FI's varied effects on diets across contexts, these new data can offer insights into the complex relationship between FI and diets. Analyses of FI and dietary intake across countries are further complicated by differences in the recall period of FIES (1 year) and DQQ (1 day), as well as seasonal effects.

OS8.4 COST OF A HEALTHY DIET: A POPULATION-REPRESENTATIVE COMPARISON OF THREE DIET COST METHODS IN CANADA

Gabriella Luongo [1], Valerie Tarasuk [2], Leah Cahill [1], Mohammad Hajizadeh [1], Yanging Yi [3], Catherine Mah [1]

[1] Dalhousie University, [2] University of Toronto, [3] Memorial University of Newfoundland

Introduction: Different food price sources and dietary assessment tools may impact the estimation of diet costs and hamper our understanding of the relationship between diet costs and dietary intakes. We investigated the effect of three diet cost derivation methods, with increasing numbers of food prices and geographic specificity, holding consistent the dietary assessment, on the estimation of diet costs overall and by food group.

Methods: We matched 24-hour dietary recall data from the 2015 Canadian Community Health Survey-Nutrition (CCHS-N) to food price data from three Canadian Consumer Price Index (CPI) food price lists; national short list, national long list, and provincial long list. We compared the daily ($/day) and energy-adjusted ($/2,000kcal) diet costs overall and by food groups for the overall population (4+ years), children (4-18 years), and adults (19+ years).
Results: The proportion of dietary intakes (g) that were covered by CPI prices significantly increased from the national short list to the national long list but did not significantly differ from the national long list to the provincial long list. The national short list resulted in the highest daily and energy-adjusted diet costs overall. No difference in diet costs was noted between the national and provincial long lists. Diet costs for four food groups—additions, sweets, fruits, and vegetables, which were poorly covered by the national short list—significantly differed using the national and provincial long lists. All three diet cost methods were significantly correlated with energy intakes; however, a strong/very strong correlation was detected for children, and a weak/moderate correlation for adults.
Conclusion: The choice of food price data may introduce bias in the diet cost estimate, as well as limiting our understanding of how individuals allocate their diet costs. Refinement of diet cost estimation methodology and measures can strengthen future studies of how consumers allocate their purchases to their diets.

OS8.5 THE IMPACT OF A BASIC INCOME ON DIET QUALITY AND DIETARY INEQUITIES IN CANADA: AN AGENT-BASED COMPLEX SYSTEMS SIMULATION MODEL

Dana Lee Olstad [1], Brent Langellier [2], Eldon Spackman [1], Andres Useche [2], Rebecca Hasdell [3], Nicolas De Guzman Chorny [4], Heidi Olstad [5], Seyed Hosseini Pozveh [1]

[1] University of Calgary, [2] Drexel University, [3] BC Centre for Disease Control, [4] Public Health Agency of Canada, [5]Alberta Health Services

Introduction: The inadequacies of current social protection policies in improving diet quality and reducing dietary inequities have renewed interest in a Basic Income (BI) to ensure all Canadians can afford a healthful diet. However, due to the challenges of conducting large, long-term, population-based randomized controlled trials, there are no data pertaining to the impact of different forms of a BI on diet quality and dietary inequities. We developed the first agent-based complex systems simulation model to investigate the effectiveness of 20 different forms of a BI on diet quality and dietary inequities among adults in Canada.

Methods: Agents in our model are adults who are assigned an age, sex, ethnicity, household income, food budget, diet quality (Healthy Eating Food Index-2019 scores from 0-80; HEFI-2019), energy intake, and food spending based on nationally representative data. At each bi-weekly time step, agents receive their regular income plus a BI (if eligible), calculate their new food budget, and incrementally adjust their food spending based on empirically derived decision rules until it is within 10% of their new food budget. Agents' diet quality evolves in conjunction with incremental increases in food spending, leading to emergence of a new distribution of diet quality by income at the population level for each of the 20 forms of a BI. These 20 forms of a BI combine different BI models (universal, negative income tax, income top-up), benefit levels (low-income cut-off, low-income measure, market basket measure, living wage), and reduction rates (0-100%).
Results: Different combinations of BI models, reduction rates, and benefit levels did not meaningfully improve HEFI-2019 scores at a population level, with maximum improvements of 1.5 points. All BI models, reduction rates, and benefit levels improved HEFI-2019 scores in the lowest income quintile by up to 4 points, which may be clinically meaningful. However, a universal BI, higher benefit levels and a 0% reduction rate also improved HEFI-2019 scores by up to 1.3 points in the middle and highest income quintiles.
Conclusion: A BI may not meaningfully improve diet quality at a population level in Canada, regardless of its design features. All forms of a BI may improve diet quality in the lowest income groups and may thereby reduce dietary inequities. However, a universal BI may be less effective in reducing dietary inequities because it also improves diet quality in higher income groups.

Oral Session 9
HARMONIZATION, REPORTING, AND PROTOCOLS
Wednesday, April 30 | 9.45am - 10.45am
Location: Toronto 2
Chair: Pedro Saint-Maurice

OS9.1 HARMONIZATION OF DIETARY DATA ACROSS EPIDEMIOLOGICAL STUDIES IN GERMANY

Franziska Jannasch [1], Matthias Schulze [1], Florian Schwarz [1]

[1] German Institute of Human Nutrition Potsdam-Rehbruecke

Introduction: There is considerable heterogeneity in the methods used to assess and operationalize dietary exposure across epidemiological studies. This is due to different dietary assessment methods, variations in the design of assessment instruments (to some extent reflecting the

variation in regional diet composition) and different levels of dietary intake (meal intake, dietary intake, dietary pattern) and corresponding dimensions (e.g., food intake, nutrient intake) and subdimensions (e.g. specific nutrients). This heterogeneity can impede multi-study investigations. Hence, there is the need to standardize and harmonize these data across different studies.
Methods: NFDI4Health aims to harmonize dietary data across 17 epidemiological studies in Germany (4 in children, 13 in adults). The harmonization followed a pre-specified work-flow, published in a harmonization protocol, using adapted tools from the Maelstrom Research group: First, an inventory of existing standards on dietary data was conducted in the participating studies. The most suitable standard in terms of applicability in epidemiological research settings and comparability with other European countries was identified. Second, in pilot projects addressing typical research questions, necessary metadata describing the definition, assessment, and characteristics of dietary data were collected across the studies. Third, the study-specific metadata of dietary data were then harmonized towards the standard, by respectively identifying the harmonization potential and applying specific harmonization rules using the R package Rmonize, developed by the Maelstrom Research group.
Results: FoodEx2 was identified as the most suitable standard for dietary data on food item and food group level in epidemiological studies and was mapped to the EPICSOFT food grouping system, resulting in a set of 119 target dietary variables. Across 17 studies who participate in the pilot projects, study-specific metadata of dietary variables could be collected from 16 studies. Of these 16 studies, ten have reported to use food frequency questionnaire, one a 24h-recall, three use food records and two use a combination of different assessment methods. The dietary metadata were successfully harmonized in the majority of participating studies.
Conclusion: Despite inherent heterogeneity, dietary data were successfully harmonized towards FoodEx2 across diverse epidemiological studies in Germany, ready to be used in future multi-study investigations.

OS9.2 DIET ITEM DETAILS: REPORTING CHECKLIST FOR HUMAN FEEDING STUDIES MEASURING THE METABOLOME – A DELPHI STUDY CONSENSUS

Jessica Ferguson [1], Erin Clarke [1], Jordan Stanford [1], María Gómez-Martín [1], Tammie Jakstas [1], Clare Collins [2]

[1] University of Newcastle and Hunter Medical Research Institute, [2] University of Newcastle

Introduction: Metabolomics is an emerging approach for characterising dietary intake and specific metabolic responses to diet using objective biomarkers. Our scoping review highlighted gaps and inconsistencies in

design and reporting of dietary interventions in human feeding studies measuring the metabolome. This study aimed to gain consensus on core diet-related item details (DID) and recommendations for developing a reporting checklist. The checklist will guide researchers on the minimum level of detail for reporting dietary information within human feeding studies measuring the metabolome.

Methods: Twenty-eight DIDs categorised in five domains underwent consensus development via a two-stage online Delphi comprising five survey rounds (February-July 2024). International experts (n, 67) with expertise in clinical trial design, feeding study intervention implementation, and/or metabolomics were invited. Stage 1 (2 rounds) gained consensus on a core set of DIDs, including phrasing. Stage 2 (3 rounds) gained consensus on reporting recommendations and acceptance of the final reporting checklist. After every round, the research team convened to discuss consensus-driven results. This study is approved by the University of Newcastle's Human Research Ethics Committee (H-2023-0405).

Results: After stage 1 (25 experts), 29 core DIDs were identified after two DIDs merged and two new DIDs were added. In stage 2 round 2, all items were organised to determine the level of detail of reporting in the methods section of publications and supplementary files. In round 3, the expert working group (n, 22) accepted the reporting guideline (DID-METAB Checklist), comprising DIDs across dietary intervention modelling and implementation; dietary assessment; adherence and compliance monitoring; and bias. All experts agreed that relevant journals should endorse the checklist for applicable studies.

Conclusion: The Delphi gained expert consensus on a core set of DIDs and the level of detail required when reporting in research. The DID-METAB Checklist can be implemented independently or as an extension to existing guidelines such as CONSORT (at item 5) or SPIRIT (at item 11) to improve reproducibility and comparability. Endorsement by scientific societies and journals is key for dissemination and optimising uptake of the tool. This checklist will be a key tool to advance reporting of diet-related methodologies in metabolomics for personalised and precision nutrition interventions.

OS9.3 STUDY DESIGN AND LESSONS LEARNT FROM MENUCH-KIDS: THE SWISS NATIONAL NUTRITION SURVEY OF CHILDREN AND ADOLESCENTS, INCLUDING BIOBANKING

Aline Siegfried-Troxler [1,2], Julia Vincentini [3], Christine Zuberbühler [4], Christine Brombach [5], Angéline Chatelan [6], Julia Dratva [5], Franziska Isler [7], Pascal Müller [8], Franziska Righini [9], Serge Rezzi [10], Sabine Rohrmann [11], Christoph Saner [12], Giacomo D. Simonetti [13], L. Suzanne Suggs [14], Klazine Van Der Horst [15], Murielle Bochud [3]

[1] Swiss Government, [2] Swiss Federal Department of Home Affairs, [3] Unisanté, University of Lausanne, Lausanne, Switzerland, [4] Federal Food Safety and Veterinary Office, [5] ZHAW Zurich University of Applied Sciences, [6] Geneva School of Health Sciences, HES-SO University of Applied Sciences and Arts Western, [7] YouGov Schweiz, [8] OKS Children's Hospital of Eastern Switzerland, [9] Children's Hospital of Central Switzerland, [10] Swiss Nutrition and Health Foundation, [11] University of Zurich, [12] Department of Pediatrics and Department of Biomedical Research, University of Bern, [13] Ente Ospedaliero Cantonale Bellinzona, [14] Università della Svizzera italiana, [15] BFH Bern University of Applied Sciences

Introduction: National nutrition surveys are essential for food safety, health promotion and prevention, and policy making. In Switzerland, national data on nutrition with related biobank for children and adolescents were inexistent. Therefore the cross-sectional population-based menuCH-Kids study was run between 2023–2024, gathering dietary, health, lifestyle and biomarker data, including a biorepository for future research. Such surveys face many challenges, including low participation rates, participant burden, diet seasonality, multi-centricity, multi-cultural context, and complex pre-analytic biobanking procedures.

Methods: A stratified sample of 6–17-year-olds from the three main linguistic regions was draw by the Swiss resident registry. Children were recruited over eight waves during one year. Participation involved: i) filling a questionnaire; ii) visiting a study center for 24h dietary recall or record (24HDR), anthropometry, blood pressure, first morning urine, and optional blood draw; iii) completing a second 24HDR by phone (>2 weeks later). Tailored communication, recruitment specialists, and a belted sampling with a radius of 30-minute travelling time were used, alongside a multi-level incentive strategy (personalized results, recipe booklets and monetary rewards) to improve participation. Weighting will correct participation bias.

Results: Of 16,223 invited children, 1,852 participated and 1,829 (11%) completed all three phases, 23 dropped out. Whereas 14% of households with a registered phone number participated, only 6% without phone number did. Main reasons for refusal were lack of interest (42%) and time (28 %). The blood draw was accepted by 60%, surpassing the study's capacity. In total, 1,847 urine and 848 blood samples were collected.

Conclusion: The study demonstrated the practicability of collecting high-quality dietary and bio-sample data thanks to specialists' collaboration. Phone contact was key for recruitment success.

Individualized result feedback incentivized participation and high willingness for blood draws (staff feedback). Participation rate exceeded the recent Swiss salt study (9%) but is lower than in the 2014–2015 adult Swiss national nutrition survey menuCH (15%). Despite all efforts, overall rates remained low, with time burden cited as important barrier. Investment in time-saving technologies e.g., photo-driven data collection, barcode scanning or remote participation seems promising for time burden reduction.

OS9.4 FEASIBILITY OF A PROTOCOL MEASURING PHYSICAL ACTIVITY, DIET, AND SLEEP BEHAVIORS OF YOUNG CHILDREN WITH DOWN SYNDROME

Michaela Schenkelberg [1], Heather Wasser [2], Emily Clarke [2], Seema Agrawal [2], Phoebe Tchoua [2], Kelsey Thompson [2], Derek Hales [2], Erik Willis [2]

[1] University of Nebraska at Omaha, [2] University of North Carolina at Chapel Hill

Introduction: Compared to typically developing peers, young children with Down Syndrome (DS) are disproportionately affected by preventable chronic health conditions. Yet, children with DS are often overlooked in health promotion initiatives and few studies assess health behaviors of young children with DS. This study investigates the feasibility of a protocol to measure physical activity (PA), diet, and sleep behaviors of young children with DS.
Methods: Parents with an ambulatory child (ages 2-6 years) with DS were recruited through community partners. Child PA was assessed using an ActiGraph GT3X+ accelerometer worn on the non-dominant wrist for 7 consecutive days. Parents also completed two 24-hour recalls using the ASA24 about their child's diet and sleep behaviors for a random weekend and weekday. Parents completed a semi-structured interview to provide feedback about the study protocol and instruments. Descriptive statistics were used to calculate means and rates of protocol completion.
Results: Twelve children with DS (age= 4.2 ± 1.3 years; 50% female; 83.3% non-Hispanic white) participated in the study. Most parents (72.7%) reported that their child tolerated the accelerometer but often removed it (e.g., in the car, during nap), and 45.5% expressed a preference for a non-removable wristband. Overall, 75% of children provided sufficient PA data. Wear time improved from an average of 18.7±6.5hrs (Day 2; i.e., first full 24h day) to a peak of 22.4±3.3hrs (Day 6). The ASA24 completion rate was 95.8%. All parents felt confident in their ability to recall children's food and drink. However, 63.3% reported that they could not find foods typical of their child's diet. Nearly half reported that ASA24 was easy to use, and 27.3% already track their child's diet for feeding therapy needs. The ASA24 Sleep Module was completed 91.3% of the time, of which 76% included bed- and wake times. All parents found verbal and written instructions helpful, and 27.3% suggested providing instructions to other caregivers (e.g., grandparents, teachers).

Conclusion: The protocol was well-received by families of children with DS and study activities had good completion rates. Wrist-worn accelerometers appear feasible for this population, and researchers should consider oversampling due to potential device intolerance. The ASA24 allowed for parent proxy-report of children's diet, but additional modifications should be considered to ensure it is suitable for young children with DS.

OS9.5 PRIORITIZING KEY INDICATORS FOR LARGE-SCALE SURVEILLANCE OF FOOD ENVIRONMENTS: GLOBAL EFFORTS FROM THE INFORMAS NETWORK

Lana Vanderlee [1], Kelly Garton [2], Caroline Vaillancourt [1], Boyd Swinburn [2], Gary Sacks [3]

[1] Université Laval, [2] University of Auckland, [3] Deakin University

Introduction: Healthy food environments are a cornerstone of healthy diets. The last decade has seen considerable growth in food environments monitoring undertaken by researchers and governments, with diverse metrics and methods used.
Methods: A narrative review was conducted to identify potential food environment indicators published in peer-reviewed and grey literature, using the framework from the International Network for Food and noncommunicable disease Research, Monitoring and Action Support (INFORMAS) across seven policy domains (food composition, labelling, promotion, provision, prices, retail, trade & investment). From this broad inventory, a long list of potential indicators for each domain was discussed with INFORMAS experts from each module in online focus groups and interviews, with an aim to create a 'short list' of indicators for each domain. Next, an international network of 51 experts representing all World Health Organization regions participated in an online survey to prioritize and provide qualitative feedback on proposed indicators. From this, a final list of indicators recommended for international surveillance and identified key considerations in implementing this monitoring into national surveillance strategies will be developed.
Results: Short lists comprised 2-4 indicators per domain, which were further prioritized to a final set of indicators. Feedback from experts indicated a necessity to balance the ability to adapt indicators to national context with considerations for international comparisons. Key challenges identified included: definitions of the healthiness of foods; selection of key foods/food categories; lack of available data that underpin indicators; sampling strategies for effective national surveillance across broad geographies; reliance on industry data; identifying indicator benchmarks; and capacity-building within countries to robustly collect and analyze surveillance data.

Conclusion: These results will contribute to ongoing research to prioritize indicators to include in country-level and international monitoring efforts, with a goal of providing guidance to governments and other key actors as they seek to develop comprehensive surveillance systems. This work may also guide research efforts to support enhanced monitoring and surveillance of food environments and policy evaluation and identify gaps in capacity and resources that could be addressed by the global community.

Oral Session 10
ACTIVITY, FITNESS, AND HEALTH
Wednesday, April 30 | 9.45am - 10.45am
Location: Toronto 3
Chair: Erika Rees-Punia

OS10.1 CHANGES TO ACCELEROMETRY-DERIVED WAKING-HOURS MEASURES IN THE CANADIAN HEALTH MEASURES SURVEY

Janine Clarke [1], Rachel Colley [1], Joel Barnes [1]

[1] Statistics Canada

Introduction: From 2007-2019, the Canadian Health Measures Survey (CHMS) collected waking-hours accelerometer data from a nationally representative sample of Canadians aged 3-79 using the Actical accelerometer. In its seventh cycle (2022-2024), the CHMS switched to the ActiGraph wGT3X-BT and began a 24-hour collection protocol. Understanding the impact of this change and the comparability of waking-hours movement behaviours is important for interpreting trends in physical activity and sedentary behaviour in Canada over time.
Methods: In 2021, a cross-over study was conducted where volunteers aged 3-79 years wore both Actical and ActiGraph accelerometers 24-hours a day for seven days and completed a sleep and wear-time log. The Actical data from the crossover study were processed using the same approach as past CHMS cycles. For the ActiGraph, sleep time and non-wear time were identified using the algorithm developed by Barreira et al. and age-specific cut-points were used to identify light, moderate, and vigorous physical activity (PA) on valid days. Average PA was compared for paired valid days; intra-class correlations, Bland-Altman, and density plots were used to characterize the relationship between methods across age groups (early years, school-aged, adults, and older adults).
Results: Sedentary time was consistently lower while both light and moderate-to-vigorous PA were consistently higher according to the Actigraph. Estimates for adherence to physical activity recommendations were also higher with the ActiGraph, though

differences were not statistically significant. These results suggest that some caution may be required when comparing estimates of PA between cycles 1-6 and cycles 7+ of the CHMS. An adjustment factor is being considered for comparability over time.
Conclusion: The results of the cross-over study will contribute to a better understanding of the upcoming CHMS estimates of physical activity and sedentary behaviour in Canada from Cycle 7 of the CHMS compared to past cycles.

OS10.2 ASSOCIATIONS BETWEEN FRAILTY ASSESSMENTS AND PHYSICAL ACTIVITY PATTERNS USING WEARABLES IN PEOPLE WITH END-STAGE RENAL DISEASE

Kirsten Rennie [1], Subhankar Paul [2], Catriona Walker [2], Lewis Griffiths [3], Michael Catt [3], Victoria Keevil [2], James Richards [2], Gavin Pettigrew [4]

[1] University of Cambridge, [2] Cambridge University Hospitals NHS Foundation Trust, [3] MRC Epidemiology Unit, University of Cambridge, [4] University of Cambridge and Cambridge University Hospitals NHS Foundation Trust

Introduction: Wearables can objectively measure physical activity in vulnerable patient groups in their home for several days. This technology could remotely monitor changes in activity related to frailty, with studies to date focusing on daily steps or overall activity counts. We explore a range of other physical activity patterning metrics, derived from continuous raw accelerometer data, and their associations with components of the fried frailty phenotype (FFP) in people with end-stage renal disease (ESRD).
Methods: This cross-sectional study enrolled 123 patients with ESRD (89 men, 34 women) from dialysis (n=65) and low clearance clinics (n=58) with median age of 75 (range 30-91) years. All participants completed FFP assessments and cut points were applied to categorise low usual walking speed and low grip strength. Participants were asked to wear a wrist-worn triaxial accelerometer (GeneActiv) for the following week for 24 hours a day. Data were processed using GGIR (https://cran.r-project.org/web/packages/GGIR/citation.html) to assess patterning of daily activity including time spent in light and at least moderate intensity activities (MOD+) (mins/day), number and duration of bouts of light and MOD+ intensity of different bout lengths (1-5 mins, 5-10 mins, 10+ mins), and median daily total activity (mg/day).
Results: By FFP component, 31% participants met criteria for low walking speed, 37% low grip strength, 24% self-reported exhaustion and 8% unintentional weight loss, respectively. Distinct patterns were observed according to FFP component. Those with low walking speed, low grip strength, or exhaustion had significantly lower number and duration of bouts of activity in MOD+, with strongest associations with shorter bouts of MOD+ of 1-5 mins and lower daily total activity (Mann-Whitney U test, p<=0.001 for all). Those who reported no exhaustion had significantly

higher light intensity activity, with significant associations with longer bouts of light activity (5-10 and 10+ mins) (Mann-Whitney U test, $p<0.05$ for all). Unintentional weight loss was not associated with any daily activity patterning.
Conclusion: There are distinct associations between objectively measured activity patterning metrics and FFP components, particularly shorter bouts of moderate intensity activity and low walking speed, grip strength, and exhaustion. These could be used to remotely monitor patients for signs of frailty.

OS10.3 SELECTING THE MOST APPROPRIATE DEVICE-BASED METHOD FOR MONITORING PHYSICAL ACTIVITY IN CHILDREN AND ADOLESCENTS WITH DISABILITIES BY USING A FALLA PROFILE FORM

Kati Karinharju [1], Janne Kulmala [2], Tuomas Kukko [2], Tuija Tammelin [2], Piritta Asunta [2]

[1] Satakunta University of Applied Sciences, Finland, [2] Jyväskylä University of Applied Sciences

Introduction: Children and adolescents with disabilities (CAWD) accumulate less physical activity (PA) and more sedentary time than their peers. The amount of daily habitual PA for this population has often been determined using subjective evaluation methods such as self-reported recalls and questionnaires. The existing device-based monitoring systems can potentially be applied to assess daily habitual PA among this population. However, CAWD have wide functional and mobility profiles that need to be taken into consideration when selecting appropriate monitoring device, including the mounting location. This study presents a FALLA profile form for selecting the most appropriate device and mounting location in CAWD.
Methods: Existing literature for using device-based monitoring systems among the target population was reviewed. The first version of the form was tested and modified by observing the functioning of CAWD during a school day. The reliability of the ready form was evaluated with selected group of CAWD, where the researcher, guardians and teachers filled the form simultaneously and then results were compared.
Results: The information regarding performed locomotion, limited use of body parts or restricted range of movement, and the use of assistive aids as well as the preferred type of daily PA and sports are crucial when selecting the appropriate monitor, mounting location, and analyzing methods. Among this population, the simplicity and convenience of monitoring devices are highlighted, especially when the functional limitation is cognitive, psychological, or social. The FALLA form includes four main themes followed by 16 questions leading to six different options of the most appropriate device and mounting locations. Guardians' knowledge is the most reliable when selecting the appropriate device and mounting location in CAWD.

Conclusion: To provide reliable information and to promote PA in CAWD, appropriate methods for monitoring daily habitual PA are needed. The FALLA profile form provides an individually tailored decision tree for selecting the most appropriate device and mounting location in CAWD.

OS10.4 AN R PACKAGE FOR PROCESSING AND SUMMARIZING ACTIGRAPH-MEASURED ACCELEROMETRY DATA FROM THE CANADIAN HEALTH MEASURES SURVEY

Rachel Colley [1], Joel Barnes [1], Janine Clarke [1]

[1] *Statistics Canada*

Introduction: From 2007 to 2019, Statistics Canada's Canadian Health Measures Survey (CHMS) used the Actical accelerometer to measure physical activity and sedentary time among Canadians. In Cycle 7 of the CHMS (2022-2024), the measurement device changed from the Actical to the ActiGraph accelerometer and the wear protocol changed from a waking hours only to a 24-hour wear protocol. An ongoing challenge for researchers using accelerometers is the complexity of processing and analyzing raw accelerometer data. A lack of transparency and detail in analytical procedures prevents harmonization and comparability between studies.
Methods: A CHMS Actigraph R Package has been developed using an R6 object-oriented approach to work with raw Actigraph data to classify every epoch as physical activity, sedentary behaviour, or sleep and to summarize daily time spent in each of these behaviours. The package starts by reading in the epoch-based files (.agd), which have previously been extracted using the ActiLife software from the raw files (.gt3x) using both the normal filter and the low-frequency filter at an epoch of 15-sec. Next, the user is given the option of aggregating data to their desired epoch level (e.g., 30-sec, 60-sec) and to set up their data for sleep analysis (noon-to-noon) or activity (waking hours) analysis (midnight-to-midnight). After pulling in age information to the file, the R package applies age-specific intensity thresholds to the waking hours data to derive time spent in sedentary, light, moderate, and vigorous intensity movement. Demo data and the ggplot2 package are used throughout the package documentation to illustrate expected outputs and possible visualizations at each stage of the code.
Results: The CHMS Actigraph R Package provides users with a seamless, flexible, and coordinated analytical tool that is transparent and rigorously documented. This new R package is freely available (https://github.com/statcan/chms), thus building capacity within the research community and facilitating more robust analyses and comparisons between studies.
Conclusion: The CHMS Actigraph R Package takes advantage of the R environment to provide users with a fast, efficient, and reliable

approach to analyzing Actigraph data. The CHMS Actigraph R Package may also be used with other raw Actigraph datasets to facilitate harmonization and comparability with CHMS estimates.

OS10.5 DOES NEIGHBOURHOOD WALKABILITY AND BIKEABILITY IMPACT PARK USAGE?

Stephanie Prince Ware [1], Gregory Butler [2], Sean Waites [3], Nitharsana Manoharan [3], Nauman Shakeel [3]

[1] Public Health Agency of Canada, [2] Centre for Surveillance and Applied Research, Public Health Agency of Canada, [3]Centre for Data Management, innovation, and Analytics, Public Health Agency of Canada

Introduction: In parks, people engage with nature, play, gather, and are physically active. Parks also provide many physical, social, and psychological benefits. While the characteristics within parks and the time spent therein are associated with use and physical activity, the surrounding neighbourhoods (NBs) of parks have been less studied. Walking and cycling to and from parks is a source of additional activity. It is important to understand whether NB design can influence park use. The objective of this study was to understand the association between NB walkability and bikeability and park visits in Canada.
Methods: Park visits from January 2019 to October 2021 were assessed via BlueDot mobility data (cell phone data). Park types were manually labeled using Google Maps and categorized into six groups: municipal parks, dog parks, national/provincial parks, conservation areas, ecological reserves, and others (e.g., small greenspaces, historic sites). A total of 365 parks were linked to NB walkability (2016 Canadian Active Living Environments) and bikeability (2022 OpenStreetMaps© cycling infrastructure categorized using the Canadian Bikeway Comfort and Safety Classification System). A negative binomial regression, controlling for year, province, and urban/rural location, was used to explore the association between walkability, bikeability, and park visits.
Results: NB walkability and bikeability were moderately correlated and explored in separate models ($r=0.37$, $p<.001$). Greater NB walkability and bikeability were both positively associated with municipal park visits. Compared to the lowest walkability category, parks with the highest level of walkability had significantly more visits ($\beta=2.61$, $p<.001$). Similarly, compared to parks with the lowest level of cycling infrastructure, those with the highest level experienced significantly more visits ($\beta=2.51$, $p<.001$). Urban parks saw significantly more visits than rural parks, and municipal parks saw significantly more visits than dog parks.
Conclusion: Using a novel source of data, this study explored the underexamined relationship between NB walkability and bikeability and park visits. Results suggest that the supportiveness of surrounding NBs of parks for walking and cycling may impact park visits. Future studies would benefit from exploring the ways in which different characteristics of the built environment can promote park use, physical activity, and health.

Oral Session 11
DIETARY PATTERN INDICES AND CHRONONUTRITION
Wednesday, April 30 | 11.15am - 12.15pm
Location: Toronto 1
Chair: Rebecca Leech

OS11.1 DIETARY QUALITY INDICES: HETEROGENEITY OF DEFINITIONS AND HEALTH ASSOCIATIONS AMONG ADULTS

Christine El Khoury [1], Franziska Jannasch [1], Marcela Prada [1], Matthias Schulze [1]

[1] German Institute of Human Nutrition Potsdam-Rehbruecke

Introduction: Several dietary quality indices (DQIs) are linked to chronic disease risk. Their application is limited by inconsistent methods and suboptimal reporting. However, the effect of index composition heterogeneity on the strength of disease associations is not clear.
Methods: A scoping review was carried out to identify evidence on the most common disease-related DQIs and assess their application in dietary pattern research. We systematically identified umbrella reviews, systematic reviews, and primary studies that investigated the association of DQIs with all-cause mortality, incidence of/mortality from cardiovascular diseases, type 2 diabetes, and cancer among adults. We explored compositions of the prioritized DQIs in primary studies and quantified the degree of deviance from the original DQI versions. We then graphically explored possible patterns of association between the degree of score modification and disease risk estimates.
Results: 51 DQIs were identified from 175 eligible primary studies, retrieved from 20 systematic reviews included in two umbrella reviews. The most common indices used in 79.4% of the studies were respectively the Mediterranean diet scores (MedDiet scores), Alternative Healthy Eating Index (AHEI), Dietary Approaches to Stop Hypertension (DASH), Healthy Eating Index (HEI), and Dietary Inflammatory Index (DII). Higher diet quality reflected by these indices was associated with beneficial health outcomes in 17 meta-analyses. Heterogeneity of MedDiet scores was not considered since it has been addressed in previous reviews. Substantial heterogeneity was identified in the remaining DQI applications. Among studies that reported composition details, AHEI-2010 and DII were modified in almost all studies, while DASH and HEI-2015 in nearly half of the studies. The reasons behind these modifications were mainly related to population- and study-specific characteristics. Nevertheless, no clear patterns between the degree of index modification and the associations of DQIs with the selected outcomes were detected.
Conclusion: While the assessed DQIs support a preventive potential of healthy diets, substantial heterogeneity in their application exists. We did not find strong evidence that such modifications impacted the associations with mortality or disease risk. Still, heterogeneity of composition and its suboptimal reporting limit the reproducibility and comparability of results from studies on DQIs and health outcomes.

OS11.2 EATING WINDOW PATTERNS OF ADULTS WITH OVERWEIGHT AND OBESITY ACROSS THE WEEK, ASSESSED OBJECTIVELY USING A WEARABLE CAMERA, AND THEIR ASSOCIATIONS WITH BODY MASS INDEX

Beatriz Dos Santos Bechara [1], Edward Sazonov [2], Tonmoy Ghosh [2], J. Graham Thomas [3], Janine A. Higgins [4], Megan McCrory [1]

[1] Boston University, [2] University of Alabama, [3] Warren Alpert Medical School of Brown University, [4] University of Colorado

Introduction: Eating later on weekends (WE) compared with weekdays (WD) has sometimes been associated with higher risks for obesity and chronic disease. The timing of eating has often been assessed using self-report dietary assessment methods, which are subject to misreporting and imprecision. We used a wearable camera to assess eating timing for one week and allow for more objective assessment of eating timing. We hypothesized shorter eating windows with later start times on WE compared with WD, but longer eating windows in participants with higher BMI.
Methods: Participants with overweight and obesity (n=42; aged 18-60 y; BMI 27-45 kg/m²) used a wearable camera (Automatic Ingestion Monitor v2, or AIM-2) for 7 consecutive days. From time stamps of images captured, we calculated eating windows as time of last minus time of first eating occasion each day, based on a "metabolic day" of 04:00 to 03:59.
Results: Preliminary results were available for n=30 (67% F; aged 42.3±13.2 y; BMI 33.9±4.7 kg/m²; race/ethnicity: 14% Black/African American, 14% Asian, 3% more than one race, remainder White). Neither the eating window nor its start or end times differed significantly across the week or between WD and WE. Twelve participants were compliant with the protocol, defined as wearing the AIM-2 ≥8 h/d and having ≥2 eating occasions/d on all days. In this compliant subsample, start time of the first eating occasion was later on WE (10:02±2:17) compared with WD (9:38±1:49) but did not differ significantly (p=0.23). End time of the last eating occasion on WD and WE were similar (19:40±1:11 vs. 19:51±1:44; p=0.68). Eating window also did not differ significantly on WD vs. WE (10:02±1:35 vs. 9:50±1:11; p=0.64). Associations with BMI showed earlier start times of the first eating occasion with higher BMIs on WD and WE (r=-0.567, -0.635; p=0.02-0.05), but not with the end times of last eating occasion (r=-0.443, -0.457; p=0.14-0.15). Eating windows were longer with higher BMI on WE (r=0.543; p=0.068) but not WD (r=0.321; p=0.310).
Conclusion: Longer eating windows, due to earlier start times of the first eating occasion on WE were positively associated with BMI, suggesting WE may be a potential target for management of eating timing behavior for weight control and chronic disease risk.

OS11.3 CHARACTERIZING THE TIMING OF EATING AND ENERGY INTAKE AMONG URBAN AND RURAL GHANIAN HOUSEHOLDS USING A WEARABLE CAMERA

Megan A. McCrory [1], Sorochi Anyaibe [1,2], Christabel A. Domfe [3], Tonmoy Ghosh [4], Gary Frost [5], Matilda Steiner-Asiedu [6], Mingui Sun [7], Wenyan Jia [7], Tom Baranowski [8], Edward Sazonov [9], Benny Lo [5], Alex K. Anderson [3]

[1] Boston University, [2] Department of Health Sciences, Boston University, [3] University of Georgia, Athens, [4] University of Alabama, Tuscaloosa, [5] Imperial College, London, [6] University of Accra, Ghana, [7] University of Pittsburgh, [8] United States Department of Agriculture, Children's Nutrition Research Center, [9] University of Alabama

Introduction: Eating timing studies have disproportionately been conducted in high income countries. Also, these studies have used participant self-report, which is subject to reporting bias. We characterized eating and energy intake timing in urban and rural households in Ghana more objectively using the Automatic Ingestion Monitor v2 (AIM-2), a wearable camera attached to eyeglasses that automatically captures images of consumed food and beverages.
Methods: A mother, father, adolescent, and/or child ≤5 y from each household (n=30 urban, n=30 rural) wore the AIM-2 during waking hours for 3 days. AIM-2 images were reviewed for start and end times of eating episodes, identification of foods and beverages consumed, and portion sizes. Nutritional analysis was conducted using the West African Food Database, the Food and Nutrient Database for Dietary Studies, and others. Eating episodes were designated meals or snacks based on time of day, context, and items consumed. Calculations of daily eating window (start time of last eating occasion minus start time of first eating occasion), eating episode duration (end time minus the start time of each eating episode), and eating frequency (total number of eating occasions) were performed.
Results: AIM-2 data were available for 30 fathers (43.8±10.7 y), 30 mothers (43.4± 9.5 y), 18 adolescents (14.8±2.8 y), and 10 children (3.5±0.7 y) in urban households, and 30 fathers (37.3±12.4 y), 30 mothers (36.8±11.1 y), 7 adolescents (14.4±2.9 y), and 7 children (2.1±1.1 y) in rural households. Snacking was uncommon, with only 33% of household members snacking on one or more of the 3 days. Further, snack energy intake was 105±26 kcal/d higher in urban vs rural households. Meals were 452±21 kcal/d higher in energy, consumed more frequently (0.9±0.6 per d), and 3.8±0.8 mins longer than snacks in both locations for all household members. Children had longer eating windows (1.4±0.47 h) than fathers and higher eating frequencies (0.73±0.17 per d) than other household members regardless of location. Eating frequency (2.4-2.7 per d) and window (6.5-9.5 h/d), and % who snacked (33%) was lower than reported for Black/African Americans in the US (5 per d, 12 h/d and 90%, respectively).
Conclusion: Eating timing in Ghanaians differs by location and household member and from Black/African Americans in the US.

OS11.4 EXTENT TO WHICH FOODS ARE CONSUMED REPEATEDLY OVER TIME AND IMPLICATIONS FOR DEVELOPMENT OF AN ECOLOGICAL MOMENTARY ASSESSMENT (EMA)-BASED DIET ASSESSMENT APP

Lisa Harnack [1], Diane Mitchell [2], Terry Hartman [3], Nathan Mitchell [4], Abigail Johnson [4], Regan Bailey [5]

[1] University of Minnesota, [2] Texas A&M University System, [3] Emory University Rollins School of Public Health, [4]University of Minnesota School of Public Health, [5] Texas A&M Institute for Advancing Health Through Agriculture

Introduction: We aim to develop an EMA-based diet assessment app that prompts individuals to report everything they ate and drank over a specified period, such as the past 3 hours. Prompts would occur periodically (e.g., 2-3 times per day) over a specified period of time (e.g. 14 days) so a representation of usual daily nutrient intake may be estimated. The user interface for reporting foods will be designed so that food search and selection is expeditious. Success in creating this user interface will depend, in part, on the assumption that individuals eat a limited number of different foods over time, and that some types of foods are consistent from day to day (e.g., someone who drinks coffee will tend to drink it regularly, with the type consumed consistent).To test these premises, we analyzed 24-hour dietary recalls collected in from adults from the Minneapolis St Paul metropolitan area of Minnesota in the US.
Methods: Six interviewer-administered dietary recalls were collected over a 20-week period using Nutrition Data System for Research (NDSR). Using this data, the total number of foods and total number of unique foods reported per person across the 6 days were calculated, and differences by demographic characteristics were examined. The types of foods eaten multiple times versus once were compared.
Results: The sample included 201 adults with low household incomes and diverse racial identities. The total number of foods reported per person across the 6 recalls averaged 62 (range 32-123). The number of unique foods per person across the 6 recall days averaged 41 (range 19-79). These numbers were similar for males and females but varied by age and education level (higher for those with greater levels of education and higher age). On average, 81% of foods reported by a person were consumed only once.
Conclusion: Findings suggest assumptions could potentially be made for some foods to streamline food reporting. For example, in advance of the initiation of EMA prompts, participants could be asked questions about the types of beverages they typically consume, and this information could be used to streamline food reporting when EMA prompts commence (e.g,. when the participant text enters 'milk' in the food reporting window, the type of milk they report typically consuming would appear as the first food search result). Many foods are not eaten repeatedly, and thus alternative approaches will be needed to expedite their reporting.

Oral Session 12
ULTRA PROCESSED FOOD CONSUMPTION
Wednesday, April 30 | 11.15am - 12.15pm
Location: Toronto 2
Chair: Carolina Batis

OS12.1 DEVELOPMENT OF INDICATORS REFLECTING HEALTHY AND UNHEALTHY PLANT-BASED DIETARY PATTERNS INTEGRATING THE LEVEL OF FOOD PROCESSING AND THEIR LONGITUDINAL ASSOCIATION WITH THE RISK OF CARDIOVASCULAR DISEASES

Clémentine Prioux [1,2], Emmanuelle Kesse-Guyot [1], Bernard Srour [1], Léopold K Fézeu [1], Julia Baudry [1], Sandra Wagner [3], Serge Herberg [1], Mathilde Touvier [1], Benjamin Allès [2]

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Introduction: Very few studies have examined the link between plant-based dietary patterns and health accounting for the level of processing, while the latter represents a major challenge with the current increasing intake of ultra-processed foods worldwide. This study aimed to develop new dietary indices combining the contribution of plant food consumption and the level of food processing, to assess their association with the risk of cardiovascular disease, and to compare these associations with those obtained when the level of food processing is not integrated, in a French cohort.
Methods: We analyzed data from participants in the NutriNet-Santé prospective online cohort (2009-2024). First, the two original healthy Plant Based Diet (hPDI) and unhealthy Plant-Based Diet (uDPI) scores were computed using data from 24h records. Each component of the two scores was multiplied by a factor corresponding to i) the contribution of unprocessed food, ii) the contribution of ultra-processed foods, using the NOVA classification, leading to four new scores. A higher hPDI-unprocessed score reflected a diet richer in plant-based foods which were both healthy and unprocessed, whereas a higher hPDI-ultraprocessed score reflected a diet richer in ultra-processed plant-based foods, and conversely for uPDI-unprocessed and uPDI-ultraprocessed. The association between each one of the six scores and incidence of cardiovascular diseases (cerebrovascular and coronary) were estimated using multivariable Cox proportional hazards models, adjusted for potential confounding factors.
Results: A total of 63,808 participants were included (mean follow-up duration 9.0 years [SD=4.7]). A higher hPDI-unprocessed was associated with a lower risk of cardiovascular diseases ($HR_{10\ points\ increase}$: 0.94; 95% CI: 0.89, 0.99; P= 0.01). There was no significant association between the hPDI-ultraprocessed score and cardiovascular disease risk. A higher uPDI-ultraprocessed was associated with a greater risk of cardiovascular disease risk ($HR_{10\ points\ increase}$: 1.09; 95% CI: 1.03, 1.14; P= 0.002).

There was no significant association between uPDI and uPDI-unprocessed scores and cardiovascular disease risk.
Conclusion: Our findings indicate the necessity of incorporating the degree of food processing in future investigations examining the relationship between plant-based diets and health outcomes. Additionally, it is feasible to enhance existing nutritional epidemiology tools to integrate this dimension of dietary quality.

OS12.2 ULTRA-PROCESSED DIETARY PATTERN ADHERENCE AND IRRITABLE BOWEL SYNDROME: EVALUATING THE ASSOCIATION USING DIFFERENT DIETARY ASSESSMENT TOOLS

Giovanna Andrade [1,2], Leandro Cacau [2], Maria Laura Louzada [3], Renata Bertazzi Levy [3], Carlos Augusto Monteiro [4]

[1] Department of Nutrition at School of Public Health and Nupens, University of São Paulo, [2] School of Public Health, University of São Paulo, [3] University of Sao Paulo, [4] Department of Nutrition, School of Public Health, University of São Paulo

Introduction: Several studies show that the consumption of ultra-processed foods (UPFs) increases the risk of developing chronic diseases, such as cardiovascular diseases, type 2 diabetes, and certain types of cancer. However, a common limitation in this research is the use of dietary assessment methods that are not specifically designed to measure the degree of food processing. To address this gap, two dietary assessment tools—a 24-hour recall (NOVA24h) and a simplified food questionnaire (NOVA screener)—were developed and utilized in the NutriNet Brasil cohort to evaluate UPF consumption and its impact on health outcomes. This study aims to investigate the prospective association between adherence to a UPF dietary pattern and the incidence of irritable bowel syndrome (IBS) in Brazil, using these two distinct dietary assessment methods.
Methods: Data were analyzed from 7,769 adult participants in the nationwide, web-based NutriNet Brasil cohort. Dietary intake was assessed at baseline using two tools: NOVA24h (with a minimum of two food recalls) and NOVA-UPF score (with at least three assessments). New cases of IBS were identified using the Rome IV criteria. The association between the UPF dietary share (% of total energy intake), NOVA-UPF score (points) and IBS incidence was estimated using Cox proportional hazards models.
Results: Over an average follow-up period of 20.9 months, 742 new cases of IBS were identified. Adjusted models revealed a significant linear increase in IBS risk across quartiles of UPF dietary share, as measured by both dietary assessment tools. Comparing the lowest quartile (Q1: 0-13.8%) to the highest quartile (Q4: 29.5-74.4%) of UPF consumption using the NOVA24h tool, the risk of developing IBS increased by 1.25 (95% CI: 1.01-1.54). Similarly, when comparing the lowest quartile (Q1: 0-1) to the highest quartile (Q4: 2.7-8.4) using the NOVA-UPF score, the risk increased by 1.46 (95% CI: 1.18-1.80).

Conclusion: This study provides compelling evidence that a higher intake of UPFs is associated with an increased risk of developing IBS in the Brazilian adult population, irrespective of the dietary assessment tool used. The consistency of findings across different methodologies underscores the reliability of these tools in capturing UPF consumption and its health impacts. These results highlight the need for public health strategies aimed at reducing UPF intake to mitigate the growing burden of diet-related diseases, including IBS.

OS12.3 ARE ULTRA-PROCESSED FOODS ASSOCIATED WITH MORTALITY IN THE PATHWAYS STUDY, A COHORT OF FEMALE BREAST CANCER SURVIVORS?

Jennifer Cadenhead [1], Alexis Zimbalist [2], Isaac Ergas [2], Euridice Martinez-Steele [3], Janise Roh [2], Marilyn Kwan [2], Lawrence Kushi [4]

[1] Teachers College, Columbia University, [2] Kaiser Permanente Northern California, Division of Research, [3] University of Sao Paulo, [4] Kaiser Permanente Northern California

Introduction: High ultra-processed food (UPF) consumption, as classified by the NOVA system, has been associated with poor health outcomes, including premature mortality. Few studies have examined the association between UPF consumption and health outcomes in female breast cancer survivors.
Methods: A cohort of 3,659 women diagnosed with breast cancer between 2006 and 2013 at Kaiser Permanente Northern California, a large integrated healthcare system, were followed over 96 months. Using the baseline 139-item food frequency questionnaire, food items were categorized into four categories: (1) unprocessed/minimally processed foods, (2) processed culinary ingredients, (3) processed foods, and (4) UPF. Categorization was based on the most likely consumed food and then assigning the less processed option, if unclear. Participants were excluded if their caloric consumption was estimated to be less than 400 kcal or greater than 4,000 kcal. Cox proportional hazards models were used to determine the association between mortality outcomes and UPF consumption, $p<0.05$ was considered significant. The full model adjusted for diagnosis age, education, income, menopausal status, non-sedentary activity, smoking status, daily alcohol, Elixhauser comorbidity score, diagnosis stage, ER/PR status, HER2 status, chemotherapy, radiation, and hormonal therapy. Analysis was performed with UPF consumption (% gram or kcal) by quintiles of UPF consumption. We examined breast cancer-specific mortality, mortality other than breast cancer, and overall mortality as outcomes. R (v. 4.3.1) was used for the analysis.
Results: Median consumption of UPF was 47% kcal/19% grams. There was no significant association found between UPF (% grams or kcal) and breast cancer-specific or overall mortality. However, there was an association between higher UPF (grams, but not kcal) consumption and mortality other than breast cancer.

When comparing the highest (>28%) versus lowest (<10%) quintiles of UPF (grams) consumption, HR =1.38 95%CI (1.02, 1.86).
Conclusion: Higher UPF (grams) consumption was associated with an increased risk of mortality from non-breast cancer related causes in a cohort of female breast cancer survivors. Patients should be counseled on the level of processing in dietary choices.

OS12.4 LOCAIS-NOVA: A CLASSIFICATION SYSTEM FOR FOOD PURCHASE PLACES BASED ON THE BRAZILIAN DIETARY GUIDELINES

Marcos Anderson Lucas Da Silva [1], Larissa Loures Mendes [2], Maria Alvim Leite [3], Luana Lara Rocha [2], Camila Aparecida Borges [3], Renata Bertazzi Levy [3], Maria Laura Da Costa Louzada [3]

[1] University of Sao Paulo, School of Public Health, [2] Federal University of Minas Gerais, [3] University of Sao Paulo

Introduction: The Brazilian Dietary Guidelines recommend that diets be based on unprocessed or minimally processed foods, culinary preparations, and that ultra-processed foods be avoided. In light of this recommendation, it is necessary to assess the characteristics of food purchase places to identify those that promote healthy eating. Therefore, the objective of this study is to propose a methodology to classify food purchase places based on the guidelines of the Dietary Guidelines.
Methods: Data from the 2017-2018 Household Budget Survey, produced by the Brazilian Institute of Geography and Statistics, were used. Food purchase places were grouped into 15 categories: 1) supermarket, 2) mini-market, 3) open-air market, 4) bakery, 5) butcher shop, 6) food street vendor, 7) snack bar, 8) bar, 9) restaurants, 10) convenience store, 11) fish market, 12) confectionery, 13) dairy shop, 14) canteen, and 15) frozen food shop. The acquired foods were categorized according to NOVA: unprocessed or minimally processed foods and culinary ingredients (G1+G2), processed foods (G3), and ultra-processed foods (G4). The quantities of acquired foods were expressed as the average percentage contribution of each food group to the total grams purchased throughout Brazil. The classification was based on cutoff points defined by this average percentage contribution of the foods. Three categories of food purchases places were created: sources of unprocessed or minimally processed foods and culinary ingredients (when the acquisition within the place was ≥64.65% of the grams), processed foods (≥8.87%), and ultra-processed foods (≥26.48%).
Results: Open-air market and butcher shops were the main sources of unprocessed or minimally processed foods and culinary ingredients, with 93.69% and 87.75%, respectively. Bakeries were the primary source of processed foods (54.90%), and mini-markets were the primary source of

ultra-processed foods (30.58%). The supermarket was the only location that was a source of both unprocessed or minimally processed foods and culinary ingredients (69.29%), as well as ultra-processed foods (27.04%).
Conclusion: The "locais-NOVA" methodology offers an innovative approach to monitoring food environments in Brazil, providing valuable support for the development of public policies that promote access to healthy eating.

Oral Session 13
DATA SCIENCES AND MODELING TO ADVANCE ASSESSMENT
Wednesday, April 30 | 11.15am - 12.15pm
Location: Toronto 3
Chair: Marji McCullough

OS13.1 ASSESSING MACHINE LEARNING METHODS FOR PREDICTING ENERGY EXPENDITURE IN PRESCHOOL CHILDREN ACROSS NATIONS: IMPACTS OF PREPROCESSING AND FEATURE SELECTION

Hannah Coyle-Asbil [1], Mirko Brandes [2], Berit Brandes [2], Christoph Buck [2], Marvin N. Wright [2], Lori Ann Vallis [1]

[1] University of Guelph, [2] Leibniz Institute for Prevention Research and Epidemiology – BIPS

Introduction: An increasing number of physical activity researchers are turning towards machine learning to develop better models of the complex relationship between movement and energy expenditure (EE). There are various advantages that accompany machine learning; however, few researchers consider the impact of preprocessing and feature selection. This study explored the impact of preprocessing for accelerometer signals and inclusion of various features for the prediction of EE of preschool children using two different sample populations.
Methods: Data from Canadian children served as the internal sample and were used for model training and validation (2/3 for leave-one-subject-out cross validation, LOSO-CV; 1/3 as a holdout). These children (N=39; 3.0-5.99 years) were instrumented with accelerometers on their wrists (OPAL) and right hip (ActiGraph GT9X). A sample of German children acted as the external sample (N= 41 children; 3.0 to 6.99 years) and were similarly instrumented with accelerometers on their wrists (GENEActiv) and right hip (GENEActiv; ActiGraph GT3X+). Portable metabolic units were used in both samples to record EE during a semi-structured activity protocol. We investigated the impact of filtering, rectifying, incorporating a time delay, frequency domain (FD) features, and participant features (age, sex, height, and weight) on the predictions of EE (METs; kJ/min) across linear regression, random forest (RF), and fully connected neural network models. Root mean squared error (RMSE) was used to evaluate model performance.

Results: Findings indicate that the RF with filtered, not rectified data, FD features, participant features, and a time delay resulted in improved performance compared to approaches used previously (Steenbock et al., 2020), with RMSE reductions ranging from 4.82% to 24.82% in the LOSO-CV. The RMSE values were similar in the Canadian holdout sample but resulted in higher error when applied in the German external validation dataset.
Conclusion: These findings indicate that applying bandpass filtering to the data, alongside incorporating both frequency and participant features, will enhance the predictive accuracy of models estimating the EE of preschool children from raw accelerometer data. These modifications may offer a more robust approach for researchers aiming to improve model performance in this domain.

OS13.2 DECODING FOOD PURCHASE PATTERNS USING HIDDEN MARKOV MODELS: CHALLENGES AND INSIGHTS FROM LOYALTY CARD DATA

Jaakko Nevalainen [1], Haniyeh Danesh Doost [1], Anna Abdollahi [2], Suvi Ahtinen [1], Reija Autio [1], Henna Vepsäläinen [2], Jelena Meinilä [2], Anna-Leena Vuorinen [3], Mikael Fogelholm [2], Hannu Saarijärvi [1], Maijaliisa Erkkola [2]

[1] Tampere University, [2] University of Helsinki, [3] Faculty of Social Sciences, Tampere University

Introduction: Hidden Markov Models (HMMs) are a powerful computational tool for decoding underlying states from time sequenced observations. Traditional dietary assessment methods have not been ideal for the use of HMMs because the number of measurements per individual typically remains small. Access to high time-resolution data on food purchases sets up new possibilities for HMMs in the investigation of food purchase patterns compared to, e.g., factor or cluster analyses. In HMM terminology, states represent food purchase patterns, and individuals may move back and forth from one state to another over time. We consider the practical and computational challenges with HMMs on food purchase data, propose ways to resolve them, and illustrate what insights HMMs provide to nutrition research.
Methods: We have obtained individual-level food purchase data in two separate Finnish cohorts, each consisting of over 40,000 consenting loyalty card holders. In total, the observation period is from 9/2016 to 12/2024. The retailer, which contacted the participants via email, holds a 48 % market share. We re-classified the purchased food items in a nutritionally meaningful way and linked them with a food composition database. Then, we calculated the monthly purchased volumes by food groups and fitted HMMs over individual sequences of observation.
Results: Food purchase data must be pre-processed in such a way that participants are comparable despite of differences in household structures or loyalty to the retailer. Moreover, food baskets consist of a large variety of food groups, which makes the fitting of HMM computationally challenging. Hence, we propose a dimension reduction

step prior to the analysis that does not compromise the possibility to differentiate between underlying states. Finally, we illustrate what we can learn by HMMs of the patterns themselves, transitions between states on a shorter- or longer term, and what are the drivers of the dynamics between them.
Conclusion: HMMs are valuable analysis techniques for understanding pattern-level behaviors in longitudinal studies with sufficiently many time points of observation. Food purchase data are an example of data in which HMMs hold strong potential for data-driven learning of food related behavior. Efficient and successful use of HMMs in nutrition research requires high-quality data, skilled statistical modelling and programming, computational power, and interdisciplinary collaboration with domain experts.

OS13.4 MODIFICATIONS OF THE 2018 WORLD CANCER RESEARCH FUND AMERICAN INSTITUTE FOR CANCER RESEARCH SCORE AND CANCER RISK IN THE UK BIOBANK

Fiona Malcomson [1], Marissa Shams-White [2], E. Christi Thompson [3], Solange Parra-Soto [4], Frederick Ho [5], Carlos Celis [5], Linda Sharp [1], John Mathers [1]

[1] Newcastle University, [2] American Cancer Society, [3] Los Alamos National Laboratory, [4] Universidad del Bío-Bío, [5]Glasgow University

Introduction: The '2018 WCRF/AICR Score' (hereafter Score) is a standardised scoring system to assess adherence to the WCRF/AICR Cancer Prevention Recommendations, which aim to reduce cancer risk. We investigated changes to the total Score and associations with cancer risk, following these modifications.
Methods: We included 94,778 cancer-free participants (53% female, mean age 56) from the UK Biobank prospective cohort study for whom a total Score could be derived. Scores were calculated from baseline dietary, physical activity, and anthropometric data. We applied the following modifications: i) addition of sub-components on body fat percentage and A Body Shape Index to the 'be a healthy body weight' recommendation, ii) cut-off of 300mins/week MVPA to meet the 'be physically active' recommendation, iii) addition of a sub-component for sedentary behaviour (proxy based on time spent driving, watching television or using a computer), and iv) cut-off of ≤350g red meat weekly to the recommendation to 'limit consumption of red and processed meat'. Modifications were applied in different combinations, resulting in multiple total Score variants. Associations between Score variants and risk of all cancers combined were investigated using Cox proportional hazard models, adjusting for confounders.
Results: Mean total original Score was 3.84 (SD 1.0) points. The largest difference in Score (-0.15 points, $p<0.001$) followed application of the higher MVPA cut-off. Each variant Score correlated positively with the

original Score (Pearson's coefficient >0.96, p<0.001). In a median follow-up time of 7.9 years, 7,296 participants developed cancer. Each 1-point increment in the original
Score was associated with a 7% lower cancer risk (HR=0.93, 95%CI: 0.90-0.95, p<0.001). Inverse associations of a similar magnitude were found for all Score variants; the greatest risk reduction was observed by adding sedentary behaviour and changing the red meat cut-off (HR=0.92, 95%CI: 0.90-0.94, p<0.001).
Conclusion: We found inverse associations between variants of the 2018 WCRF/AICR Score and cancer risk. Incorporating sedentary behaviour and applying more stringent criteria for meeting the recommendation to limit red meat intake may improve predictive utility for cancer risk.

Poster Session 1-A
DATABASE DEVELOPMENT AND RESOURCES
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-A-1 A REVISED FOOD GROUPING SYSTEM FOR IMPROVED DIETARY REPORTING IN THE UK NATIONAL DIET AND NUTRITION SURVEY

Birdem Amoutzopoulos [1], Angela Mulligan [1], Caireen Roberts [1], Gillian Swan [2], Suzanna Abraham [3], Anila Farooq [3], David Collins [1], Toni Steer [3], Polly Page [3]

[1] University of Cambridge, [2] Office for Health Improvement and Disparities, [3] MRC Epidemiology Unit, University of Cambridge

Introduction: A standardized food classification system is essential in food consumption surveys, such as the UK National Diet and Nutrition Survey (NDNS), to ensure consistency and enable meaningful analysis of dietary data. Dating from 1986, the NDNS food group system was in need of revision to better reflect the current UK diet, align with today's public health priorities, and meet current reporting requirements. Furthermore, a new system would improve efficiency of updates and data consistency, bring flexibility to evolve with surveillance priorities, and enhance scope for advanced research analysis, such as contributory food sources to dietary intake.
Methods: Our aim was to establish a systematic, flexible, and sustainable food group ontology, designed in accordance with established systems (e.g., FoodEx2). New food groups would ensure similarity in terms of food matrix, nutrient composition, preparation methods, consumption patterns, and their overall role in the diet. A 3-tiered food classification structure was devised to enable both efficient NDNS reporting and more comprehensive research analysis. Consideration was given to retaining, where possible, elements of the former food group structure to enable comparisons with previous data.
Results: A revised NDNS food grouping system consisting of 18 main food groups, 141 second-tier, and 211 third-tier sub-groups was implemented. All 3,486 food items in the NDNS Nutrient Databank (2022-2023) were successfully classified. Foods were organized using key criteria including ability to distinguish dietary contributors on the basis of added sugars, plant-based, meat-based, vegetable-based, whole grains, and complex dishes. The three-tier structure provided the opportunity to distinguish between high-fat and low-fat and high-sugar and low-sugar food sources. Continuity in monitoring consumption of specific food groups, especially main categories, e.g., milk and milk products, was retained where possible.
Conclusion: The new NDNS food grouping system enables reporting of dietary intake and contributory food sources in line with current public health priorities, providing an efficient and standardised methodology with the ability to differentiate for aspects of detail. NDNS data can be

employed for a range of research aims, including application of health indices. The previous and new food grouping systems will be archived following publication of the next NDNS report (2019-2023).

P1-A-2 DEVELOPMENT OF A FOOD IMAGE DATABASE FOR AUSNUT TO AUTOMATE FUTURE NUTRIENT ANALYSIS

Josephine Tam [1], Jessica Gannon [1], Lauren Davidson [1], Margaret Allman-Farinelli [2], Virginia Chan [2]

[1] The University of Sydney, [2] Charles Perkins Centre, The University of Sydney

Introduction: Traditional dietary assessment methods such as food diaries face challenges of high respondent burden. The ubiquity of smartphones with inbuilt cameras combined with the rise in artificial intelligence and image recognition could reduce the burden on individuals but poses challenges around nutrient analysis. Advancements in machine learning are decreasing this challenge, but a dataset of food images is required to develop a food image recognition model. This study aimed to develop a protocol for systematically creating a food image database and to establish an Australian food image database linked to an Australian food composition database.
Methods: Utilising food consumption data for minor food groups in the most recent National Nutrition and Physical Activity Survey (NNPAS) 2011-12 study, the top 100 consumed foods by energy contribution were used to select food items for the database. Image data were gathered via Google's API service using custom Google search engines and the Google Images Search Python package. This package searched and saved images based on provided search terms. Two search strategies were employed: (i) a detailed and specific search and (ii) a broad and inclusive search. For the detailed search, a comprehensive list of search terms that accounted for the diverse ways food can appear and be prepared was generated. The downloaded images were then screened in duplicate against the inclusion criteria and assigned AUSNUT 2011-13 database food item codes.
Results: Preliminary results of eight food items are presented: rice, apple, banana, pear, egg (chicken), potatoes, cheese (cheddar), and chocolate. In total, 25,825 images were collected and 6,554 images included. The broad and inclusive search strategy performed better, with an average yield of 37%, in comparison to the detailed and specific search, with an average yield of 20%. An exception was chocolate, for which the specific search performed better with a yield of 52% in comparison to 39%.
Conclusion: Sourcing images online was a feasible and rapid method to obtain a large set of food images. When sourcing images online, selecting appropriate search terms is vital for maximising image yield. Using broader terms instead of specific phrases should be adopted to improve yield. Ultimately, the findings of this study will inform the development of a more comprehensive food image database to improve AI recognition capabilities of food.

P1-A-3 APPROACH TO CREATING A FOOD AND NUTRIENT DATABASE THAT INCLUDES FOODS UNIQUE TO VARIED EATING TRADITIONS

Lisa Harnack [1], Abigail Johnson [2], Janet Pettit [3], Jennifer Stevenson [3], Kristine Schmitz [3], Bhaskarani Jasthi [3]

[1] University of Minnesota, [2] University of Minnesota School of Public Health, [3] University of Minnesota Nutrition Coordinating Center

Introduction: Food and nutrient databases are often developed with a focus on including foods most commonly consumed in the country for which the database is developed. This approach can result in a database that includes the foods consumed by the dominant groups in a society, with the foods consumed by non-dominant groups such as Indigenous and immigrant communities not included. The developers of the University of Minnesota Nutrition Coordinating Center (NCC) Food and Nutrient Database have used an approach to work toward having a database that supports inclusive nutrition surveillance and research in the US.

Methods: The approach used by NCC to identify and add foods unique to varied eating traditions to its database is described, and strengths and limitations of it are highlighted.

Results: The process of adding foods unique to a specific eating tradition to the NCC Database involves the following key steps: 1) identify foods (e.g., entrees, side dishes, desserts) commonly consumed as part of the eating tradition; 2) identify representative recipes for multi-ingredient foods (e.g., recipe for ewedu soup); 3) locate reliable food composition data for basic foods not already included in the database (e.g., locate analytic nutrient composition data for jute leaves), and carry out imputation of nutrient values as needed (e.g., calculate nutrient composition of a multi-ingredient food based on its recipe); and 4) create food descriptions that are recognizable to both study participants and those who may be carrying out data collection or entry. For example, the food description created for jute leaves- 'jute (ewedu, lalo, or saluyot)'- encompasses the ways this food is described in cultures in which this food is eaten. Ideally, each step in the process is carried out in collaboration with those who have deep understanding of the eating tradition through either lived experience or close engagement with it. Strengths of the approach NCC uses include reliance on experts, rigorous procedures for assigning nutrient values to foods, and the creation of food descriptions that take into account the varied ways a food may be described. Limitations include the time-intensiveness of the process and the risk of subjectivity when relying on experts versus measured data.

Conclusion: The approach NCC uses for including foods unique to varied eating traditions in its database may serve as a useful model for other database developers.

P1-A-4 QUALIFYING FOOD MATCHINGS WHILE MAPPING COMPUTERIZED 24-HOUR RECALLS ON A NUTRIENT DATABASE

Eduardo De Carli [1], Kristy Soraya Coelho [1], Eliana Bistriche Giuntini [1], Jéssica Levy [1], Eduardo Purgatto [1], Bernadette Dora Gombossy De Melo Franco [1], Isabela Martins Benseñor [1], Paulo Andrade Lotufo [1], Dirce Maria Lobo Marchioni [2]

[1] University of São Paulo, [2] Public Health Faculty, University of São Paulo

Introduction: Standardized procedures for matching food and nutrient databases are critical for deriving reliable dietary estimations in epidemiological studies. To facilitate this task, many computerized tools have been recently proposed, with few considerations of international criteria to assess the quality of food composition data. In this study, we developed and validated a semi-automatic system for standardly qualifying food matchings while mapping computerized 24-hour recalls on a nutrient database, following guidelines from the International Network of Food Data Systems (INFOODS).

Methods: Data from a national food composition database (TBCA 7.1) and from outputs of 24-hour dietary recalls (24HR) described by the Brazilian version of the GloboDiet software were selected to develop and test the automated approach. The system was structured as a decision tree with more than 12,000 endpoint nodes, reflecting both one-to-one and multiple matching possibilities between 1,742 GloboDiet and 1,412 TBCA items, based on their names/synonymies as well as on food-specific sets of facets and descriptors influencing nutrient quality data. For each endpoint node, a matching quality code relative to the overall food proximate composition data was documented, according to INFOODS guidelines. For error measurement purposes, food consumption data from 101 individuals were analyzed (196 24HR, 7337 entries pertaining to 1,594 unique food items). The system precision for ascribing both TBCA and quality codes to the 24HR outputs was determined by manually reviewing the percentage of accurate matches. Validity indicators relying on association and concordance between manually and automatically calculated intake estimates for energy and 29 nutrients included relative mean differences, Pearson correlation coefficients, and weighted kappa statistics.

Results: Application of the system to 24HR data enabled it to map all food items with a precision rate of 98.2% for TBCA codes and of 91.8% for matching quality codes, respectively. When comparing dietary estimates obtained manually and with the aid of the system, small relative mean differences (≤9.2%), high correlation coefficients (≥0.92), and high kappa statistics (≥0.75) were found.

Conclusion: The proposed system may aid epidemiologists in comparing nutrient data qualities across studies, while allowing the compiler to identify the major limitations of food composition databases and priority aspects for improvements.

P1-A-5 METHODOLOGICAL ADVANCES IN MOVING TOWARDS BRANDED FOOD BASED DIETARY ASSESSMENTS

Mary L'Abbe [1], Guanlan Hu [2], Hayun Jeong [1], Alyssa Schermel [2], Daniel Zaltz [1], Emily Ziraldo [2]

[1] University of Toronto, [2] Department of Nutritional Science, Temerty Faculty of Medicine, University of Toronto

Introduction: Mandatory Front of Pack Labelling (FOPL) has been implemented in many countries and will be mandatory in Canada by January 2026, with a 'high in' nutrition symbol required on foods and beverages meeting or exceeding thresholds for sodium, sugars, and/or saturated fats. Current national dietary intake surveys, which rely on generic food composition databases, are unable to assess the impact of FOPL on the food choices of the population.The objective is to overview the methodological issues and potential solutions to monitor the intake of populations in response to food policies, such as FOPL.
Methods: We developed FLIP©, the Food Label Information and Price database, which contains nutrition information, ingredients, and price of brand name packaged and restaurant foods sold in Canada since 2010. For the timely collection and management of the large FLIP2023 database (n>150,000 foods and beverages), web-scraping and OCR were used to collect data from Canada's 8 largest grocery retailers, and different machine learning algorithms were developed and used to analyze the data, including food classification, nutrient profiling system application, ingredient analyses, and free sugars estimation. Image object detection algorithms were applied to identify and analyze specific marketing features on the packaging. Leveraging the current FLIP© architecture allows us to link this database with food diary and 24hr recall applications to create brand-specific 24-hour dietary recall survey tools to monitor and evaluate the impact of food policies on the dietary intakes of populations.
Conclusion: Branded food databases and dietary intake survey tools based on brand name foods are needed to evaluate FOPL and many other food policies such as restrictions on marketing unhealthy foods to children or determining if foods meet school food standards or dietary responses to reformulation strategies, such as SSB taxes or sodium or sugar reduction programs.

P1-A-6 ESTIMATING MICRONUTRIENT CONTENTS OF PACKAGED FOODS BASED ON THE INGREDIENT COMPOSITION AND NUTRITION LABELS

Sungok Kwon [1], Jihyun Yoon [1], Cho-Il Kim [1]

[1] Seoul National University

Introduction: Nutrition labels (NL) on packaged/branded foods serve as a key source of nutritional information for consumers and are considered a valuable tool for promoting healthier dietary choices. Nevertheless, NL list only 9 nutrients due to regulatory restrictions and labeling constraints,

providing limited information on essential vitamins and minerals in Korea. To enhance NL use, information on additional nutrients, such as vitamins and minerals, is needed.
Methods: We explored the possibility of estimating unreported micronutrient contents using the ingredient list and ingredient mixing ratio derived from the food manufacturing report of 57,363 packaged/branded foods in Korea. Ingredient statements were parsed with a Python program and converted into a dataset where each row represents a unique food item and each column correspond to a specific ingredient mixing ratio. We matched ingredient names with food items listed in the Food and Nutrient Database (FNDB) from the Korea National Health and Nutrition Examination Survey and the Rural Development Administration. Nutrient values for each ingredient were multiplied according to the mixing ratio and summed to calculate the total nutritional value for each product.
Results: At the first step of the analysis, we excluded products if the number of ingredients that could not be matched with the foods in FNDB exceeded 10% of the total number of ingredients. This selection process identified 1,957 products with a sum of mixing ratio between 90% and 110% (breads 320 products, confectioneries 183 products, food for infants and toddlers 133 products, coffee 132 products). Estimation of energy, carbohydrate, protein, and fat content revealed that 901 products met the criteria of ±20% difference between the calculated and NL values for energy content. Of these, 641, 390, and 240 products also met the criteria for carbohydrate, protein, and fat, in an additive manner. Only 12% of products examined satisfied all criteria for energy, carbohydrate, protein, and fat content within 20% tolerance.
Conclusion: Accurate micronutrient estimation requires optimal matching of product ingredients with foods in FNDB in addition to processing factors. We are working on developing a model to estimate micronutrient content of packaged/branded foods considering food processing categories and accounting for relevant nutrient changes. The model will be validated against the chemically analyzed micronutrient data from this study.

P1-A-7 DEVELOPMENT OF THE BRAZILIAN TABLE OF FOOD ADDITIVES CONSUMED BY BRAZILIANS IN 2017-2018

Luisa Lage [1], Maria Laura Da Costa Louzada [1]

[1] *University of Sao Paulo*

Introduction: Food additives are substances intentionally added to foods to modify their physical, chemical, biological, or sensory characteristics, especially in ultra-processed foods. Despite the increase in the consumption of these products, data on the consumption of food additives are scarce, including in Brazil. Therefore, the objective of this study was to develop a database to identify food additives in foods

consumed by Brazilians in the most recent national survey.
Methods: The process of identifying food additives in foods consumed by Brazilians used four databases: a) Food consumption database - Household Budget Survey (2017-2018); b) Database of food labels sold in Brazil (IDEC/2017); c) Database of food brands in Brazil - Euromonitor (2017); d) Database of standardized recipes - Brazilian Food Composition Table (TBCA, 2022). A total of 2,072 food items were identified and divided into three groups: group 1, natural and minimally processed foods (e.g. banana); group 2, packaged and ready-to-eat foods (e.g. instant noodles); group 3, culinary preparations or foods with multiple items (e.g. hot dogs), whose ingredients were extracted from standardized recipes. The identification of food additives occurred in three phases: Phase 1 – For items in groups 2 and 3 with a brand (e.g. Tang Soft Drink), the list of ingredients was selected directly from the label database. Phase 2 – For items without a brand, the Euromonitor database was used to identify the most consumed brands in Brazil, and then the list of ingredients was obtained from the label database. Phase 3 – For food items from the consumption database that were not identified in the food label database, other criteria were established based on the three most consumed brands. By identifying the list of ingredients for food items in groups 2 and 3, it was possible to identify the presence or absence and the number of functions of food additives in each of the 2,702 items in the food consumption database.
Results: This method resulted in a database compatible with a nationally representative food consumption survey, the most recent available in the country.
Conclusion: The method developed to identify food additives present in foods consumed by Brazilians is innovative and will be useful in research on the consumption of these substances.

P1-A-8 ADDITIVES IN ULTRA-PROCESSED FOODS CONSUMED BY CHILDREN 6 TO 23 MONTHS IN PERU 2019

Marianella Miranda [1], Miguel Campos [2]

[1] Instituto Nacional de Salud, [2] Universidad Peruana Cayetano Heredia-PERU

Introduction: Food additives are substances intentionally added to foods for technological purposes, as defined by the Codex Alimentarius. These compounds are common in ultra-processed foods (UPF, Nova 4), which have an increasing impact on the Peruvian diet and may be associated with adverse health effects. This study aimed to estimate the additive content in ultra-processed foods consumed by the Peruvian child population.
Methods: A secondary analysis was performed on data from the food consumption survey in Peru: Food and Nutrition Surveillance by Life Stages 2019, which surveyed 604 children between 6 and 23 months of age. A random sample of 1080 foods were selected (from a total of 21790,

with the unit being each serving of food in the 24-h recall, including foods used in preparations). For each UPA (excluding infant foods and supplements) in the sample (95 in total) information on additives was sought from its labelling, and from online databases and local supermarkets. The additives identified were classified according to the 27 Codex Alimentarius functional classes and their characteristics. Weighted estimates with their 95% confidence intervals (95 CI) are presented.
Results: In this sample of 604 children, 27% (95 CI 24 to 28) of the energy came from UPA. Among its 95 AUPs, 96% (95CI 91 to 100) contained some food additive, 63% (95CI 52 to 75) contained emulsifiers, 34% (95CI 22 to 45) colorants, 38% (95CI 27 to 49) foaming agents, and 47% (95CI 35 to 59) highly toxic additives.
Conclusions: The additive content in ultra-processed foods consumed in Peru poses risks to public health. It is necessary to strengthen the regulation and surveillance of labeling and additive content in these products, in addition to promoting policies to reduce their consumption.

P1-A-9 NITRATE-RICH VEGETABLES IN BRAZILIAN SOIL: A COMPARATIVE STUDY

Clíslian Luzia Silva [1], Danilo Carvalho [2], Sandra Arruda [3], Teresa Da Costa [3]

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Introduction: Dietary nitrate is a precursor of nitric oxide (NO), an important physiological signaling molecule. Due to its vasodilatory properties, NO has beneficial effects on cardiovascular health. Leafy vegetables are the leading plant-based foods high in nitrate. However, nitrate content in plants varies widely depending on soil characteristics. This study aimed to analyze the nitrate content in nitrate-rich vegetables grown in Brazil and to compare the frequency distribution of these values with those reported in the literature.
Methods: Seven types of vegetables commonly found in the Brazilian diet and classified as nitrate-rich according to the literature (chard, lettuce, watercress, beetroot, kale, spinach, and arugula) were selected. Samples of these vegetables were collected over one year (June 2023 to June 2024) from the same commercial establishment in Brasília, Brazil. A portion of each vegetable was stored at -80°C until nitrate analysis, which was performed by spectrophotometry. Vegetables were categorized as lower than or higher/equal to the median of nitrate concentration (mg/kg) reported in a reference study. A chi-square goodness-of-fit test was used to compare the frequency distribution of vegetable samples with the literature data, at a significance level of 0.05.
Results: The following vegetables did not reach the median nitrate concentration reported in the literature, with more than 50% of their samples falling below the expected value: chard (89%, $x^2(1) = 17.29$, $p < 0.01$), lettuce (89%, $x^2(1) = 18.24$, $p < 0.01$), kale (72%, $x^2(1) = 5.83$, $p < 0.05$),

spinach (90%, $x^2(1) = 19.20$, $p < 0.01$), and arugula (82%, $x^2(1) = 13.36$, $p < 0.01$). Conversely, beetroot had fewer samples below the median nitrate concentration than expected (31%, $x^2(1) = 4.17$, $p < 0.05$). The frequency of watercress samples below the median was similar to the expected distribution (52%, $x^2(1) = 0.04$, $p = 0.84$).
Conclusion: The study revealed notable differences in nitrate content between vegetables identified as nitrate-rich in existing literature and those cultivated in Brazil. These discrepancies may be attributed to variations in growth conditions, genetic factors, and climatic influences. Therefore, it is essential for intervention studies that utilize vegetables as a source of nitrate to conduct detailed analyses of the nitrate content.

Poster Session 1-B
DATA ANALYSIS AND DATA SCIENCE
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-B-10 THE ROLE OF ENERGY INTAKE AND UNDER-REPORTING IN THE CALCULATION OF DIETARY CLIMATE IMPACT

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Introduction: The methodology of calculating dietary climate impact is of key importance when studying the dietary shift towards more sustainable diets. When evaluating greenhouse gas emissions (GHGE) induced by diets, it is essential to understand the connection between energy intake and GHGE. The aim was to evaluate the role of under-reporting and to compare the different options to account for energy intake when studying the dietary GHGE sum.
Methods: The dietary climate impact (GHGE sum as kg CO2 eq/day) was calculated for the Finnish nationally representative FinDiet 2017 Survey data (n= 1 655, age 18–74, response rate 53%) with two non-consecutive 24-hour dietary recalls. GHGE sums were divided into sex-specific quartiles (Q1-Q4). GHGE values were produced with the life cycle assessment (LCA) by the Natural Resources Institute Finland. Energy under-reporters (URs) were identified following the EFSA/EU Menu methodology.
Results: The Spearman's rank correlation coefficient between energy intake and absolute GHGE sum was 0.63 for women and 0.64 for men. Using absolute GHGE values, the mean energy intake in Q1 of GHGE sum was low (5.7 MJ for women and 7.0 MJ for men), indicating a high proportion of URs (around 50% in both sexes in Q1). Taking energy into account in GHGE sum either using the residual or energy density method, the proportion of URs was the largest in Q4 compared with other quartiles of GHGE sum (30% in women and 40% in men). The energy adjustment

using either the residual method or the energy density method leads to very similar quartiles of GHGE sum (94% agreement, Kappa statistic 0.92). When comparing the absolute GHGE quartiles with energy-adjusted GHGE quartiles (the residual method), 50% of the sample were identified to the same quartile in both measures and 40% to the adjacent quartile, Kappa statistic being 0.33. When URs were excluded (22% of women and 28% of men), the measures of agreement did not change significantly between absolute and energy-adjusted quartiles. However, excluding URs resulted in more plausible mean energy intake levels in Q1 of absolute GHGE sum (6.8 MJ for women and 8.3 MJ for men).
Conclusion: Energy intake and GHGE of diet are strongly correlated. Therefore, it is essential to examine both energy intake and under-reporting when studying the climate impact of diets. In evaluation of absolute GHGE level, exclusion of under-reporters should be considered.

P1-B-11 HOW DO FOOD APPROACH BEHAVIORS AFFECT THE VARIABILITY OF FOOD INTAKE IN CHILDREN AND ADOLESCENTS WITH AUTISM SPECTRUM DISORDERS?

Eduarda Silva Teixeira [1], Laura Hoffmann [1], Laura Pohl [1], Josiane Luçardo [1], Kamila Castro [1], Eliseu Verly-Junior [2], Sandra Valle [1], Juliana Vaz [1]

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Introduction: Feeding difficulties, experienced by around 80% of autism spectrum disorder (ASD) patients, impact food acceptance and refusal, consequently affecting their nutrient intake. Most dietary studies with ASD patients have found different results when assessing the adequacy of energy and nutrient intake. However, these studies often lack rigorous methodology and adjustments for day-to-day variation to estimate usual intake. This study aims to provide data on within-individual (S^2_w) and between-individual variance (S^2_b) of children and adolescents with ASD in southern Brazil according to food approach scores.
Methods: We utilized data from the cross-sectional stage of the research project "Protocol for Nutritional Care in Autism," conducted at a neuropediatric service at the Federal University of Pelotas. The study included children and adolescents aged 2 to 18 years diagnosed with non-syndromic ASD and received ethical approval from the institution. Socio-demographic data were obtained from a standardized questionnaire. Feeding behavior was assessed using the Children Eating Behavior Questionnaire's food approach scores, which were used to divide the sample (<median and ≥ median). Three 24-hour food recalls were carried out on non-consecutive days (one weekend day). The Brazilian Food Composition Table (TBCA, version 7.2) was utilized to estimate energy and nutrients. The S^2_w and S^2_b coefficients and the variance ratio ($VR = S_w^2/S_b^2$) were obtained with the Multiple Source Method program, adjusting for sex and age.

Results: The sample consisted of 231 participants (193 boys), with mean age of 7.6 years. The median for the food approach domain was 53. Generally, S^2w was higher than S^2b (VR > 1) for the dietary variables in both food approach score groups. However, lower values were observed in the group with scores below the median, with more variables showing VR < 1. Accurate food consumption assessments depend on VR, which varies between nutrients and according to sample characteristics. Previous studies found different values for the dietary variability of neurotypical children and adolescents; however, they investigated limited associations, restricted to age and sex.
Conclusion: Our results indicate the need to consider the particularities associated with ASD when planning and conducting dietary analyses.

P1-B-12 FEAST OR FAST: EVIDENCE OF DAILY VARIATION IN INTAKES DURING PREGNANCY

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Introduction: Studies of nutrition during pregnancy commonly use food frequency questionnaires, 24-hour dietary recalls, or short-term food records to assess intakes. However, the lack of long-term daily observations means it is unknown how much day-to-day variation exists during pregnancy and how that might impact long-term health.
Methods: Pregnant individuals were recruited from a New York City health system, December 2020-June 2023, as part of the Temporal Research in Eating, Nutrition, and Diet during Pregnancy (TREND-P). Each participant collected dietary data during two 14-day rounds during the 2nd trimester (with 4-6 weeks between rounds; mean gestational age at round 1 and 2, 17.6 and 24.5 weeks, respectively) using a mobile phone and custom app to log before/after photos of all eating occasions. Diet logs were used to determine all consumed foods and beverages and their respective portion sizes. Nutritional information was obtained using ESHA Food Processor Nutrition Analysis software. Variation was measured using intraclass correlation coefficient (ICC) and coefficient of variation (CV). Comparison of weekends and weekdays was done using paired t-tests.
Results: There were 150 participants who completed at least one round of data collection, with 134 completing both rounds. We found significant intra-individual variation in daily energy and macronutrient intake (ICC range 0.30-0.39). Intra-individual and total variation was more pronounced for critical micronutrients (CV range 45-140% and ICC range 0.15-0.37) and food type (CV range 94-1640% and ICC range 0.08-0.34). We also found significant differences ($p<0.05$) in nutrient intakes between weekends and weekdays, with weekdays having a higher consumption of fiber; protein; copper; folate; iron; magnesium;

phosphorus; omega 3; and vitamins A, B1, B3, and E. Milk and dairy products were consumed significantly more on weekdays.
Conclusion: The TREND-P study represents one of the largest collections of real-time individual days of dietary intakes during pregnancy, an under-researched stage of life. Significant variation in energy and nutrient intake variation observed during the second trimester warrants further investigation into whether this is true during other stages of pregnancy and how it relates to health outcomes.

P1-B-13 DOUBLY LABELED WATER VALIDATION OF THE GOLDBERG METHOD AND QUESTIONNAIRE-DERIVED PHYSICAL ACTIVITY LEVELS (PAL) TO CLASSIFY ENERGY INTAKE REPORTING STATUS IN ADULTS

Heather Neilson [1], Shervin Asgari [2], Karen Kopciuk [3], Janet Tooze [4], Farah Khandwala [1], Anita Koushik [5], Rémi Rabasa-Lhoret [6], Ilona Csizmadi [7]

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Introduction: Dietary intake misreporting is widely acknowledged in nutritional epidemiology. The Goldberg method has been proposed as an option for identifying under-reporters of energy intake (EI) in large epidemiologic studies. However, its implementation remains limited given the challenges associated with estimating physical activity levels (PAL), a key component. The objective was to quantify the accuracy of the Goldberg method to classify EI misreporting using Sedentary Time and Activity Reporting Questionnaire-derived PAL_{STAR-Q} compared with doubly labelled water (DLW)-derived total energy expenditure (TEE_{DLW}).
Methods: Between 2009 and 2011, 99 weight-stable men and women (mean [SD]: 48 [8] years) completed a two-week DLW protocol, the Canadian Diet History Questionnaire I, and the STAR-Q, a comprehensive past-month activity questionnaire. TEE_{DLW} was the criterion measure of EI to determine the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy (proportion correctly classified as under-reporters or acceptable reporters) of Goldberg cut-points based on the PAL_{STAR-Q}. A global PAL of 1.55 frequently used in the classic Goldberg method was also studied for comparison.
Results: The Goldberg method with the PAL_{STAR-Q} classified 58% of men and women as under-reporters, compared with 60% of men and 56% of women identified with TEE_{DLW}. Among men, values for sensitivity, specificity, PPV, NPV, and accuracy of the Goldberg method and PAL_{STAR-Q} were estimated as: 88%, 87%, 91%, 81%, and 87%, respectively. Among women, these values were: 79%, 69%, 77%, 72%, and 75%, respectively. Substituting a PAL of 1.55 for the PAL_{STAR-Q} reduced the proportion of men and women classified as under-reporters to 35% and 19%, respectively,

lowered sensitivity to 54% and 33%, and increased specificity to 93% and 100%.
Conclusion: Population-specific validation sub-studies using the Goldberg method combined with validated questionnaire-derived PALs present a viable option for exploring the extent of EI misreporting in large epidemiologic studies lacking objective EI measures.

P1-B-14 A PERSPECTIVE ON THE VALIDITY OF USING JONES FACTORS TO CALCULATE PROTEIN CONTENT

Beulah Pretorius [1], Hettie Schönfeldt [1]

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Introduction: Protein-rich foods from animal origin are the most expensive part of consumers' food baskets today. Not only does protein contribute energy to the diet as an essential macronutrient, but it also contributes essential and non-essential amino acids to the diet. Protein content in food is calculated from the nitrogen concentration (determined by Kjedahl or Dumas method) of the food using a nitrogen-to-protein conversion factor - the Jones factor, specific for certain foods. The most commonly used Jones factor is 6.25, which assumes that protein contains 16% nitrogen.
Methods: In this study, the amino acid content of high-protein foodstuffs (meat, dairy, and protein supplements) was analysed (using high-performance liquid chromatography) and the protein content was calculated in two ways. First, using the respective Jones factors and secondly, by using the sum of the amino acid residues.
Results: The protein content was over-reported when using the Jones factor. For meat and the supplements, the difference was statistically significant ($p \leq 0.05$). Genetic variability and seasonality in foodstuffs and the effects of how protein sources are produced and processed may to a certain extent explain the discrepancies between values determined for the same type of foodstuff. The more accurate method to determine protein content is to hydrolyse protein to their component amino acids, which can then be quantified. The sum of the amino acid residues will represent the protein content of the food. This should be the preferred approach to quantify proteins in foods.
Conclusion: The indirect analysis using the total nitrogen content of the food multiplied by a conversion factor will still be used as it is more cost-effective and requires less sophisticated analytical instrumentation and skill. Therefore, more discussion is recommended on the updating and application of Jones factors.

P1-B-15 USING DATA ENVELOPMENT ANALYSIS TO ASSESS ADHERENCE TO RECOMMENDED ENERGY BALANCE-RELATED BEHAVIORS IN CHILDREN

Henna Vepsäläinen [1], Josefine Björkqvist [2], Satu Kinnunen [3], Reetta Lehto [2], Jenna Rahkola [2], Eva Roos [2], Carola Ray [2], Maijaliisa Erkkola [1]

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Introduction: Clustering of energy balance-related behaviours (EBRBs) can be investigated using a data-driven or theory-based approach. While data-driven methods, such as cluster analysis, can identify existing combinations of EBRBs, they may lack interpretability. On the other hand, pre-defined indices might not reflect real-world EBRB clusters. We piloted a hybrid approach combining empirical and theoretical views to create a measure for existing combinations of EBRBs aligned with recommendations for 3-6-year-olds.

Methods: Altogether 521 children from the DAGIS Survey were included. Data on food consumption, moderate-to-vigorous physical activity (MVPA), sleep duration, and screen time were collected using food records, accelerometers, and screen time diaries in 2015-2016. We used input-oriented data envelopment analysis (DEA) with four less-is-better variables (consumption of sweet pastries, sweets, and sugared drinks; screen time) and six more-is-better variables (consumption of fresh vegetables, fruits, fish, and skimmed milk; sleep duration; MVPA). All variables were normalized. The consumption of fresh vegetables, fruits, skimmed milk, and MVPA were capped to the recommended levels (125 g/d, 125 g/d, 400 g/d, 60 min/d). An efficiency score ranging from 0 to 1 was calculated for each of the participants, with a higher score indicating stronger adherence to recommendations. The participants were divided into high efficiency (the top 20%) and lower efficiency (the bottom 80%) groups. We then used Student's t- and Chi Squared-tests to investigate differences in background characteristics and health behaviors between these groups.

Results: Mean efficiency scores were 0.39 in the whole sample, 0.25 in the lower, and 0.98 in the high efficiency group. Age, gender, and parental education did not differ between the groups. The participants in the high efficiency group consumed more fresh vegetables, fruits, fish, and skimmed milk, and less sweet pastries and sweets than the participants in the lower efficiency group. They also had longer sleep duration, more MVPA, and less screen time.

Conclusion: DEA identified participants with stronger adherence to the recommended EBRBs, suggesting acceptable construct validity. The continuous efficiency score can be flexibly used in subsequent analyses, which are needed to confirm, for example, the criterion validity of the measure.

P1-B-16 IMPACT OF VARYING EPOCH LENGTH IN ACCELEROMETRY DATA PROCESSING ON PHYSICAL ACTIVITY INTENSITY CLASSIFICATION IN ADULTS: CONSIDERATIONS FOR PUBLIC HEALTH

Valérie Deschamps [1,2], Rayane Haddadj [3], Jeremy Vanhelst [4], Charlotte Verdot [2]

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Introduction: Accurately measuring physical activity (PA) is essential for monitoring needs and guiding public health policies. PA questionnaires are commonly used in epidemiology for their low cost and ease of implementation, but they remain a subjective tool. Accelerometry represents a strong alternative, though its data collection and processing methods vary across studies. Standardizing these methods is crucial for reliable comparisons and generalizations. Epoch length, the sum of successive acceleration values over a period, is a key factor in accelerometry data processing. Its variability impacts results (PA profiles), as demonstrated by previous studies in children. Our study aims to assess the impact of epoch length choice on PA profiles patterns in adults.

Methods: This research used data from the French Esteban study (2014-2016). Participants wore a wGT3X-BT ActiGraph® accelerometer for seven consecutive days, positioned on the right hip, during waking hours. Data were exported and processed using Actilife® software. A repeated measures ANOVA was used to assess the impact of epoch length choice (1, 5, 10, 15, 30 or 60 seconds) on PA intensity classification: sedentary time, light PA (LPA), moderate PA (MPA), vigorous PA (VPA).

Results: Data from 181 adults (80 males; 101 females) aged 18-74 were analyzed. Longer intervals are associated with less sedentary, MPA, and VPA times in favour of more time in LPA. As a result, the proportion of individuals reaching the PA recommendations (based on MPA and VPA durations) varies considerably according to epoch lengths used (respectively 93%, 54% and 12% according to 10s, 30s and 60s epoch).

Conclusion: These results indicate that epoch length choice significantly affects PA intensity classification in adults, as in children. The determination of PA levels and health guideline adherence, based on moderate to vigorous PA duration, suggests that interval duration choice in analyses is crucial. Shorter intervals are recommended to capture both brief and extended PA bouts.

P1-B-17 UNVEILING DIFFERENCES IN YOUNG CHILDREN'S SLEEP AND PHYSICAL ACTIVITY METRICS USING ACTILIFE VERSUS GGIR ANALYSIS METHODS

Katarina Osojnicki [1], Hailey Mazenauer [1], Jess Haines [1], David Ma [1], Lori Ann Vallis [1]

[1] *University of Guelph*

Introduction: Different processing software are available for characterizing accelerometer derived movement behaviours in preschool-aged children however, studies reporting the agreement for key outcome measures is limited. The current study compares sleep and physical activity (PA) metrics for accelerometer data processed using Actigraph's Actilife software versus GGIR open-source code.

Methods: Free-living data from children in the Guelph Family Health study were recorded using an accelerometer (wGT3X-BT ActiGraph; 100Hz; right hip; 7 days; 24 hours/day). Raw data was first downloaded using Actilife (v. 6.13.1; low frequency extension feature enabled) and files were exported to 60- and 1-sec epochs. Algorithms (Sadeh et al., 1994; Tudor-Locke et al., 2014) were applied to 60-sec epoch files to identify sleep/wake times and cross-validated with parent-filled activity logsheets; reported bedtimes were also visually compared to ActiLife detected bedtimes. One-sec files were imported and cross-validated with logsheets and PA age-appropriate cutpoints were applied (Trost et al., 2012; Butte et al., 2014, Evenson et al., 2008). Raw data were then processed using the GGIR package (v. 3.1.1) in R (v. 4.4.0). The Euclidean Norm Minus One method was used, applying the Hildebrand (2016) cutpoint for PA metrics and the Sadeh (1994) sleep algorithm. PA variables computed in Actilife and GGIR included light PA (LPA), moderate-vigorous PA (MVPA), total PA, and sedentary behaviour (SED). Sleep variables computed included total sleep time, wake after sleep onset (WASO), and sleep efficiency (SE).

Results: Preliminary results are from a subsample (n=14); further analyses will be completed on the full dataset (n=206) comparing processing methods. One-way ANOVAs (SPSS; v. 29.0.2.0) revealed significant differences ($p<0.05$) between methods; e.g. GGIR calculated more SED time (+289min) and less LPA (-114min), MVPA (-71.8min) SE (-0.76%), and WASO (-6.65min) time compared to ActiLife processed data.

Conclusion: Preliminary findings suggest that accelerometer processing methods significantly influences accelerometer estimated PA and sleep values. While sleep metrics are more comparable between methods, GGIR calculates significantly higher SED values and significantly lower PA values compared to ActiLife. Discrepancies between the two methods emphasize the need for methodological consistency and transparency in software processing when studying children's PA and sleep.

P1-B-18 A CONTROL SYSTEMS MODEL FOR SEDENTARY AND PHYSICAL ACTIVITY BEHAVIOURS: AN INTEGRATED CONCEPTUAL FRAMEWORK

Reza Daryabeygikhotbehsara [1], Ralph Maddison [1], David Dunstan [1], Sheikh Mohammed Shariful Islam [1], Mohamed Abdelrazek [1]

[1] Deakin University

Introduction: Theoretical frameworks are critical for understanding behaviour change, but they often do not capture the complexity of human behaviours such as physical activity (PA). The development of real-time data analytics and big data has opened up opportunities for creating dynamic, testable models of existing theories. This study aims to present a control systems model of the Capability-Opportunity-Motivation and Behaviour (COM-B) framework aimed at reducing sedentary behaviour (SB) and promoting PA in adults. By leveraging the principles of control systems engineering, this model offers a structured way to test behavioural interventions more dynamically.
Methods: We used a control systems approach to the COM-B model, mapping key behaviour change techniques (BCTs), such as goal setting, problem-solving, and social support, to illustrate their interaction with the core components of COM-B. The framework highlights how dynamic models can help optimise behavioural interventions, making them more adaptable to individual needs in real-time.
Results: A fluid analogy is used to represent the COM-B system and provides a dynamic explanation of how BCTs interact with COM-B variables. Mathematical representations of model inputs and outputs were used to describe the behaviour change process, providing an empirical basis for understanding how interventions modify behaviour over time.
Conclusion: This integrated control systems model of the COM-B framework provides a foundation for empirically testing and optimising individual behaviour change components. Dynamic modelling goes beyond traditional static approaches by offering a more precise understanding of the interrelations between variables, allowing for the development of more adaptive, personalised, and effective interventions. This marks a significant step forward in utilizing advanced computational approaches to refine behaviour change theories and interventions aimed at reducing sedentary behaviour and promoting physical activity in adults.

P1-B-19 A SYSTEMATIC REVIEW AND META-ANALYSIS OF THE FIRST DECADE OF COMPOSITIONAL DATA ANALYSES OF 24-HOUR MOVEMENT BEHAVIOURS, HEALTH, AND WELL-BEING IN SCHOOL-AGED CHILDREN

Nicholas Kuzik [1], Markus Duncan [2], Natalie Beshara [3], Matthew Macdonald [3], Diego Augusto Santos Silva [4], Mark Tremblay [1]

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Introduction: Movement behaviours (i.e. sleep, sedentary behaviour, and physical activity) are associated with numerous health and well-being outcomes. The application of compositional data analysis (CoDA) to movement behaviour analyses accounts for the interdependent nature of time use of these behaviours. This systematic review and meta-analysis synthesizes CoDA research examining the association between daily movement behaviours, health, and well-being in school-aged children.
Methods: Databases were searched for peer-reviewed studies examining CoDA associations between movement behaviours and health or well-being in school-aged children. All health and well-being outcomes were eligible for inclusion as were all methods of reporting CoDA results (e.g., regression parameters, substitution effects, optimal composition). Where possible, meta-analyses were conducted.
Results: Twenty-six studies were included in the review. Sample sizes ranged from 88-5,828 (median=387) participants and the mean ages ranged from 8 to 16 years. Regression parameters ($k_{studies}$=16) were the most common method of reporting results, followed by substitution effects ($k_{studies}$=12), optimal compositions ($k_{studies}$=3), and movement behaviour clusters ($k_{studies}$ =1). For regression analyses, moderate to vigorous physical activity (MVPA) was beneficial in 35% of results and null in 65%. Meta-analysis of substitutions also supported the benefits of MVPA, with the risks of reducing MVPA for other movement behaviours being double the magnitude compared to the benefits of adding MVPA.
Conclusion: The results of this review and meta-analysis align with the conclusions of previous reviews that support the benefits of MVPA. However, this review also quantified not only the need to promote MVPA, but perhaps more importantly, the urgency needed to preserve the limited MVPA school-age children currently accumulate. The main findings reinforce the "more is better" message, at least as it relates to MVPA in relation to other movement behaviours. However, the findings do not allow us to recommend more specific balances of movement behaviours among school-aged children. As CoDA of movement behaviours progresses and accumulates further research, the current review can serve as a stepping stone toward producing meta-analyses to inform precision health guidance needed for optimizing children's health and well-being.

Poster Session 1-C
ECOLOGICAL MOMENTARY ASSESSMENT
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-C-20 EXPLORING THE VALIDITY OF MOBILE-BASED ECOLOGICAL MOMENTARY ASSESSMENT FOR CAPTURING FOOD AND BEVERAGE INTAKE: A COMPARISON AGAINST 24-HOUR RECALL AND IMAGE-BASED TRACKING

Leanne Wang [1,2], Anna Rangan [2], Juliana Chen [2], Eric Hekler [3], Margaret Allman-Farinelli [2]

[1] University of Sydney, [2] Charles Perkins Centre, The University of Sydney, [3] Herbert Wertheim School of Public Health and Human Longevity Science, University of California San Diego

Trainee Poster Presentation Award Nominee

Introduction: Mobile-based ecological momentary assessment (mEMA) may overcome some of the limitations of traditional dietary assessment such as high respondent burden and memory biases by capturing time-sensitive data via concise surveys. Few studies have validated mEMA for dietary assessment. Self-administered 24h recall may now be considered the gold standard for assessing dietary intake, but previous studies have identified that some foods may be omitted during 24h recalls. This study aimed to validate mEMA for dietary data capture by comparing it with both the Automated Self-Administered 24h Dietary Assessment Tool (ASA24) and food/beverage images.
Methods: Four days of dietary data were collected, including responses to two to six signal-contingent mEMA per day, 24h recalls (2016 Australian version of the ASA24), and images taken by participants at all eating occasions. Each mEMA included a checklist of 33 food/beverage items based on a previously validated short-form food frequency questionnaire. Each mEMA was classified as a complete or partial/no match when compared against the two methods separately. Two outcome variables were extracted; the proportion of complete mEMA out of those received by the participant and the number of intrusions (false positive) and extrusions (false negative) for each food/beverage item in mEMA labelled as partial/no match.
Results: Twenty-three subjects were included (13 female; mean age 26 ± 2.1 years). The mEMA, ASA24, and images captured a total of 611, 841, and 750 food/beverage items, respectively. The proportion of complete mEMA responses was 56.9 ± 22.0% and 51.7 ± 25.0% when compared against the ASA24 and images, respectively. mEMA had 13 intrusions and 243 extrusions when compared against the ASA24 and 24 intrusions and 163 extrusions when compared against the images. The item with the most extrusions was “Sauces, salad dressings, condiments, gravy” for both comparisons followed by “Alcohol” and “Sweet biscuits, cakes, chocolate, sweets” for the ASA24 and image comparisons, respectively. Whilst mEMA had a higher match rate with the ASA24 than the images, the discrepancy in extrusions results from failure to collect all images and

inability to discern additions such as dressings.
Conclusion: Our study suggests that signal-contingent mEMA alone may not provide a comprehensive assessment of dietary intake. Event-contingent mEMA may need to be used in conjunction with wearable sensors and employ image or digital entry recording to improve accuracy whilst minimising burden.

P1-C-21 CONTRIBUTIONS OF EATING OCCASIONS TO DIET QUALITY: IMPLICATIONS FOR DEVELOPMENT OF ECOLOGICAL MOMENTARY ASSESSMENT (EMA)-BASED DIET ASSESSMENT METHODS

Terry Hartman [1], Ellen Mitchell [2], Ying Wang [2], Diane Mitchell [3,4], Lisa Harnack [5], Marissa Shams-White [2], Marjorie Mccullough [2]

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Introduction: We aim to develop diet assessment EMA-based methods to prompt reporting of food and beverage consumption over a specified period (e.g., past 3 hr). Prompts would occur periodically (e.g., 2-3 times/d) over a specified timeframe (e.g., 2 wks) and data combined to estimate usual daily intake of foods, food groups, and nutrients. Diet quality measures like the Healthy Eating Index (HEI), Alternate HEI (AHEI), DASH, and American Cancer Society Diet (ACSD) scores assess how well a diet pattern aligns with recommendations intended to promote healthful diets and reduce the development or progression of chronic disease. New innovations in diet assessment should consider future use; thus, it is important to characterize the role of eating occasions in determining overall diet quality.
Methods: Between 2015-2016, approximately 700 participants in the American Cancer Society's (ACS) Cancer Prevention Study-3 (CPS-3) Diet Assessment Substudy (mean age, 52 yrs; 64% female; 60% non-Hispanic white, 25% non-Hispanic black, 15% Hispanic) completed < 6 unannounced, telephone, interviewer-administered 24-hr diet recalls (DR) over 1 year. DR-derived eating-occasion variables included the number of meals and snacks, breakfast consumption (y/n), overnight fasting time (ONF) and diet quality measures. Multiple linear regression analyses evaluated associations between eating occasion variables with diet quality indices (continuous; β, 95% CI).
Results: Mean (SD) diet quality scores (possible range) for HEI-2015 (0-100), AHEI (0-110), DASH (0-40), and ACSD (0-12) were 62 (10.7), 63 (11.3), 24.1 (4.1), and 6.2 (1.9), respectively. On average, participants reported 2.8 (0.4) meals/d and 1.5 (0.9) snacks/d, with ONF time (hr)12.6 (1.5). Eating occasion frequency variables were positively associated with diet quality. For example, for each additional meal consumed HEI was 5.8 (4.1-7.5), AHEI 5.7 (3.9-7.4), DASH 2.0 (1.4-2.6), and ACSD 1.0 (0.7-1.3) points higher. For each additional snack consumed HEI was 2.6 (41.8-3.4), AHEI 3.5 (2.7-4.3), DASH 1.1 (0.8-1.4), and ACSD 0.4 (0.3-0.6) points higher. Regular breakfast consumption was positively and ONF time was inversely

associated with diet quality indicators.
Conclusion: Assumptions could potentially be made for the EMA collection of eating occasion data for diet quality estimation. For example, participants could be asked questions that characterize meal frequency and timing to inform initiation of EMA prompts.

P1-C-22 THE FEASIBILITY OF A SHORT-INTERVAL DIETARY RECALL AND ITS COMPARABILITY WITH TRADITIONAL 24-HOUR DIETARY RECALLS: IMPLICATIONS FOR THE FUTURE DEVELOPMENT OF AN ECOLOGICAL MOMENTARY ASSESSMENT BASED APPLICATION TO ASSESS DIETARY INTAKE

Diane Mitchell [1,2], Terry Hartman [3], Lisa Harnack [4], Whitney Mohr [5], Alexandra Cowan Pyle [6], Regan Bailey [7]

[1] Texas A&M University, [2] Texas A&M University System, [3] Rollins School of Public Health, Emory University, [4]University of Minnesota, [5] Institute for Advancing Health Through Agriculture, Texas A&M AgriLife Research, [6] Texas A&M AgriLife Research, [7] Texas A&M Institute for Advancing Health Through Agriculture

Introduction: Using an Ecological Momentary Assessment (EMA) based approach to collect multiple sessions of short-interval dietary recall (SIR; ~ past 3-5 hours) may be a more cost-effective and feasible method that could reduce participant burden and memory-associated errors when compared to traditional 24-hr diet recalls (24-hr DR). Combining EMA with an assessment of individual behaviors for meals including timing, types of foods and beverages reported, contextual details, and the number of unique foods consumed to streamline the recall process may decrease the level of detail needed "in the moment" and may further reduce participant burden.
Methods: Feasibility of this novel approach compared with traditional 24-hr DR collection are being tested in adults (age18-60 years) using a random cross-over design. For the SIR method, ~9-12 chats using WhatsApp to simulate an EMA approach will be collected with simultaneous food and beverage entry into the Nutrition Data System for Research (NDSR). NDSR is also being used to collect three 24-hr DR by phone interview in each participant. Testing various iterations of the SIR process to assess and identify which individual behaviors (e.g., meal patterns and timing, beverage questionnaire) could be used to streamline the SIR. For example, in the first iteration, participants have completed a meal grid to help guide best times for the SIR, as well as the length of time needed to capture intake for that interval.
Results: Preliminary results suggest that the SIR is feasible using WhatsApp to simulate an EMA approach. Compared to the 24-hr DR, the SIR collects comparable details on food and beverage intake with similar efficiency. While the use of a meal grid helps to define individual mealtimes and the frequency of meals and snacks, standardized timing of short intervals may work for most individuals. A short beverage

questionnaire that assesses the usual intake of beverages (e.g., types, additions, brands) also may reduce the number of details required during the SIR. The frequency, consistency in food, contextual details, and number of unique foods will further refine and improve the SIR method.
Conclusion: These data suggest that the SIR is feasible using WhatsApp to simulate an EMA approach. Future research, with a more refined conceptual framework, can be used to further the development of an app using an EMA approach to collect dietary data.

P1-C-23 ECOLOGICAL MOMENTARY ASSESSMENT FOR ASSESSING EATING BEHAVIOR AND DISCRIMINATION REGARDING BODY WEIGHT IN ADULTS DIAGNOSED WITH OBESITY: A PILOT STUDY

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Introduction: Individuals with obesity experience discrimination based on their body weight, which can have negative consequences on eating behavior. Conventional study designs fail to accurately capture how discrimination may influence the eating behavior of individuals with obesity. Ecological momentary assessment (EMA) has the potential to fill this gap by improving the validity and reliability of these assessments. This study aims at describing a pilot study that evaluated eating behavior in adults diagnosed with obesity who experience discrimination based on their body weight, using the ecological momentary assessment (EMA).
Methods: This pilot study included adults of all genders, with a clinical diagnosis of obesity (i.e., BMI >30 kg/m²). EMA was used to record the occurrence of discrimination based on body weight and dysfunctional eating behavior of participants over 7 consecutive days, with pre-defined alerts four times a day (i.e., 8am, 1pm, 4pm, 7pm). Volunteers were instructed to report any food or drink consumption that constituted an "episode of loss of control or overeating", reporting the loss of control with a Likert scale from 1 (not at all) to 5 (extremely). Data were analyzed using descriptive statistics to assess the frequency of reports of discrimination based on body weight and dysfunctional eating behavior.
Results: Two female volunteers, white, heterosexual, diagnosed with grade 2 obesity, and both with higher education, were included. Both participants achieved an adherence rate of over 85% to the EMA. Eight episodes of discrimination based on body weight were reported. Both participants reported overeating in 47% of meals. Only one participant reported feeling out of control when eating.
Conclusion: This pilot study suggests that the EMA is a viable tool for assessing the occurrence of discrimination based on body weight and dysfunctional eating behavior in adults with obesity.

P1-C-24 ECOLOGICAL MOMENTARY ASSESSMENT OF CONTEXTUAL AND FOOD CHOICE FACTORS THAT CONTRIBUTE TO SALT INTAKE AT MEALS

Nana Shinozaki [1], Kentaro Murakami [1], Shizuko Masayasu [2], Satoshi Sasaki [1]

[1] The University of Tokyo, [2] Ikurien-naka

Introduction: Salt (sodium) intake can vary considerably across meals depending on the meal context and food choices, including what and how much was consumed and where, when, and with whom it was consumed. However, the dynamic associations between these factors have not been fully elucidated. We aimed to examine the relationships between contextual and food choice factors and salt intake at meals.
Methods: The cross-sectional analysis used data collected from 2,757 Japanese adults aged 18-79 years. An event-based ecological momentary assessment was conducted using eight-day dietary records to obtain information on meal context, food choices, and salt intake.
Results: Multilevel linear regression analysis of 63,154 meals showed that salt intake (g/meal) at lunch (β: 0.47, 95% confidence interval [CI]: 0.43, 0.51) and dinner (β: 0.84, 95% CI: 0.80, 0.88) were higher than that at breakfast. In addition, salt intake from meals eaten on non-working or non-school days (β: 0.10, 95% CI: 0.06, 0.13), in restaurants (β: 0.40, 95% CI: 0.34, 0.45), and with one other person (β: 0.08, 95% CI: 0.05, 0.12) were higher than that from meals eaten on working or school days, at home, and alone, respectively. Regarding food choice factors, salt intake was significantly higher in meals containing staple foods (e.g., rice and bread), especially noodles (β: 2.28, 95% CI: 2.22, 2.34), as well as soup (β: 1.06, 95% CI: 1.03, 1.09), pickles (β: 0.72, 95% CI: 0.68, 0.75), reduced-salt seasonings (β: 0.35, 95% CI: 0.23, 0.47), herbs and spices (β: 0.13, 95% CI: 0.10, 0.16), citrus juice and vinegar (β: 0.30, 95% CI: 0.26, 0.34), moderately processed meat and seafood (β: 0.59, 95% CI: 0.56, 0.62), highly processed meat and seafood (β: 0.58, 95% CI: 0.55, 0.61), and alcoholic beverages (β: 0.36, 95% CI: 0.32, 0.40) than in meals without these foods. Consumption of salt-based seasonings and vegetables was positively associated with salt intake, whereas consuming fruit was associated with lower salt intake (β: -0.12, 95% CI: -0.15, -0.09). These findings remained generally consistent when the analysis was limited to plausible energy intake reporters (with an energy intake to basal metabolic rate ratio between 1.07 to 2.24) and when salt intake density (g/100 kcal) was a dependent variable.
Conclusion: Meal context and food choice factors were associated with salt intake at meals. These findings are useful for developing effective and practical strategies for reducing salt intake.

P1-C-25 ASSESSING PHYSICAL ACTIVITY, DIET, AND SLEEP IN INDIVIDUALS WITH TYPE 2 DIABETES: A PROTOCOL USING ECOLOGICAL MOMENTARY ASSESSMENT, ACTIGRAPHY, 24-HOUR DIETARY RECALL, AND CONTINUOUS GLUCOSE MONITORING

Soohyun Nam [1], Minjung Lee [1], Robin Whittemore [1], Niyati Parekh [2], Garrett Ash [1], Sangchoon Jeon [1], Stuart Weinzimer [1]

[1] Yale University, [2] New York University

Introduction: Limited data exist on the proximate temporal associations between physical activity (PA), dietary intake, eating behaviors, sleep, and glucose variability (GV: fluctuations in glucose levels) in individuals with type 2 diabetes. Ecological momentary assessment (EMA) is a real-time data collection method where participants report eating behaviors and dietary intake multiple times per day in their natural environment. Coupling continuous glucose monitoring (CGM) with EMA, actigraphy, and 24-hour dietary recall provides a comprehensive approach to assessing PA, dietary intake, eating patterns, sleep, and glucose levels in real time. This study presents a research protocol that uses multiple methods to assess lifestyle factors influencing GV.

Methods: Sociodemographic data, the International Physical Activity Questionnaire, Diabetes and Eating Problem Survey-Revised, and the Pittsburgh Sleep Quality Index will be collected through online surveys at baseline. EMA surveys on eating behavior and food intake will be prompted at fixed intervals (interval contingent) across four-time windows daily for 14 days. Dietary intake will be assessed using the Automated Self-Administered 24-hour Dietary Assessment Tool (ASA24) via video call on one weekday and one weekend day. Participants will wear an actigraphy watch continuously for 14 days to measure PA and sleep. GV parameters (e.g., coefficient of variation, time in range) will be derived from CGM data, which records glucose levels every 15 minutes for 14 days.

Results: To date, 110 participants (mean age: 59.8 ±10.5 years) have completed the 14-day data collection. The sample was 60% female, with 72.7% identifying as Non-Hispanic White and 18.2% as Non-Hispanic Black. All participants responded to 75%–100% of EMA surveys and provided valid actigraphy and CGM data (≥10 days), along with 138 dietary recalls through ASA24. Many participants appreciated receiving 14-day lifestyle reports and valued the opportunity to learn about how lifestyle patterns affect their GV.

Conclusion: This study will generate time-varying data on lifestyle factors that may influence GV in individuals with type 2 diabetes. Findings will inform the development of just-in-time interventions targeting lifestyle behaviors to improve diabetes outcomes.

P1-C-26 EVALUATING FOOD PARENTING PRACTICES USING ECOLOGICAL MOMENTARY ASSESSMENT: IS 14 DAYS ENOUGH TO RELIABLY ASSESS WITHIN-PERSON CHANGE OVER TIME?

Louise Masse [1], Olivia De-Jongh Gonzalez [1]

[1] *University of British Columbia*

Introduction: Limited data exist on the proximate temporal associations between physical activity (PA), dietary intake, eating behaviors, sleep, and glucose variability (GV: fluctuations in glucose levels) in individuals with type 2 diabetes. Ecological momentary assessment (EMA) is a real-time data collection method where participants report eating behaviors and dietary intake multiple times per day in their natural environment. Coupling continuous glucose monitoring (CGM) with EMA, actigraphy, and 24-hour dietary recall provides a comprehensive approach to assessing PA, dietary intake, eating patterns, sleep, and glucose levels in real time. This study presents a research protocol that uses multiple methods to assess lifestyle factors influencing GV.
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Conclusion: This study will generate time-varying data on lifestyle factors that may influence GV in individuals with type 2 diabetes. Findings will inform the development of just-in-time interventions targeting lifestyle behaviors to improve diabetes outcomes.

Poster Session 1-D
DIET QUALITY METRICS
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-D-27 TWO A PRIORI DIETARY INDICES AMONG YOUNG CHILDREN IN THE CHILDREN'S HEALTHY LIVING (CHL) PROGRAM: VALIDATION AND ASSOCIATION WITH HEALTH OUTCOMES

Yurii Shvetsov [1], Ashley Yamanaka [2], Rica Dela Cruz [2], Jean Butel [2], Kristi Hammond [2], Tanisha Aflague [3], Patricia Coleman [4], Leslie Shallcross [5], Travis Fleming [6], Marie Fialkowski [1], Lynne Wilkens [1], Rachel Novotny [2]

[1] University of Hawaii Cancer Center, [2] College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa, [3] University of Guam, [4] Northern Marianas College, [5] University of Alaska at Fairbanks, [6] American Samoa Community College

Introduction: Children's diet affects multiple health outcomes. Dietary indices are a useful tool for quantifying the quality of overall diet, but their performance may differ among children of different age and in understudied populations. This analysis aimed to validate two dietary indices and examine their associations with physical body measures among 2-8 y old children of the US-Affiliated Pacific region.
Methods: Data were collected from children (n=2,359) from 5 jurisdictions of the Children's Healthy Living (CHL) randomized control trial in independent cross-sectional cluster samples over 3 time points. Dietary intakes were ascertained from 2 days of dietary records completed by caregivers. The Healthy Eating Index (HEI)-2020 and Dietary Approaches to Stop Hypertension (DASH) scores were calculated using a simple scoring algorithm. Anthropometric measurements were taken by trained evaluators using standard tools. Construct validity and performance of HEI-2020 and DASH were evaluated, and associations with body measures and obesity status were examined using covariate-adjusted means and unconditional logistic regression.
Results: DASH and HEI-2020 total scores exhibited a wide range of variation, clear separation of mean component scores by quintile of total score, and multiple dimensions for each index. The mean BMI z-scores statistically significantly differed by quintile of HEI-2020 among 6-8 y olds. The mean waist circumference significantly differed across quintiles of DASH and HEI-2020 among boys and 6-8 y olds. The prevalence of obesity exhibited statistically significant downward trends across dietary score quintiles in all sexes and age groups for HEI-2020 and among boys and 6-8 y olds for DASH.
Conclusion: DASH and HEI-2020 are valid measures of dietary intake in this population of children. Specific purpose of the application may inform the choice of a dietary index.

P1-D-28 DEVELOPMENT AND VALIDATION OF DIETARY INDICES FOR DETECTING NUTRITIONAL DEFICIENCIES IN LACTATING ARGENTINIAN WOMEN: A CLINIMETRIC APPROACH USING DIET QUALITY AND HUMAN MILK BIOMARKERS

Agustin Miranda [1], Ana Scotta [2], Mariela Cortez [2], Elio Soria [2]

[1] French National Research Institute for Sustainable Development, [2] Argentine National Scientific and Technical Research Council

Introduction: Postpartum nutrition is essential for recovery and human milk production, focusing on protein intake and monitoring oxidative status. In Argentinian lactating women, three key dietary patterns—macronutritional, phytochemical, and energetic—have been identified, each with distinct health impacts. We aimed to develop and validate indices for these patterns using a clinimetric approach, assessing their reliability and relevance against nutritional, anthropometric, and biochemical parameters.

Methods: A cross-sectional study was conducted with 284 adult lactating women from Argentina during their first 6 postpartum months. Habitual dietary intake was assessed with a valid Food Frequency Questionnaire, covering 127 foods in Argentina. The index evaluation followed guidelines for reliability, validity, and sensitivity/specificity. Internal consistency was assessed, and correlations between food components were examined. Pearson's coefficients were calculated to test convergent and divergent validity. Multiple regression analysis was used to relate the indices to milk biomarkers. Nutritional indices were evaluated for their ability to detect inadequacies in calcium, fiber, and energy intake, using sensitivity, specificity, and AUC values to measure classification accuracy.

Results: Three reliable indices agreed by >75% with FFQ: macronutritional (MDI), phytochemical (PDI), and energetic (EDI), which correlated positively to Fat Quality Index and Minimum Dietary Diversity for Women. MDI and EDI correlated negatively to a Healthy Plant-Based Diet Index (H-PBDI), whereas PDI correlated positively. MDI correlated positively to the protein-to-carbohydrate ratio (PCR), whereas EDI correlated negatively. Inadequate intakes of calcium, fiber, and energy were indicated by MDI <19, PDI <19, and EDI ≥19, respectively, in a sensitive and specific manner. Body fat was therefore positively associated with EDI. MDI was associated with increased protein and superoxide anion in milk, depending on its high PCR and low H-PBDI.

Conclusion: These indices enabled prompt diagnosis of maternal malnutrition, with their validity confirmed by strong dietary correlations and biological responsiveness. MDI and EDI promoted breast bioactivity and body adiposity, respectively, whereas PDI represented a healthier option. These findings highlight the need to focus on maternal diet during breastfeeding to prevent nutritional deficiencies and facilitate early diagnosis and intervention.

P1-D-29 DEVELOPMENT AND VALIDATION OF THE GLOBAL DIET QUALITY SCORE (GDQS) FOR CHILDREN 5 TO 9 YEARS OF AGE

Joanne Arsenault [1], Nazia Binte Ali [2], Agata Mp Atayde [3], Carolina Batis [4], Elodie Becquey [5], Sabri Bromage [6], Megan Deitchler [1], Loty Diop [5], Aulo Gelli [7], Anali Castellanos Gutierrez [8], Sarah Kehoe [9], Ghattu Krishnaveni [10], Sofia Leonardo [3], Mourad Moursi [1], Brunhilda Tegomoh Nkengfack [11]

[1] Intake - Center for Dietary Assessment at FHI 360, [2] Harvard T.H. Chan School of Public Health, Department of Global Health, and Population, [3] Harvard T.H. Chan School of Public Health, Department of Nutrition, [4] National Institute of Public Health, Mexico, [5] International Food Policy Research Institute, Nutrition, Diet and Health unit, [6] Community Nutrition Unit, Institute of Nutrition, Mahidol University, [7] International Food Policy Research Institute, Poverty, Gender, and Inclusion unit, [8] Harvard T.H. Chan School of Public Health, Epidemiology Department, [9] University of Southampton, MRC Lifecourse Epidemiology Centre, [10] CSI Holdsworth Memorial Hospital, Epidemiology Research Unit, [11]Department of Nutrition, Harvard T.H. Chan School of Public Health

Introduction: Diet quality is important for ensuring nutrient adequacy and mitigating risk of nutrition related chronic disease. A holistic metric of diet quality for use in children globally is needed. The purpose of the study was to develop and validate a Global Diet Quality Score (GDQS) for children aged 5-9 years by adapting the existing GDQS developed for adults, as part of a larger effort to bridge the GDQS across the lifespan starting at 2 years of age.

Methods: The GDQS includes 25 food groups scored according to ranges of consumption in grams per day. An initial version of the GDQS for children 5-9 years old was derived by scaling down these ranges based on the ratio of average energy requirements of 5-9 year-old boys and girls to adult non-pregnant, non-lactating women of reproductive age. Additional candidate versions incorporated further adjustments to improve the operational feasibility of collecting data from populations and achieving a population distribution of consumption ranges. GDQS was scored for each candidate metric using four existing dietary datasets from low-, middle-, and high-income countries. A final GDQS metric version, selected based on strength of correlations and operational feasibility, was further evaluated with regression analyses with nutrient intakes, an overall mean probability of nutrient intake adequacy score, and biomarker and anthropometry outcomes in seven dietary datasets from different countries. Regressions were also undertaken with other diet quality metrics to compare their relative performance to that of the GDQS.

Results: The GDQS displayed strong associations with most energy-adjusted nutrient intakes, mean probability of nutrient adequacy, and some nutrients associated with NCD-risk (fiber and added sugars). GDQS performed better or as well as other dietary quality metrics in predicting nutrient intakes. Biomarker data were limited in the available datasets and fewer associations between GDQS and biomarker or anthropometric outcomes were observed.

Conclusion: The GDQS was associated with nutrient intakes and fills a gap in a global diet quality metric for children. GDQS will be a useful tool for measuring diet quality and monitoring changes over time. The work described here with GDQS for 5-9 year-old children is supported by parallel work with GDQS for children 24-59 months and 10-14 years of age.

P1-D-30 DEVELOPMENT OF THE DUTCH ULTRA-PROCESSED FOOD INDEX: A NEW TOOL TO EVALUATE DIETARY INTAKE ON INDUSTRIAL PROCESSING LEVELS AND HEALTHINESS OF CONSUMED FOODS

Hanne De Jong [1], Desiree Lucassen [1], Marlou Lasschuijt [1], Marieke Van Bruinessen [1], Jeanne Lagerweij [1], Frederick Duan [1], Corine Perenboom [1], Edith Feskens [1], Ciarán Forde [1]

[1] *Wageningen University & Research*

Introduction: Research shows that high ultra-processed food (UPF) intake is associated with increased risks of obesity and non-communicable diseases. Most studies use industrial processing classifications, such as the Nova system, to classify food processing levels. An often-overlooked methodological issue is that dietary intake data collected in these studies are not designed to quantify UPF consumption. UPFs form a heterogeneous food group, and currently, foods are categorized solely by processing level, without considering nutritional values. Surprisingly, the contribution of UPFs to diet quality has rarely been considered, as healthy eating indices solely assess diet quality (i.e., adherence to dietary guidelines) without considering processing levels. Therefore, we developed a novel Dutch UPF index (DUPFI) to classify food intake based on both processing levels and diet quality. DUPFI consists of eight categories, dividing the four Nova classes into health-beneficial and health-risk groups.

Methods: All foods in the Dutch food composition table (NEVO) were classified by Nova. Composite dishes were disaggregated into individual ingredients. Each ingredient was assigned its proportionate contribution to the dish based on its weight, and all dishes were classified accordingly. All foods were then classified as health-beneficial (a) or health-risk (b) within their Nova class, based on the Dutch food-based dietary guidelines and available literature. DUPFI can be applied to all dietary intake data linked to NEVO, providing insights into both processing levels and the contribution of healthy and unhealthy foods for each Nova class. To illustrate, DUPFI was applied to a subpopulation of healthy adults (21-50y) from the Dutch food consumption survey (n=312).

Results: The results showed that 28% of energy intake came from Nova 1, 5% Nova 2, 19% Nova 3, and 49% Nova 4. Of the Nova 4 food consumption, 24% were healthy foods and 76% were unhealthy foods.

Conclusion: These results show that DUPFI can be applied to cover more dimensions of food intake, considering both the level of processing and healthiness of consumed foods. Next steps include fine-tuning the index and integrating a scoring algorithm. The final version can be applied to investigate associations between UPF consumption and health outcomes in Dutch adults, differentiating between health-beneficial and health-risk foods. The DUPFI contributes to providing a clearer understanding of the role food processing plays in public health nutrition.

Poster Session 1-E
PATTERNS
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-E-31 PREVALENCE AND DETERMINANTS OF MINIMUM DIETARY DIVERSITY AND GLOBAL DIET QUALITY SCORE FOR WOMEN OF REPRODUCTIVE AGE IN RURAL TANZANIA: A CROSS-SECTIONAL STUDY

Hadijah Mbwana [1], Edwige Landais [2], Eric Verger [2]

[1] Sokoine University of Agriculture, [2] French National Research Institute for sustainable Development

Introduction: Women of reproductive age (WRA) in rural Tanzania are highly susceptible to malnutrition, which is exacerbated during pregnancy and breastfeeding. This study aimed to i) compute nutritional indicators, the Minimum Dietary Diversity for Women (MDD-W) and the Global Diet Quality Score (GDQS), among rural Tanzanian WRA and ii) investigate their potential determinants.
Methods: A cross-sectional survey was conducted among 637 women (15-49 years) in Morogoro and Dodoma regions. Dietary data were collected using a quantitative 24-hour dietary recall. MDD-W was calculated based on consumption of at least five out of ten food groups (with a 15g cut-off for each food). GDQS was computed using 25 food groups using a particular cut-off for each group, with a maximum score of 49. The GDQS consists of two sub-scores: the GDQS+ including 16 healthy food groups (the higher, the better) and the GDQS- including nine food groups classified as unhealthy or unhealthy in excessive amounts (the higher, the better). Multivariate logistic regression models were used to identify the determinants of MDD-W and GDQS.
Results: Only 14.1% of women met the MDD-W, with a higher prevalence in Morogoro (18.4%) compared to Dodoma (9.8%). The mean GDQS for the population was 13.5 ±3.8, indicating suboptimal diet quality, with a heavy reliance on starchy staples and limited consumption of nutrient-rich foods. More specifically, the GDQS+ was low (4.2±3.1), driven by a limited intake of fruits, vegetables, and some animal-source foods while GDQS- was high (9.3±2.3). Women with higher education levels had 2.5 times higher odds of meeting the MDD-W (OR=2.5, 95% CI: 1.8–3.4) and those in households having livestock had 3 times higher odds of achieving MDD-W (OR=3.0, 95% CI: 2.1–4.3). Access to protected water was associated with an increased likelihood of achieving MDD-W (OR=1.6, 95% CI: 1.1–2.4). Larger household size was negatively associated with GDQS (OR=0.7, 95% CI: 0.5–0.9).
Conclusion: The MDD-W and GDQS highlight the critical need to improve both dietary diversity and overall diet quality among WRA in rural Tanzania. Targeted interventions focusing on nutrition education, improving water sources, and promoting agricultural diversity could significantly enhance both nutritional adequacy and long-term health outcomes.

P1-E-32 OVERALL DIET QUALITY AND FOOD GROUP INTAKES AMONG PRESCHOOL-AGED CHILDREN WITH DOWN SYNDROME: IMPLICATIONS FOR OBESITY PREVENTION

Heather Wasser [1], Emily Clarke [1], Seema Agrawal [1], Phoebe Tchoua [1], Kelsey Thompson [1], Erik Willis [1], Michaela Schenkelberg [2]

[1] University of North Carolina at Chapel Hill, [2] University of Nebraska at Omaha

Introduction: Although data are limited, studies document a prevalence of obesity among children with Down syndrome (DS) up to three times that of typically developing (TD) children, with increases in obesity prevalence occurring between 2 and 6 years. While lower diet quality is associated with development of obesity in TD children, much less is known about diet quality of preschool-aged children with DS. Using data from a feasibility pilot of a protocol measuring diet, physical activity, and sleep behaviors of young children with DS, the current study reports dietary intakes of participating children and the extent to which intakes align with the Dietary Guidelines for Americans (DGAs).
Methods: Parents with a young child (ages 2-6 years) with Down syndrome were recruited through community partners and snowball sampling. To be included in this study, children had to be ambulatory and could not be on a liquid, puree, or mechanically altered diet. Twelve parents enrolled and proxy-reported their child's dietary intake using the Automated Self-Administered 24-Hour Dietary Assessment Tool (ASA24) for one weekday and one weekend day. ASA24 intake days were randomly selected. Healthy Eating Index (HEI) scores were calculated, and descriptive statistics run for overall HEI distributions, HEI subcomponent scores, food group intakes, and percent of calories from solid fats and added sugars.
Results: Children had a mean age of 4.2±1.3 years and 50% and 83.3% were female and non-Hispanic White, respectively. The majority of respondents were mothers (91.7%), married (100%), and college graduates (83.3%). Mean HEI scores were similar between boys (56.9±9.2) and girls (56.7±5.7). Among all children, the lowest HEI subcomponent scores were for total vegetables (2.4±1.3, out of 5 maximum points possible [MPP]), greens and beans (1.2±1.7, 5 MPP), whole grains (2.3±2.1, 5 MPP), seafood and plant proteins (2.3±2.1, 5 MPP), fatty acids (3.2±2.3, 10 MPP), and solid fats (3.9±2.5,10 MPP). Mean daily intake of non-starchy vegetables was less than one-half cup (0.4±0.6 cups [range: 0-2.4]), the most frequently consumed category of protein foods was cured meats (0.7±1.1 ounces [range: 0-3.9]), and no child consumed seafood containing n-3 fatty acids. The mean total percent of calories coming from solid fat, added sugars, and solid fats and added sugars combined was 16.4±4.6 (range: 9.0-24.0), 8.7±5.0 (range: 1.5-17.0), and 25.1±6.5 (range 13.1-37.8), respectively. Common sources of solid fats included potato chips (11 children), hot dogs and chicken nuggets (7 children), and fried potato products (5 children).
Conclusion: Our findings suggest that the diets of young children with DS align no better with the DGAs than do the diets of TD children. Indeed,

parents of young children with DS may need additional support, in particular, behavioural strategies for improving the types and sources of dietary fat in the diet.

P1-E-33 DIETARY INTAKE DURING EARLY CHILDHOOD IN THE TEDDY BIRTH COHORT

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Introduction: The Environmental Determinants of the Diabetes in the Young (TEDDY) is a prospective observational study that examines the associations between environmental exposures and the development of type 1 diabetes in children with elevated genetic risk. This analysis was to profile trends and determinants of nutrient intake in children up to 10 years of age.
Methods: Semi-annual 3-day food records were completed for 7903 children from the US, Finland, Germany, and Sweden enrolled in TEDDY between 2004 and 2010. Harmonized country-specific food composition databases were used to estimate macro- and micronutrient intake. Associations with sociodemographic and lifestyle factors were examined with linear mixed models, separately in toddlerhood (18 months to 3.5 years) and at older ages (4 to 10 years).
Results: Children had a median (IQR) energy intake (kcal/d) of 846 (241) in the US, 836 (190) in Finland, 773 (168) in Germany, and 846 (186) in Sweden at age 1 year. Energy intake increased to 1699 (556), 1642 (489), 1677 (381), and 1587 (508), respectively, at age 10 years. Energy contribution from macronutrients stabilized by age 12 months, with 49-52% of energy from carbohydrates, 32-35% from fat, and 14-16% from protein. Energy-adjusted micronutrient intakes steadied from age 4 years. Country-specific intake recommendations were largely met in all countries except fiber intake was inadequate, vitamin D intake reached the recommended level at all ages only in Finland, and the iron intake recommendation was met only in the US. Higher energy intake was positively associated with male sex, having a first degree relative with celiac disease, and having a mother who worked during pregnancy. Associations differed by age for energy intake with mother's first child status and mother's age, i.e., negative in toddlerhood and positive in older ages. Compared to girls, boys had lower energy-adjusted protein and fat intake and higher carbohydrate intake during toddlerhood, but higher protein intake at older ages, while fat and carbohydrate intake did not differ by sex in the older age range.
Conclusion: There is a complex relationship between age and dietary habits in young children in the TEDDY study: The distribution of energy contribution from macronutrients is stable and total energy intake increases steadily. However, associations between sociodemographic and lifestyle factors with dietary intake differ between toddlerhood and later childhood.

P1-E-34 MEAL PATTERNS IN AUTISM SPECTRUM DISORDER: EVALUATING DIETARY INTAKE IN CHILDREN AND ADOLESCENTS

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Introduction: Eating difficulties, such as food selectivity and overeating, are common in autism spectrum disorder (ASD), increasing the risk of nutritional inadequacies. Studying dietary intake is relevant in this group. However, few studies have assessed dietary patterns in ASD. This study aimed to describe the meal patterns of children and adolescents with ASD.

Methods: Data were collected from the cross-sectional stage of the research project Protocol for Nutritional Care in Autism, including patients aged 2-18 years diagnosed with non-syndromic ASD assisted in a neuropediatric service at the Federal University of Pelotas, Brazil. Ethical approval was provided by the institution. Sociodemographic and clinic data were collected with a standardized questionnaire. Three non-consecutive 24-hour dietary recalls, including one weekend day, were used to collect food intake data. Food items were categorized into 28 groups. Statistical analyses were conducted in STATA (v.15.1), using principal component analysis (PCA) to derive dietary patterns from average weight (g/day) of each food group. Factor loadings over 0.2 were considered significant.

Results: A total of 298 individuals were included (82% male, mean age 7.4 years). Three patterns were identified for breakfast, lunch, afternoon snack, and dinner. Breakfast pattern (BP) 1 was characterized by coffee, sugar, margarine, and bread. BP2 included beverages, cookies, and sweets, while BP3 had positive loadings for fruits. Lunch pattern (LP) 1 was described by rice, white meat, and red meat. LP2 included sodas and pasta, with negative loadings for vegetables. LP3 contained roots and tubers and processed meats, with negative loadings for beverages and beans. Afternoon snack pattern (SP) 1 included bread, margarine, and processed meat, while SP2 included sodas, snacks, cookies, sweets, and cakes, and had negative loadings for dairy. SP3 had positive loadings for sugar, coffee, and chips. Dinner pattern (DP) 1 included rice, beans, and white meat. DP2 had positive loadings for beverages, red meat, roots and tubers, with negative loadings for pasta. DP3 was characterized by sodas and processed meat. Age, nutritional status, and antipsychotic use were associated with adherence to these patterns.

Conclusion: Most meal patterns included ultra-processed foods, high in sugar and fats, and reflected low intake of fruits and vegetables. Thus, nutritional interventions focused on individuals with ASD are needed.

P1-E-35 DIETARY CARBOHYDRATE QUALITY INDEX AND INADEQUATE MICRONUTRIENT INTAKE IN BRAZILIAN ADOLESCENTS: A CROSS-SECTIONAL STUDY

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Introduction: Indexes are largely used in diet quality evaluation. In the last years, the association between the dietary carbohydrate quality with nutrient adequacy has been explored. The aim of this study was to evaluate the relationship between the carbohydrate quality index (CQI) and the adequacy of selected vitamin and mineral intake in Brazilian adolescents.

Methods: Data from two 24-h dietary recalls obtained in the 2017-2018 National Dietary Survey of a nationally representative sample of individuals aged 10-18 years old (n=7,516) were analyzed. The CQI calculation took into account the dietary fiber intake, dietary glycemic index, whole grain/total grain ratio, and solid carbohydrate/total carbohydrate ratio, providing a score ranging from 4 to 20, which was categorized into quintiles. The distribution of usual nutrient intake was calculated using the National Cancer Institute method, and the Estimated Average Requirement (EAR) was used to estimate the prevalence of intake inadequacy according to sex for the following nutrients: calcium, copper, folate, phosphorus, magnesium, pyridoxin, riboflavin, sodium, thiamin, cobalamin, vitamins A, C, E and zinc. Differences in the prevalence of nutrient intake inadequacy between the first (worst quality) and last (best quality) quintiles of the CQI were assessed by the lack of 95% confidence intervals overlap.

Results: In the population evaluated, 52% were women and the average CQI was 10. As the quality of the dietary carbohydrates improved, the prevalence of nutrient inadequate intake decreased significantly for most of the evaluated micronutrients. Exceptions were observed for vitamin B12 for both sexes, and vitamin C among boys. The prevalence of inadequate intake increased significantly across the quintiles for sodium within the whole group, while only among boys for pyridoxin and riboflavin.

Conclusion: Higher CQI scores were related to lower prevalence of inadequate vitamin and mineral intake in adolescents. Therefore, the CQI proved to capture the diet adequacy for most of the nutrients studied and can be a useful indicator of the diet quality in general, suitable to be applied in health and nutrition monitoring and surveillance.

P1-E-36 ASSOCIATION BETWEEN DIET QUALITY AND ACADEMIC EXPERIENCES AND CHARACTERISTICS RELATED TO THE QUALITY OF LIFE OF UNIVERSITY STUDENTS IN SÃO PAULO, BRAZIL

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Introduction: Food intake is a concern throughout society since its inadequacy is related to a higher risk of chronic diseases. Therefore, actions that teach healthy eating habits, especially in young people, are essential to reduce the risk of diseases, perhaps for life. University students have advantages related to being in an environment conducive to education. The purpose of this study is to evaluate the association between the diet quality of students from a university in São Paulo, Brazil, with academic experiences and characteristics related to quality of life.
Methods: A pilot study with a cross-sectional design was used to evaluate the methods. Dietary quality was assessed by the "How is your diet" questionnaire from the Brazilian Ministry of Health, which has scores ranging from 0 to 100 (high score = better diet quality). Quality of life characteristics were assessed by the WHOQOL-bref, divided into 4 domains (physical, psychological, social relationships, and environment) and by the Pittsburgh Sleep Quality Index, with scores greater than 5 indicating worse sleep quality. The Academic Experiences Questionnaire, short version (QVA-r), was used to assess the quality of students' adaptation to the university environment, divided into 5 dimensions (personal, interpersonal, career, study, and institutional). The quantitative variables had a normal distribution, but since the study sample was small, Spearman's correlation was used.
Results: The final sample consisted of 20 students, with a mean age of 24.25 years (SD=8.88), 18 female and 2 males, and from various undergraduate courses. The correlations between diet quality and the other variables were positive and strong for academic experiences in the personal (r=0.695) and interpersonal (r=0.770) dimensions and in the psychological domain of quality of life. Thus, the greater the adaptation to the university environment in relation to the perception of physical and psychological well-being and self-esteem, better relationships with peers and establishment of more intimate relationships, and more positive feelings and self-esteem, the higher the diet quality. The correlation with sleep quality was negative and moderate (r=-0.448), demonstrating that better sleep quality (lower score) is related to better diet quality.
Conclusion: This was a pilot study to previously evaluate the questionnaires and which demonstrated interesting results regarding student characteristics related to their diet quality.

P1-E-37 QUALITY OF LIFE AND ACADEMIC EXPERIENCES DIFFER IN UNIVERSITY STUDENTS WITH BETTER DIET QUALITY IN SÃO PAULO, BRAZIL

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Introduction: Inadequate eating habits have led to a greater risk of chronic non-communicable diseases in increasingly younger populations. Therefore, guiding young people to have an adequate and healthy diet is necessary to reduce the risk of diseases. The purpose of this study was to evaluate mean differences of variables related to eating behavior, quality of life, sleep quality, and academic experiences with diet quality.
Methods: A pilot study with a cross-sectional design was used to evaluate the methods. Dietary quality was assessed by the "How is your diet" questionnaire from the Brazilian Ministry of Health, which scores range from 0 to 100 (high score = better diet quality). Scores greater than or equal to 75 classified the diet as excellent and lower as poor/regular. Eating behavior was evaluated using The Three Factor Eating Questionnaire (TFEQ). Quality of life was assessed by the WHOQOL-bref (with 4 domains: physical, psychological, social relationships and environment). The Pittsburgh Sleep Quality Index (PSQI) was used to evaluate sleep quality. The Academic Experiences Questionnaire, short version (QVA-r), was used to assess the quality of students' adaptation to the university environment, divided into 5 dimensions (personal, interpersonal, career, study, and institutional). The quantitative variables had a normal distribution, but since the study sample was small, the Mann-Whitney non-parametric test was used to compare the means of the variables by classifying the diet quality as excellent and poor/regular, considering $p<0.05$.
Results: The final sample consisted of 20 students, with a mean age of 24.25 years (SD=8.88), 18 female and 2 males, and from various undergraduate courses. Students with an excellent diet quality classification (n=6) had higher means for WHOQOL psychological (16.78 vs 13.90, p=0.004), WHOQOL social relationships (16.67 vs 14.29, p=0.049), WHOQOL environment (18.17 vs 15.64 , p=0.004), QVA-r personal (57.50 vs 48.50, p=0.003), QVA-r interdisciplinary (49.17 vs 40.36, p=0.015), QVA-r career (50.83 vs 46.50, p=0.046), and study QVA- r (36.50 vs 30.43, p=0.031). The TFEQ and PSQI had no statistically significant relationship.
Conclusion: These results demonstrate that having a better diet quality is associated with a better quality of life in the psychological, social relationships, and environmental domains and a better academic experience in the personal, interpersonal, career, and study dimensions.

P1-E-38 SLEEP DIFFICULTIES IN UNIVERSITY STUDENTS IN SAO PAULO, BRAZIL: RELATIONSHIP WITH DIET QUALITY, ACADEMIC SUCCESS, EATING BEHAVIOR AND QUALITY OF LIFE

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Introduction: University students go through major changes in their lives when they begin their university journey, which can affect quality of sleep, quality of life, nutritionm and academic success. Therefore, this study aimed to evaluate the relationship between sleep quality and other characteristics of the lives of university students.
Methods: A pilot study with a cross-sectional design was used to evaluate the methods in a university in Sao Paulo, Brazil. The Pittsburgh Sleep Quality Index (PSQI) was used to evaluate sleep quality. Dietary quality was assessed by the "How is your diet" questionnaire from the Brazilian Ministry of Health, with a high score meaning better diet quality. Eating behavior was evaluated using The Three Factor Eating Questionnaire (TFEQ). Quality of life was assessed by the WHOQOL-bref (4 domains: physical, psychological, social relationships and environment). Academic success was assessed by the Academic Experiences Questionnaire, short version (QVA-r), which analyzes quality of students' adaptation to the university environment (5 dimensions: personal, interpersonal, career, study, and institutional). The quantitative variables had normal distribution, but since the study sample was small, the Mann-Whitney non-parametric test was used to compare the means of the variables by classifying sleep quality in those with and without sleep difficulties, considering $p< 0.05$.
Results: The final sample consisted of 20 students, with a mean age of 24.25 years (SD=8.88), 18 female and 2 males, and from various undergraduate courses. Students without sleep difficulties (n=7) compared to those who had difficulties (n=13) had higher means for WHOQOL physical (17.63 vs 15.21, p=0.023), WHOQOL social relationships (16.76 vs 14.05, p=0.010), WHOQOL environment (17.93 vs 15.58, p=0.015), QVA-r personal (55.57 vs 48.85, p=0.028), QVA-r interpersonal (47.71 vs 40.46, p=0.039), QVA-r career (52.00 vs 45.54, p=0.001), QVA-r study (37.71 vs 29.31, p=0.001). Emotional eating had a lower mean among those who did not have difficulty sleeping (24.60 vs 61.11, p=0.019). Diet quality had no statistically significant relationship with sleep quality.
Conclusion: These results demonstrate that having no sleep difficulties is associated with a better quality of life in the physical, social relationships, and environmental domains; a better academic experience in the personal, interpersonal, career and study dimensions; and reduced emotional eating in university students.

P1-E-39 FACTORS ASSOCIATED WITH LOW-QUALITY DIET AMONG BRAZILIAN UNDERGRADUATE STUDENTS

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Introduction: Several factors influence the eating habits of university students, often considered to be of poor quality, which poses a challenge for designing strategies to promote healthy eating in this group. This study aimed to analyze the characteristics of university students associated with low-quality diet.
Methods: This is a cross-sectional study conducted between 2020 and 2021 with undergraduate students from a Brazilian public university (n=2835). Data were collected through an online questionnaire. Information was obtained on the frequency of consumption, in the last three months, of six unhealthy foods (processed meats, instant noodles, sweet/filled biscuits, salty crackers, powdered juice, soft drinks/guaraná-based beverages), with the following response options: 5-7 days/week [0 points]; 3-4 days/week [1 point]; 1-2 days/week [2 points]; or never [3 points]. A score ranging from 0 to 18 was estimated and categorized into tertiles, indicating low (1st Tertile), moderate (2nd Tertile), or high (3rd Tertile) diet quality. Weight status was assessed using BMI (weight/height²) and the WHO criteria, classifying students as overweight or non-overweight. The Brazilian Food Insecurity Scale was used to classify students as food secure, mildly food insecure, or moderately to severely food insecure (MSFI). The Beck Inventory was applied to evaluate anxiety levels (minimal, mild, moderate, or severe).
Results: The average age of the students was 24 years, 70% were female, 55% self-identified as having White skin colour, 35% were overweight, 11% were in MSFI, and 35% had severe anxiety. Low-quality diet was more frequent ($p<0.05$) among Black students (47%) compared to White students (27%), among overweight (38%) compared to non-overweight students (30%), among those affected by moderate to severe food insecurity (53%) compared to those who were food secure (28%), and among students with mild, moderate, or severe anxiety (39%) compared to those reporting minimal anxiety (25%).
Conclusion: Among Brazilian university students, being Black, overweight, food insecure, and having anxiety were associated with low-quality diet. These findings point out factors that should be considered when designing health promotion initiatives in the university environment.

P1-E-40 LONGITUDINAL ASSESSMENT OF U.S. DIET QUALITY AND SUSTAINABILITY USING PLANETARY HEALTH DIET INDEX FOR THE UNITED STATES (PHDI-US) SCORES AND THEIR ASSOCIATIONS WITH MORTALITY RATES BETWEEN 2005 AND 2020

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Introduction: This study aimed to delineate the trajectory of the Planetary Health Diet Index for the United States (PHDI-US) scores of the U.S. population from 2005 through 2020 to evaluate adherence to the EAT-Lancet Planetary Health Diet and to investigate potential associations between PHDI-US scores and mortality rates. Assessing these associations will also evaluate whether PHDI-US scores can help predict mortality risk.

Methods: PHDI-US scores were calculated using nationally representative data from the National Health and Nutrition Examination Survey (NHANES) spanning 2005 to 2020, which encompassed a cohort of 43,012 adults ≥19 years of age living in the U.S. Total PHDI-US scores can range between 0-150 and were derived from 24-hour dietary recalls. Descriptive statistics were performed to determine mean ± standard error (SE) of quantitative variables. ANOVA was used to assess for significant differences. Weighted linear regression was used for trend analysis, and weighted Cox regression was employed to study mortality rates.

Results: Analysis of the aggregate dataset revealed a small yet significant upward trend (P-trend =0.03) in PHDI-US scores over the fifteen-year period. Over this time, the average total PHDI-US score for the overall U.S. population ranged between 45.23-45.87. This increasing trend was mirrored across various subpopulations, including age brackets, gender, race/ethnicity, poverty-income ratios, and educational levels. After adjusting for age and other covariates, an inverse relationship (P-value<0.01) was observed between the total PHDI-US scores and all-cause mortality rates, a pattern consistent in various subgroup analyses.

Conclusion: This study found a low total PHDI-US score and a very small progressive escalation in scores among the U.S. population between 2005-2020, a pattern also evident across all evaluated subgroups. In addition, a significant inverse association was discerned between PHDI-US scores and mortality rates, indicating that elevated PHDI-US scores might be concomitant with reduced mortality risk. These results also help support the predictive validity of the PHDI-US with all-cause mortality. Over the fifteen years studied, only minor improvements occurred in U.S. adherence to the Planetary Health Diet. Innovative strategies are needed to encourage dramatic shifts in U.S. diets, which could aid in reducing mortality risk and improving planetary health.

P1-E-41 ADHERENCE TO THE 2018 WORLD CANCER RESEARCH FUND/AMERICAN INSTITUTE FOR CANCER RESEARCH CANCER PREVENTION RECOMMENDATIONS AND RISK OF LIFESTYLE-RELATED CANCERS IN THE PROSTATE, LUNG, COLORECTAL, AND OVARIAN CANCER SCREENING TRIAL

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Introduction: The World Cancer Research Fund (WCRF)/American Institute for Cancer Research (AICR) Cancer Prevention Recommendations aim to lower cancer incidence worldwide. Our study explored associations between adherence to these Recommendations, assessed using a standardized scoring system ('2018 WCRF/AICR Score'), and the risk of first cancer incidence in a US cohort.
Methods: Prostate, Lung, Colorectal and Ovarian (PLCO) Cancer Screening Trial Study participants who were cancer-free at baseline and who had complete data on 2018 WCRF/AICR Score components (n=69,061) were included in our analysis. Adherence to the Recommendations was assessed by operationalization of the standardized 2018 WCRF/AICR Score, using data on BMI, diet, and alcohol (collected using the Diet History Questionnaire), and physical activity (assessed using the Supplemental Questionnaire). Associations between Score and cancer endpoints, including incidence of any cancers, WCRF/AICR-reviewed lifestyle-related cancers, and individual cancer sites, were investigated using Cox proportional hazard models, adjusting for age, sex, trial arm, race, education, and cigarette, cigar, and pipe smoking. Pre-defined sub-group analyses were stratified according to sex and smoking status.
Results: Mean 2018 WCRF/AICR Score was 3.6 points (range 0-7). During a median follow-up time of 10 years, 11,109 participants developed cancer. The 2018 WCRF/AICR Score was inversely associated with risk of any cancer (HR: 0.97; 95% CI: 0.95-0.99; p=0.003), 17 WCRF/AICR-reviewed cancers (HR: 0.97; 95% CI: 0.95-0.99; p=0.007), pancreatic cancer (HR: 0.86; 95% CI: 0.78-0.96; p=0.007), and breast cancer (HR:0.91; 95% CI: 0.87-0.96; p<0.001). The observed protective associations were stronger in females and in participants who had never smoked.
Conclusion: Our findings support adherence to the 2018 WCRF/AICR Cancer Prevention Recommendations for reducing risk of cancer incidence, particularly breast and pancreatic cancer, in the US.

P1-E-42 ASSESSING LIFESTYLE-DRIVEN COLORECTAL CANCER RISK: DEVELOPING A COLORECTAL CANCER RISK INDEX USING THE 2018 WORLD CANCER RESEARCH FUND/AMERICAN INSTITUTE FOR CANCER RESEARCH (WCRF/AICR) STRONG EVIDENCE RISK FACTORS

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Trainee Poster Presentation Award Nominee

Introduction: Colorectal cancer (CRC) is among the most common and deadliest cancers worldwide. While lifestyle factors play a major role in CRC development, reliable and widely applicable methods to model lifestyle-driven CRC risk in research are scarce. Therefore, we aimed to develop a CRC-specific risk index based on strong evidence risk factors for CRC identified in the 2018 WCRF/AICR Expert Report and test it in population-based data of Finnish adults.

Methods: We compiled the CRC risk index using nine risk factors, including body mass index (BMI), waist circumference (WC), height, physical activity, and consumption of whole grains, dairy products, red meat, processed meat, and alcohol. In addition, we compiled a data-driven index using those risk factors associated with CRC risk in our population-based data. We constructed both indices following the principles of the Standardised 2018 WCRF/AICR Scoring System for total cancer risk. Each index component scored 0, 0.5, or 1 point based on predefined cut-offs, with higher points intended to represent lower CRC risk. The CRC risk index included four components: 1) a component formed of BMI and WC, 2) height, 3) physical activity, and 4) a component formed of whole grain, dairy product, red and processed meat, and alcohol consumption (point range 0-4). The data-driven index included three components: 1) BMI, 2) height, and 3) a component formed of red and processed meat and alcohol consumption (point range 0-3). We tested the indices (continuous and in quintiles) in relation to CRC cases (n=1100) using Cox regression in a pooled data of 43 000 Finnish adults.

Results: After adjustments, a one-point increase in the CRC risk index was associated with a 19% decrease in CRC risk (HR [95% CI]: 0.81 [0.74-0.88]). Moreover, participants scoring the highest points (quintile 5) had a 31% lower CRC risk (0.69 [0.58-0.83]) compared with those scoring the lowest points (quintile 1; p_{trend} <0.0001). The results were similar with the data-driven index.

Conclusion: Our results suggest that the CRC risk index based on the 2018 WCRF/AICR strong evidence risk factors is an appropriate method to model lifestyle-driven CRC risk in Finnish adults. Further research is required to determine the index's validity in different populations. Identifying a widely applicable method to model lifestyle-driven CRC risk and standardizing its use are essential for gaining a comprehensive understanding of how lifestyles drive CRC development.

P1-E-43 CLASSIFICATION OF GENERIC MEAL PATTERNS: REFLECTIONS OF DIETARY INTAKE DATA OF NORTH INDIAN WOMEN DURING PREGNANCY

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Introduction: Traditionally, nutrition research focuses on individual nutrients and dietary patterns. The focus has shifted to dietary intake trends at the meal level. A review of the literature suggests that the application of latent class analysis (LCA) can be used as a data reduction method for categorizing dietary intake data at meal levels into meaningful groups. In this milieu, the study aims to analyze dietary intake data of pregnant women at meal levels to study associations with clinical, biochemical, and birth outcomes.

Methods: LCA is being applied to dietary intake data collected for the study entitled "The effect of daily versus weekly iron supplementation on haemoglobin levels, oxidative stress and birth outcomes," conducted from 2011 to 2015 with 500 North Indian pregnant women. Demographic, anthropometric, and biochemical data documented in the study are being used in this analysis. For LCA, meal intake of food items for breakfast, lunch, and dinner are being entered for two weekdays and one weekend day for each study participant. Mean nutritional compositions of generic meals will be determined to produce a generic meal data set. Thereafter, statistical comparisons will be done against the original outcomes. Principal component analysis will be applied to generic meals to identify meal patterns. The analysis of clinical and biochemical variables with multivariate adjustments across the generic meal patterns will be done by variance analysis with the Bonferroni post-hoc comparison method.

Results: Currently, data are being entered to determine generic meal categories. Results will be obtained for latent classes for generic meal intakes, overall daily intakes (g/day or ml/day) of selected food groups by latent class, mean daily macronutrient and micronutrient intake by latent class, most dominant class in the study participants, daily food intakes by the most dominant class, and clinical and biochemical variables by most dominant latent class.

Conclusion: Simplifying dietary intake data to generic meal patterns to analyze maternal diet during pregnancy with birth outcomes will enable effective meal-based nutrition counselling strategy.

P1-E-44 EFFECT OF REPLACING COMMONLY CONSUMED FRUIT WITH BERRIES IN THE USDA DIETARY PATTERNS: A MODELING ANALYSIS

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Introduction: A recent review of the evidence suggests that anthocyanin-rich foods, such as berries, may be readily incorporated into the diet and is a simple dietary change that may have an effect in reducing cardiovascular disease risk. The objective was to assess the nutritional impact of replacing a serving of commonly consumed fruit with a serving of berries in the USDA Dietary Patterns: Healthy US-Style (HUS), Healthy Mediterranean-Style (HMS), and Healthy Vegetarian (HV).
Methods: The USDA's food pattern modeling approach was used to develop three 7-day replacement menus in the USDA Dietary Patterns: HUS, HMS, and HV for the 2000-calorie level. The replacement menus incorporated one serving of mixed berries replacing one serving of commonly consumed fruit (apples, bananas, and grapes) in the United States while adhering to other recommendations for vegetables, dairy, grains, and protein foods. A total of 2 servings of fruit per day were used in the menus. For three of the seven days, 1 cup of blueberries and four of the seven days 1 cup of mixed berries (1/3 cup blackberries, 1/3 cup raspberries, 1/3 cup strawberries) were used. Nutrient and anthocyanin analyses were conducted on the 7-day menus using ESHA Food Processor: 11.14.x software and the USDA Database for Flavonoid Content of Selected Foods, Release 3.3.
Results: Replacing a serving of commonly consumed fruit, such as apples, bananas, and grapes with a serving of berries per day in the 2000 calorie USDA Dietary Patterns resulted in a < 2.0% increase or decrease in calories, macronutrients, fatty acids, and cholesterol. Dietary fiber was increased by 4.7% in the HUS and 5.1% in the HMS USDA Dietary Patterns with minimal increases (< 1.5%) in the HV USDA Dietary Pattern. Soluble fiber was increased by 10.1%, 5.3%, and 10.2% in the HUS, HMS, the HV USDA Dietary Patterns, respectively. Vitamin C was increased by 16% in the HUS, 13.9% in the HMS, and 11.9% in the HV USDA Dietary Patterns. Anthocyanins were increased by 93.8% in HUS, HMS, and HV USDA Dietary Patterns.
Conclusion: Food pattern modeling analysis provides insights into the nutritional benefits of replacing one serving of commonly consumed fruit with one serving of berries per day in the USDA Dietary Patterns at the 2000 calorie level. The addition of berries to the USDA Dietary Patterns increased some beneficial nutrients and dietary components with minimal change in calories, macronutrients, fatty acids, and cholesterol.

P1-E-45 INTEGRATING TIMESERIES DATA ON DIET AND 24-HOUR MOVEMENT BEHAVIOURS TO IDENTIFY TEMPORAL BEHAVIOUR PATTERNS

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Introduction: Understanding how dietary and 24-hour movement behaviors—physical activity (PA), sedentary time, and sleep—interact over time may provide insights into their combined impact on health. However, few studies have examined all these behaviors together. This study analyzed timeseries dietary and 24-hour movement data from the EverydayLife Study to identify distinct temporal behaviour patterns.
Methods: Participants (n=142, 18-65 years, 81% female) recorded dietary intake using a smartphone food diary ("FoodNow") and wore a SenseWear Armband over 7 consecutive days. BMI and body fat mass (%) were estimated using anthropometry and Dual X-Ray Absorptiometry. K-means cluster analysis was used to classify participants using hourly contributions (%) of energy intake and time spent in PA, sedentary time, and sleep across the weekday as input variables. Differences between clusters were assessed using t-tests and linear regression (adjusted for age and gender).
Results: Two clusters were identified: "Earlier" (68%) and "Later" (32 %). Compared to the "Earlier" cluster, adults in the "Later" cluster had later sleep and wake times, ate their first meal later, and spent more time sedentary after 9pm. Those in the "Earlier" cluster also spent more time in total PA (~40 minutes/day), less time sedentary (~55 minutes/day), and had higher total energy intake (~842 kJ/day; all $p<0.05$). No significant difference in sleep duration was observed between clusters. The "Later" cluster had a higher representation of males ($p=0.05$) and were younger than those in the "Earlier" cluster (mean [95% confidence interval]: 36.8 [32.4, 41.2] vs. 41.6 [38.7, 44.6] years; $p=0.06$). Percent body fat was 3% lower in the "Earlier" cluster, but this difference was not statistically significant ($p=0.06$). There was also no significant difference in BMI.
Conclusion: This study highlights the value of integrating dietary and 24-hour movement data to identify meaningful behavior patterns. Future research in larger samples should explore whether these temporal behavior patterns influence metabolic health and how coordinated behaviour interventions might optimise health outcomes.

P1-E-46 INFLAMMATORY DIETARY PATTERN IS ASSOCIATED WITH INCREASED FASTING BLOOD GLUCOSE, INSULIN RESISTANCE AND BODY MASS INDEX IN BRAZILIAN ADOLESCENTS

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Introduction: Diet can play an important role in regulating the subclinical inflammatory response related to metabolic disorders.
Methods: We analyzed data from the Study of Cardiovascular Risks in Adolescents (ERICA), a nationwide cross-sectional school-based study that examined 12-17-year-old students. Dietary patterns were extracted by Partial Least Square (SAS PROC PLS routine) using data from a subsample (n=3,703) with information on food consumption (collected by 24-hour dietary recall) and inflammatory biomarkers (adiponectin and C-reactive protein). Predictor variables were the consumption (in grams) of 26 food groups and the response variables were the two inflammatory biomarkers. Food groups with factor loadings ≥|0.15| were retained in the patterns. The first dietary pattern identified, including 13 food groups (positive loadings: soda, cakes, cheeses, fats, pasta, snacks, sweets and breads; negative loadings: rice, milk-based dishes, poultry, fish, beans), was named 'inflammatory' and considered for subsequent analyses. Individual scores of the inflammatory dietary pattern were calculated by adding up the multiplication of the factor weight by the quantity (in grams) consumed of each food group included in the pattern. Positive factor scores indicate a diet with pro-inflammatory characteristics, while negative scores indicate a diet with anti-inflammatory characteristics. The factor scores were estimated for the ERICA subsample (n=36,956) that had data on food consumption, metabolic biomarkers, and anthropometric measurements. Multiple linear regression models (adjusted for sex, age, type of school, diet misreport, and daily energy intake) were used to evaluate the association between the factor score (independent variable) with total cholesterol, LDL-c, HDL-c, triglycerides, fasting blood glucose, HOMA-IR, waist circumference, and BMI (dependent variables). Statistical analyses considered the complex sample design and weights (SAS Studio 3.8).
Results: Mean inflammatory dietary pattern scores were 0.035 (boys) and 0.051 (girls). A statistically significant association ($p<0.01$) was found between the inflammatory dietary pattern and BMI ($\beta=0.07 kg/m^2$), fasting blood glucose ($\beta=0.20 mg/dL$), and HOMA-IR ($\beta=0.03$).
Conclusion: The findings suggest that the diet of Brazilian adolescents has pro-inflammatory characteristics and is related to the increase in body weight, fasting blood glucose, and insulin resistance.

Poster Session 1-F
BIOMARKERS AND METABOLOMICS
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-F-47 MICRONUTRIENT BIOMARKER STABILITY IN WHOLE BLOOD ASSESSED IN THE UK NATIONAL DIET AND NUTRITION SURVEY (NDNS)

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Introduction: Measuring micronutrient (vitamin and mineral) status is important to determine the prevalence of micronutrient deficiency, to monitor and evaluate public health and micronutrient supplementation and fortification programmes, and to investigate relationships between micronutrient status and health outcomes. However, the feasibility of collecting and processing blood specimens in a timely manner remains a barrier to the generation of large-scale micronutrient status data. Therefore, we investigated the effect of 24 h delayed processing of chilled whole blood on micronutrient status biomarkers.
Methods: The study was performed in 2022 and was embedded within the UK National Diet and Nutrition Survey (NDNS). Six tubes of venous blood (two of serum, lithium heparin, and EDTA) were collected from 64 participants. One set of tubes was taken to local laboratories for processing within 2 h, and the other set were mailed in an insulated box with cold packs using an overnight postal service to the Nutritional Biomarker Laboratory (NBL), Epidemiology Unit, University of Cambridge. Laboratory specimen processing protocols were aligned in all sites and resulting specimens transported and stored -70 °C frozen until analysis.
Results: The geometric mean (95% CI) percent difference was calculated between the 2-h processed and overnight cooled postal specimens. This was compared with quality specifications for allowable difference determined from intra- and inter-individual variation for all micronutrient status markers used in the NDNS. Small percent differences between protocols indicated acceptable stability for many micronutrient biomarkers including 25-hydrovitamin D (1% (-1, +3)), vitamin B6 (0% (-2, +1), vitamin B12 (1% (-1, +4), and serum folate (-1% (-4, +2). However, compared with the 2-h processed specimen, ferritin concentration (6% (+3, +8)), zinc concentration (4% (+1, +6)), and vitamin C concentration (4% (0, +8) were higher in the postal specimens. Selenium (-3% (-5, -1)) and retinol (-3% (-4,-1) concentrations were lower in the postal protocol.
Conclusion: Blood specimen processing protocols for chilled whole blood that include a 24-hour processing delay can be feasible in studies of micronutrient status, allowing collection of specimens for measurement of micronutrient status where laboratory facilities may not be readily available. However, testing of study-specific protocols is recommended.

P1-F-48 DIETARY CAROTENOID INTAKE AND ITS ASSOCIATION WITH EXCESS BODY MASS INDEX AMONG ADULTS: ANALYSIS OF NHANES 2011-2018 DATA

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Introduction: Managing excess Body Mass Index (BMI), defined as over 25 kg/m², is a significant healthcare challenge. Despite various treatment strategies, excess BMI rates continue to rise globally. Recent research suggests carotenoids may help regulate adipose tissue, offering potential for obesity management. However, there are no formal dietary reference intake recommendations (DRIs) for carotenoids. Consensus on intake guidelines or benchmarks for carotenoid levels remains unresolved. This study investigates the relationship between carotenoid intake and BMI to identify intake levels associated with BMI reduction.

Methods: This cross-sectional study used data from the National Health and Nutrition Examination Survey (NHANES) 2011–2018, including 19,915 participants aged over 20 years. Of these, 5,661 had a BMI<25 kg/m² and 14,254 had a BMI≥25 kg/m² (referred to as excess BMI). Dietary carotenoid intake, covering α-carotene, β-carotene, β-cryptoxanthin, lycopene, lutein/zeaxanthin, and total carotenoids from diet and supplements, was assessed via two 24-hour dietary recall interviews. Multivariable weighted logistic regression analysis and smooth curve fitting techniques were performed to explore the association between carotenoids intake and excess BMI.

Results: After adjusting for potential confounders in our most comprehensive model, the adjusted odds ratios with 95% confidence intervals for the highest versus lowest quartile of intake demonstrated a statistically significant decrease in the likelihood of excess BMI: 0.8 (0.69-0.94) for α-carotene, 0.81 (0.71-0.93) for β-cryptoxanthin, 0.78 (0.67-0.9) for lutein with zeaxanthin, and 0.79 (0.68-0.93) for total carotenoid intake. Smooth curve fittings robustly supported these associations and indicated a lower prevalence of excess BMI. In both logistic regression and generalized models, consensus remains elusive regarding the relationships between β-carotene, lycopene, and excess BMI. To achieve these BMI reductions, we propose a daily carotenoid intake of approximately 24.5 mg as the optimal amount.

Conclusion: Our findings indicate a significant inverse relationship between higher total dietary carotenoid intake and reduced odds of having an excess BMI among adults. Further investigation is warranted to refine and verify the recommended carotenoid dosage, with the aim of establishing evidence-based dietary guidelines for effective weight management.

P1-F-49 SEASONAL CHANGES IN SKIN CAROTENOID SCORES

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Introduction: Most dietary intake data is subjective and therefore prone to social desirability, recall, and confirmation biases. The Veggie Meter® is a recent advancement in skin carotenoid technology that is portable and has been used in community and research settings as a non-invasive, objective biomarker of carotenoid intake. However, seasonal changes in sun exposure and dietary intake may affect skin carotenoid scores (SCS) and thus affect research outcomes longitudinally. The purpose of this project was to assess SCS of urban adults throughout the year to determine whether scores change seasonally and to discover possible factors that might influence these changes.

Methods: Adult participants, aged >18 years, were recruited at food pantries, senior centers, local college campuses, and other locales in the Washington D.C. area (USA). SCS was determined by pressure-mediated reflection spectroscopy (Veggie Meter®). Surveys were conducted to assess participant characteristics, including self-assessed skin colour. Due to varying numbers of repeated measurements across seasons, mixed linear model regression was employed to analyze seasonal changes and examine the impact of various demographic and health-related factors on SCS.

Results: The study included 188 adults (64.2% African American, 20.7% Caucasian) who ranged from 20-86 years of age (mean±SD = 58.5±15.5 years). The sample comprised 68.1% females, with 45.5% having a Bachelor's degree or higher. Compared to Winter, SCS was significantly lower in Spring (-13.7, $p<0.001$), Summer (-14.3, $p<0.001$), and Fall (-15.2, $p<0.001$). SCS was significantly lower in individuals with dark skin (-61.6, $p<0.001$) and medium skin (-49.6, $p<0.001$) compared to those with light skin. Individuals reporting a medical condition had an average SCS 30.5 points lower than those without ($p = 0.019$). Smokers had an average SCS 27.4 points lower than non-smokers ($p = 0.041$). Seasonal changes in SCS were consistent across skin colour, smoking status, or presence/absence of a medical condition.

Conclusion: In this group of primarily urban adults, SCS was higher in Winter than any other season regardless of skin colour, smoking status, and presence of a medical condition. Future studies should investigate the mechanisms underlying the seasonal differences in SCS.

P1-F-50 PROBIOTICS FOR ENHANCED SKIN CAROTENOID STATUS: A RANDOMIZED, DOUBLE-BLIND, CONTROLLED TRIAL

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Introduction: Skin carotenoid status (SCS) is a reliable indicator of carotenoid intake and has been shown to reflect interindividual variability in carotenoid metabolism and absorption. However, most host-related factors suggested to influence this interindividual variability, like gut microbiome composition, have rarely been explored using randomized controlled trials (RCTs). While probiotics are known to enhance micronutrient status, their impact on phytochemicals like carotenoids remains understudied.

Methods: A 10-week, double-blind RCT involving 37 premenopausal women (average age of 40 years) was conducted. All participants took two supplements daily: a mixed carotenoid supplement (17 mg of total carotenoids) and either a probiotic or a placebo. The primary outcome was SCS measured using a spectrophotometer. Subgroup analyses were conducted according to baseline SCS, carotenoid intervention responsiveness, and body mass index (BMI). Secondary outcomes included stool microbiota composition (16S rRNA sequencing analyzed using QIIME2 and machine learning), plasma carotenoids, and markers of antioxidant capacity, inflammation, and skin health (e.g., wrinkling). Dietary intake, physical activity, and quality of life and sleep were also monitored. Repeated measures were analyzed using linear mixed models with treatment and time (week 0, 5, and 10) as factors.

Results: Baseline gut microbial composition was associated with baseline SCS and carotenoid intervention responder status (median final accuracy ≥ 0.75). Both groups increased SCS and plasma carotenoids from weeks 0 to 5 ($p < 0.01$), but Probiotic SCS continued to rise from weeks 5 to 10 ($p=0.032$), while Placebo SCS and plasma carotenoids in both groups did not. Subgroup analyses showed that the effect of probiotic supplementation was strongest in participants with one or more of the following characteristics: (a) normal BMI; (b) high baseline SCS; and (c) those who did not respond to carotenoid supplementation. Probiotic + carotenoid supplementation was associated with changes in gut microbial composition, while carotenoid supplementation alone was not (median final accuracy of 1.0 vs. 0.35). There were no notable changes in plasma antioxidant capacity, immune status, or skin health measures.

Conclusion: Overall, these findings indicate the potential of probiotics to enhance SCS and highlight the role of the gut microbiota among many host-related factors in the SCS response to carotenoid intervention.

P1-F-51 AGREEMENT BETWEEN CAROTENOID-RICH FOOD INTAKES AND CONCENTRATION OF PLASMA CAROTENOIDS AMONG SWEDISH YOUTH EATING PLANT-BASED OR OMNIVOROUS DIETS

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Introduction: People eat plant-based diets of varying strictness, and self-reported fruit and vegetable intake is prone to misreporting. This study aimed to assess the agreement of self-reported intakes of carotenoid-rich foods among youths eating plant-based or omnivorous diets and their plasma carotenoids as objective biomarkers.
Methods: A cross-sectional study with 235 youth (16-to-24 years) was conducted in Sweden. Dietary intake was assessed by four non-consecutive 24-hour dietary recalls, from which average intakes (g/d) of carotenoid-rich food groups were calculated. Non-fasting dried blood spot samples were collected and analyzed for carotenoid concentrations of β-carotene, α-carotene, β-cryptoxanthin, lycopene, lutein+zeaxanthin, and total sum of the carotenoids.
Results: Participants (78% female, mean age 22 years, BMI 23 kg/m^2) included 60 vegans, 59 lacto-ovo-vegetarians (LOV), 55 pescatarians, and 61 omnivores. No significant differences were found between diet groups for median intakes of carotenoid-rich foods. However, vegans showed a significantly lower median plasma concentration of total carotenoids (3.01 vs 3.52 µmol/L, p=0.003) and α-carotene (0.16 vs 0.26 µmol/L, p=0.013) compared to pescatarians. Vegans also had a lower concentration of β-carotene (0.5 µmol/L) compared to LOVs (0.74 µmol/L), pescatarians (0.86 µmol/L), and omnivores (0.66 µmol/L), p<0.001. Correlations between intakes of carotenoid-rich foods and the corresponding plasma carotenoid were weak to moderate, r=0.23 to 0.40 (p<0.001, for all). The findings remained after controlling for BMI, age, and sex. The correlation between food intakes and plasma carotenoids was higher for vegans than pescatarians for total carotenoids (r=0.29 vs 0.23) and α-carotene (r=0.49 vs 0.36), and for β-carotene (r=0.48) compared to LOVs (r=0.23) and pescatarians (r=0.27). Of the total sample, 69-74% were correctly classified into the same or adjacent quantile when comparing intakes of carotenoid-rich foods with the corresponding plasma carotenoid.
Conclusion: The findings show a weak-to-moderate agreement between carotenoid-rich food intakes and plasma carotenoids, indicating somewhat acceptable self-reported intakes among Swedish youth eating plant-based or omnivorous diets. Despite comparable intakes between the diet groups, differences in plasma carotenoids suggest possible misreporting or variations in absorption, bioavailability, or metabolism of carotenoids, warranting further investigation.

P1-F-52 BIOMARKERS OF POLYUNSATURATED FATTY ACID INTAKE: THE EFFECTS OF AGE, SEX, BMI, AND GENETICS ON THE ASSOCIATION BETWEEN INTAKE AND CIRCULATING LEVELS

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Introduction: As part of the JPI funded project DIETARY DEAL, we investigated if age, sex, BMI, and FADS genotype influence how biomarkers reflect polyunsaturated fatty acids (PUFA) intake—specifically omega-3 (alpha-linolenic acid [ALA], eicosapentaenoic acid [EPA], and docosahexaenoic acid [DHA]) and omega-6 (linoleic acid [LA], arachidonic acid [AA]).
Methods: We associated habitual dietary intake (grams/day), assessed by a food frequency questionnaire, with PUFA levels (percentage of total fatty acids) in plasma phospholipids (PL, n=1247) and red blood cells (RBCs, n=2051) in EPIC-Potsdam using multivariable regression models. LA intake was also examined as a percentage of total energy (%TE). Presence of effect modification was assessed with interaction terms (e.g., sex*PUFA intake).
Results: Intake of EPA and DHA was positively associated with their levels in RBC (β=0.79 per g/d, 95% CI: 0.57–1.11) and PL (β=1.24 per g/d, 95% CI: 0.99-1.49). These associations were stronger in women than men, older individuals (≥60 years) than younger, and among individuals without obesity (all p-interaction<0.05). The association between ALA intake (plant-derived omega-3) and EPA levels was modulated by the LA/ALA intake ratio (p-interaction=0.002). LA intake was positively associated with LA levels, this association was stronger in PL (β=0.21 per %TE; β=0.07 per g/d) than in RBC (β=0.08 per %TE; β=0.03 per g/d), indicating varying LA incorporation across different lipid fractions. We found weaker associations between LA intake and RBC LA levels in women (p interaction=0.015). LA intake was positively associated with PL AA levels, with stronger associations in younger people (<60 years, p-interaction=0.01) and people without obesity (p-interaction=0.03). The association between LA intake and RBC AA levels differed based on FADS1 genotype with varying effects depending on the number of T alleles in SNP rs174546 (p-interaction = 0.02).
Conclusion: Age, sex, BMI, and genetics may influence the relationship between PUFA intake and their PL and RBC biomarker levels, highlighting the role of these factors in modulating fatty acid metabolism. Furthermore, the findings support the hypothesis that higher LA intake may inhibit the conversion of ALA to EPA. The associations of PUFA intake on biomarker levels varied between PL and RBC, emphasizing the importance of the lipid fraction in interpreting these associations.

P1-F-53 COMPARING BIOMARKER AND DIETARY INTAKE OF OMEGA-3 FATTY ACIDS IN 24-HOUR RECALLS IN A POPULATION-BASED STUDY IN BRAZIL

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Introduction: The assessment of dietary intake of episodically consumed foods through short-term self-reported methods may be prone to errors and bias. In Brazil, Ω-3 food sources represent less than 1% of the total daily energy intake, reinforcing the challenges of accurately estimating their intake in the population. Thus, this study aimed to compare the self-reported dietary intake of alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA), and docosahexaenoic acid (DHA) assessed through 24-hour recalls (24HR) and their composition in erythrocyte membranes as a biomarker of Ω-3 fatty acids intake.
Methods: The study included 351 individuals of both sexes, aged 20-93 years from the 2015 Health Survey of São Paulo, a cross-sectional population-based study of residents of São Paulo, Brazil. Biomarkers of Ω-3 fatty acids were obtained through the fatty acids composition of erythrocyte membranes using a gas chromatograph (Shimadzu, CG-2010, Kyoto, Japan), and dietary intake was collected using two 24HR on nonconsecutive days and adjusted for usual dietary intake using the multiple source method (MSM). Dietary intake and biomarkers were compared using the Spearman correlation. In addition, we created Bland-Altman plots of the Z-scores of both measurements to normalize them to the same scale for comparisons.
Results: The usual intake of Ω-3 fatty acids in the 24HR was sparse, with a mean (SD) of ALA = 1646 mg (495 mg); EPA = 10.7 mg (2.9 mg); DPA = 19.2 mg (13.5 mg); and DHA = 35.5 mg (17.3 mg). The mean percentage of erythrocyte membrane composition was 0.19% for ALA, 0.42% for EPA, 2.26% for DPA, and 3.69% for DHA. However, there were weak and non-significant correlations between dietary intake and biomarkers for all fatty acids. Bland-Altman plots showed a systematic bias in the agreements between the Z-scores of biomarkers and dietary intakes for ALA, DPA, and DHA, with an increasing dispersion of differences, especially for those individuals above 1SD of the mean. However, the worst pattern was observed for EPA, with no consistent agreement or bias between the two measurements.
Conclusion: The estimated usual intake of Ω-3 fatty acids in 24HR did not reflect their biomarkers in erythrocyte membranes, which represent a 4-month intake due to the lifespan of 120 days of the erythrocytes. In studies investigating omega-3 intake with health outcomes, the 24HR may lead to substantial bias in Ω-3 fatty acids dietary assessment

P1-F-54 EXPANDING BIOMARKER DATA AVAILABILITY TO ESTIMATE CARDIOMETABOLIC RISK FACTORS USING THE OMEGA-3 INDEX IN BRAZILIAN ADULTS

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Introduction: The Omega-3 Index (O3I) has been proposed to comprise an indicator of risk factors for cardiovascular (CVD) disease; however, the literature establishing O3I cutoffs is based on studies with limited ethnic diversity. In addition, there are a lack of data on O3I for most Latin American countries; thus, the relationships between O3I and CVD or its risk factors in these populations remain unknown. The 2024 update of the Omega-3 world map showed that 92% of the ω-3 status data come from European or North American residents. Therefore, this study aimed to identify the erythrocyte membrane fatty acid profile and the O3I in Brazilian adults, with the goal of expanding the O3I data availability in broader Latin American populations.

Methods: The data for the study was based on the 2015 Health Survey of São Paulo, a cross-sectional population-based study representative of the population of São Paulo, Brazil, the largest city in Latin America. We measured fatty acids profile in 356 individuals of both sexes, aged 20-93 years. The O3I was obtained by adding the eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids percentages in the fatty acids composition of erythrocyte membranes, using a gas chromatograph (Shimadzu, CG-2010, Kyoto, Japan), and stratified according to the original cutoffs: ≤4% (low), > 4-8% (intermediate), and ≥ 8% (desirable).

Results: The majority of fatty acids in erythrocyte membranes of the population were saturated fatty acids (45.4%). The O3I presented a mean percentage of 4.12% (SD=1.87) with no significant differences between sexes (p=0.125), which is close to values found in populations with low omega-3 intake. Most of the population (55.5%) presented an intermediate level of O3I, while a significant proportion of people (42.2%) had an O3I below 4%, indicating a low level associated with higher CVD risk. Only 2.3% (n=8) of the participants had an O3I above the desirable level of 8%.

Conclusion: Assessing specific ω-3 biomarkers in diverse populations is essential to investigate their role in cardiometabolic health. This study highlights the need to expand these investigations to more diverse populations to help establish O3I cutoffs relevant to CVD risk factors in these populations.

P1-F-55 A META-ANALYSIS OF EPIGENOME-WIDE ASSOCIATION STUDIES OF ULTRA-PROCESSED FOOD CONSUMPTION WITH DNA METHYLATION IN EUROPEAN CHILDREN

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Introduction: There is limited knowledge on how diet affects the epigenome of children. Ultra-processed food (UPF) consumption is emerging as an important factor impacting health, but mechanisms need to be uncovered. We therefore aimed to assess the association between UPF consumption and DNA methylation in children.
Methods: We conducted a meta-analysis of epigenome-wide association studies (EWAS) from a total of 3152 children aged 5 to 11 years from four European studies (HELIX, Generation XXI, ALSPAC, and Generation R). UPF consumption was defined applying the Nova food classification system (group 4) and DNA methylation was measured in blood with Illumina Infinium Methylation arrays. Associations were estimated within each cohort using robust linear regression models, adjusting for relevant covariates, followed by a meta-analysis of the resulting EWAS estimates.
Results: Although no CpG was significant at False Discovery Rate level, we found suggestive associations (p-value $<10^{-5}$) between UPF consumption and methylation at seven CpG sites. Three of them, cg00339913 (PHYHIP), cg03041696 (intergenic), and cg03999434 (intergenic), were negatively associated whereas the other four, cg14665028 (NHEJ1), cg18968409 (intergenic), cg24730307 (intergenic), and cg09709951 (ATF7), were positively associated with UPF intake. These CpGs have been previously associated with health outcomes such as carcinomas and the related genes are mainly involved in pathways related to thyroid hormones and liver function.
Conclusion: We found suggestive changes in methylation at 7 CpGs associated with UPF intake in a large EWAS among children. Although this shows a potential impact of UPF intake on DNAm, this might not be a key mechanism underlying the health effects of UPFs in children. There is a need for more detailed dietary assessment in children and for intervention studies to assess potential epigenetic changes linked to a reduction of UPF in the diet.

P1-F-56 MICROBIOME-DERIVED METABOLITES IN EARLY TO MID-PREGNANCY AND RISK OF FETAL GROWTH EXTREMES: A METABOLOME-WIDE ASSOCIATION STUDY

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Introduction: Small-for-gestational age (SGA) and large-for-gestational age (LGA) are fetal growth extremes that predispose an individual to a plethora of short- and long-term adverse health consequences. Perturbations to maternal metabolic milieu and gut microbiome have been linked to both SGA and LGA. However, the roles of microbiome-derived metabolites as the end-products of microbial metabolism in fetal growth remain understudied. We examined the prospective association of microbiome-derived metabolites in early to mid-pregnancy with risk of SGA and LGA.

Methods: We drew a random sample of 140 SGA, 134 LGA, and 140 appropriate-for-gestational age (AGA) singleton births from the Pregnancy Environment and Lifestyle Study cohort. Untargeted metabolites were measured by gas chromatography/time-of-flight mass spectrometry and reversed phase- and hydrophilic interaction liquid chromatography quadrupole time-of-flight mass spectrometry, using fasting serum collected at gestational weeks (GW) 10-13 and 16-19. Adjusted multinomial logistic regression of individual metabolites and multivariate chemical enrichment analysis in association with SGA and LGA risk were performed, with false discovery rate (FDR) adjustment.

Results: Among 1,167 annotated metabolites, we identified 135 microbiome-derived metabolites through multiple databases (Virtual Metabolic Human database, MetOrigin, and Metabolon). After adjusting for covariates, clusters of basic amino acids (AA), branched-chain AA, and dicarboxylic acids at GW 10-13 were significantly and positively associated with the risk of SGA (all P_{FDR} <0.05). At GW 16-19, branched-chain AA and hydroxybutyrates were positively associated with SGA risk, while dicarboxylic acids were inversely associated with SGA. For LGA, four clusters at GW 10-13 (basic AA, cyclic AA, dicarboxylic acids, and hydroxybutyrates) were positively associated with LGA risk. At GW 16-19, lysophosphatidylcholines, sugar alcohols, and phenylacetates were inversely associated with risk of LGA but not SGA, while carnitines were positively associated with LGA.

Conclusion: We identified common and unique microbiome-derived metabolite clusters associated with fetal growth extremes. Given that microbiota is malleable, our findings may inform nutritional, microbial, or pharmacological interventions to optimize fetal growth. Future investigation to identify upstream lifestyle factors influencing these microbiome-derived metabolites is warranted.

P1-F-57 PLASMA NITRATE/NITRITE LEVELS AND MUSCLE STRENGTH IN OLDER ADULTS: AN EXPLORATORY STUDY

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Introduction: Handgrip strength (HGS) is a crucial component in assessing physical performance in older adults. Notably, lower HGS has been linked to adverse outcomes, including falls, functional disability, and mortality. In young individuals, higher plasma nitrate and nitrite (NOx) concentrations are positively correlated with enhanced physical performance. However, studies examining this relationship in older adults are scarce and yield conflicting results. Therefore, this study aimed to investigate the association between plasma NOx levels and handgrip strength (HGS) in older adults.

Methods: This cross-sectional study included 40 male and female participants, aged 60–75 years, who were non-smokers and residents of Brasília, Federal District, Brazil. Plasma nitrate and nitrite (NOx) concentrations were determined using spectrophotometry with the Griess Reagent. Handgrip strength (HGS) was measured three times on the dominant side using a JAMAR dynamometer (model 5030J1), and the highest value was recorded. A multiple linear regression model was performed, adjusted for sociodemographic status, physical activity level, body composition, cognitive function, depressive symptoms, and biomarkers.

Results: Participants had a mean age of 66.7 years (SD = 4.3), with 62.5% being female. The mean body mass index was 25.3 kg/m^2 (SD = 2.6). Among women, the mean HGS and NOx levels were 24.6 kg (SD = 4.4) and 15.5 µmol/L (SD = 6.9), respectively. In men, the corresponding values were 39.1 kg (SD = 6.8) and 16.0 µmol/L (SD = 5.6). In a fully adjusted model, a 1 µmol/L increase in NOx was associated with a 0.322 kg increase in HGS (95% CI: 0.032 to 0.612).

Conclusion: In older adults, higher plasma NOx concentrations are positively associated with greater HGS, a key indicator of physical performance. Supplementing NOx in older adults may be a promising strategy to enhance handgrip strength, but further studies are necessary to confirm its efficacy.

Poster Session 1-G
CAPACITY BUILDING
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-G-58 BARRIERS AND FACILITATORS TO ROBUST DIETARY ASSESSMENT IN CANADA

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Introduction: Assessing dietary intake with reasonable accuracy and reliability is complex and challenging. Researchers need to select from a range of tools to identify the best assessment strategy for a given research question and context. We sought to understand barriers to and facilitators of robust dietary assessment in Canada.
Methods: We conducted an online survey of researchers (n=50) who engage in dietary assessment. Survey questions were guided by the Theoretical Domains Framework, developed to make implementation theories more accessible to researchers. Domains within the Framework include knowledge, skills, intentions, environmental context and resources, and beliefs about capabilities. The survey was promoted via newsletters disseminated by the Canadian Nutrition Society, Dietitians of Canada, and Obesity Canada, and direct emails to researchers in food and nutrition departments at Canadian academic institutions. Survey responses were collected from February to July 2024.
Results: Respondents were at a range of career stages, with one in seven identifying as trainees, and half were members of a regulated health profession. Nine in ten reported using dietary data to study dietary patterns/quality, about three-quarters were interested in energy intake, and over one in five used dietary data to examine environmental sustainability. Participants used data from a range of tools, with over three-quarters using recall data and over half using data from brief tools. Most participants reported being confident or very confident in their abilities to select appropriate tools and to appropriately analyze dietary data. Identified challenges to robust dietary assessment included the cultural relevancy of available tools and databases, lack of appropriate tools for populations such as children and youth, and the lack of appreciation of the nuances of dietary assessment among colleagues. Suggestions to facilitate robust diet assessment included a repository with freely available web-based tools that have been tested in English and French and hands-on webinars and forums related to practical aspects such as cleaning data.
Conclusion: Expanding the availability of dietary assessment tools, along with efforts to ensure they are relevant to different cultural groups and

are available in both official languages, could support dietary assessment in Canada. Also needed are resources related to best practices in dietary assessment to broaden capacity in Canada.

P1-G-59 CLIMATE-SMART FOOD AND NUTRITION RESEARCH INFRASTRUCTURE (FOODNUTRI): AN EXAMPLE OF A JOINT EFFORT TO FOSTER SUSTAINABLE FOOD SYSTEMS AND DIETS

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Introduction: We are facing critical challenges concerning 1) food security and safety, 2) resource efficiency, 3) environmental deterioration, primarily climate change, biodiversity loss, and pollution of freshwater resources, and 4) access to nutritious food for all. The transition to sustainable food systems and diets is seen as a fundament to mitigate the challenges. FOODNUTRI aims to maintain Finnish food availability and security during the changing climate and global politics, reduce the environmental burden of the food system, and promote consumer acceptance of healthy and sustainable diets. To reach these goals, an efficient research infrastructure (RI) facilitating both national and international research activities and active stakeholder collaboration is indispensable.
Methods: Altogether 12 partners including Finnish universities, research institutes, and universities of applied sciences joined forces and developed FOODNUTRI - a shared RI composed of seven knowledge-based platforms to provide facilities and expertise to study food characteristics, food safety, physiological responses to food, consumer acceptance, food consumption, and nutrient intake of populations, and environmental and health impacts.
Results: Currently, FOODNUTRI is in the stage of planning and construction and has received funding from the Research Council of Finland for 2020-2024. It is identified among the most viable national RIs and is well in line with the global strategic goals included in the UN's AGENDA 2030 and EU's FOOD 2030 policy.
Conclusion: FOODNUTRI serves as an example of a joint national effort to address critical challenges to population and planetary health and food system renewal. Through its capacity-building activities, FOODNUTRI will not only strengthen food and nutrition science but have societal impact beyond the scientific community. The unique collaborative RI will play a significant role in renewal of food value chains, introduction of new sustainable food ingredients, green-processing technologies, promotion of resource sufficiency, and food security to facilitate the shift towards sustainable plant-based diets across sociodemographic groups.

Poster Session 1-H
INSIGHTS FROM SURVEILLANCE AND EPIDEMIOLOGY
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-H-60 CREATION OF WEB TOOLS FOR VISUALIZING NUTRITION SURVEILLANCE DATA

Isabelle Rondeau [1], Julie K. Ennis [1], Nadine Kebbe [1], Stephanie Diaz [1], The Minh Luong [1], Cunye Qiao [1], Fuqi Chen [1]

[1] *Health Canada*

Introduction: A vast amount of nutrition surveillance data has been collected through various surveys. These data support Health Canada in developing nutrition policies and regulations, risk assessments, and program evaluation. Further, data are used by a broad external audience including researchers, policymakers, health professionals, food industry, and health media. The objective was to develop an innovative, user-friendly, and interactive approach to disseminate nutrition surveillance data in an accessible way.
Methods: Three 2015 Canadian Community Health Survey – Nutrition datasets were identified as candidates for development of data tools: (1) Usual Intakes from Food (pilot), (2) Total Usual Intakes from food and supplements, and (3) Food Source Contribution to intakes. For the pilot project, a multi-page web application was developed by the Bureau of Data, Science and Knowledge Integration (BDSKI; Food and Nutrition Directorate) using Flask, a python web framework. Interactive and dynamic visualizations were developed using D3.js, a JavaScript Library. A range of data users and subject matter experts were engaged throughout the design and development process. A scan of data visualization methods used by federal departments was conducted to identify options for where the nutrition data visualizations could be hosted.
Results: After consulting with the Centre for Surveillance and Applied Research at the Public Health Agency of Canada (PHAC), the Health Infobase was considered as the ideal location to host the web visualizations. Lessons learned in the initial pilot permitted streamlining the process for subsequent application development, built as single-page applications (SPAs) that use HTML, CSS, and JavaScript (D3.js). This approach is expected to provide a faster and more responsive user experience.
Conclusion: The creation of nutrition surveillance web visualizations enables users within and outside the government to view customizable data summaries in an interactive and easily interpretable manner, aiding policymakers in assessing, updating, and developing policies and regulations. These tools complement the detailed data files available on the Government of Canada's Open Data Portal and align with Canada's commitment to greater transparency and accountability.

P1-H-61 SWEET TASTE PREFERENCE AND FREQUENCY OF CONSUMPTION OF SWEET FOODS AND DRINKS DURING EARLY CHILDHOOD AMONG MEXICANS

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Introduction: Childhood obesity prevalence has risen dramatically in recent years, so it is urgent to understand its determinants. One factor that might be key for the definition of dietary habits and the development of childhood obesity is the exposure to sweet foods during infant feeding and its relation to sweetness preference. We aimed to investigate the association between the frequency of consumption of sweet beverages/foods and sweetness preference.

Methods: We conducted a study in a subsample of children 3-7 y from an ongoing birth cohort "MAS-lactancia" in Cuernavaca, Mexico. To measure sweetness preference, the Monell-2 series essay was conducted with 5 water solutions with sugar at 3%, 6%, 12%, 24%, and 36% concentration. The solutions were presented in pairs with each subsequent pair including the participant's preceding preferred solution plus an adjacent solution, until the child chose the same one two consecutive times. An FFQ for the previous month was applied to the mother about consuming beverages with added sugars and other sweet foods. The mother was also asked about her perception of how much the child enjoyed sweets on a five-point scale. We estimated regression models to identify the association between the frequency of consumption of sweet foods and sweetness preference.

Results: The analyzed sample consisted of 541 children. Each solution was selected by 18-20% of the sample, except for the third solution that was selected by 28% and the fifth (sweetest) by 13%. There were no differences in the solution selected by age. Yet, as age increases, the percentage of children in the highest tertile of consumption of sweetened foods and beverages increases, for example, at 12-18 months, 65% of children were in the lowest tertile and at 3.5 years of age, 50% of children were in the highest tertile. About 80% of the mothers perceived that their children enjoyed or enjoyed a lot of sweets (4 and 5 out of a 5-point scale), regardless of the child's age. The level of sweetness in the solution preferred was significantly associated with the frequency of consumption of sweet foods ($P < 0.05$).

Conclusion: Consumption of sugary foods and beverages begins early among Mexican children and increases with age. Furthermore, consumption of sugary foods and beverages is associated with sweetness preference for sweeter solutions. Future studies can evaluate how this is linked to long-term unhealthy eating habits.

P1-H-62 ASSOCIATION BETWEEN DIETARY PATTERNS AND ADDED SUGAR AND SWEETENERS IN BRAZIL

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Introduction: Diet is essential to promoting health and preventing disease. However, individuals do not consume foods or nutrients in isolation. In addition, identifying dietary patterns allow us to evaluate how groups of foods interact and contribute to overall health.
Methods: Food consumption data were from 46,164 individuals aged 10 years or older interviewed on the first day of the second National Dietary Survey (NDS) of the Household Budget Surveys (HBS) conducted in 2017-2018 by the Brazilian Institute of Geography and Statistics (IBGE). The reported foods were classified into 34 food groups according to similar nutritional characteristics. Subsequently, food groups with consumption frequencies of less than 5% were excluded (tea, oilseeds, diet and light foods, isotonic drinks, and other legumes). Then, the foods were grouped according to similar nutritional composition. Dietary patterns were identified by analyzing principal components using a correlation matrix. All estimates were calculated considering expansion factors and sample complexity. Linear regressions were adopted to evaluate the association of added sugars (yes or not) and sweeteners (yes or not) on dietary patterns.
Results: Twenty nine food items were identified by their main constituent: rice, beans, vegetables, cereals, roots and tubers, fruits, beef, other meats, poultry, fish, eggs, sausages, coffee, tea, milks, dairy products, flavoured dairy beverages, juices, industrialized juices, soft drinks, oils and fats, sweets, snacks and fast food, soups, pasta and flour, bread and crackers, breads, and sweet cookies and cakes. Three dietary patterns were identified (eingeinvalues >1.5) and those food items with factor loading higher than 0.30 were considered in the dietary pattern: i) Unsustainable pattern composed mainly by snacks and fast food, soft drinks, sweet cookies and cakes, and flavoured dairy beverages; ii) Traditional dietary pattern composed by rice, beans, and beef; iii) Mixed pattern composed by oils and fats, pasta, bread and crackers, and dairy products. Added sugars was inversely associated with the Traditional and Unsustainable patterns, while the addition of sweeteners was associated with the Mixed and the Traditional patterns.
Conclusion: Dietary patterns are associated with added sugars and sweeteners, potentially contributing to the role of diet in health and disease.

P1-H-63 DIETARY INTAKE AND TYPES OF FOODS CONSUMED BY CANADIAN CHILDREN AND YOUTH

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Introduction: The poor dietary choices of school-aged children/adolescents in Canada, which are directly influenced by their food environments, influence their risk for non-communicable diseases. As students consume approximately one-third of their daily calories at school, interventions targeting school food programs are increasingly important. As part of a growing federal commitment towards the development of a national school food program, gaining insights into students' dietary intake is essential to provide evidence-based recommendations to improve the types of foods provided via school food programs in Canada. The objective was to assess the overall dietary intakes and top contributors of nutrients of concern of Elementary/Middle and High School students in Toronto.

Methods: Nutrient intakes of students aged 8-17 years (n=22) were examined using a 3-day food record. The food ingredients and their quantities were analysed in the ESHA food processor. Mean energy and nutrient intakes–including carbohydrate, protein, fats, fibre, sodium, and total sugars–were calculated for analysis. Frequently consumed food ingredients among students were tallied and categorized based on the Government of Canada's Table of Reference Amount nutrition labeling guidelines.

Results: Total daily energy intake and the proportions of macronutrients were within the recommended ranges. However, students are consuming excessive amounts of total sugar and sodium, while their fibre intake falls below the recommended or derived levels. This is partly due to the frequent intake of sodium-rich foods, including fast foods and savoury snacks. Additionally, moderate consumption of soft drinks, fruit drinks, and confectionery products contributes to the high sugar intake. Although fruits and vegetables are eaten frequently, they are not consumed in significant quantities.

Conclusion: Interventions in the dietary habits of Canadian students that include foods higher in fibre and lower in sugar and sodium may significantly improve their health. These insights would be beneficial in supporting the development of a national school food program, helping schools offer foods that are essential for the overall well-being of students.

P1-H-64 ASSESSMENT OF DIETARY AND PHYSICAL ACTIVITY PATTERNS AMONG SCHOOL-GOING ADOLESCENTS IN SLUMS OF KARACHI, PAKISTAN

Sabahat Naz [1], Abiyah Narmeen [2], Rashida Rasheed [2], Romaina Iqbal [3]

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Introduction: Adolescents are more susceptible to non-communicable disease (NCD)-shared risk factors, including unhealthy diet and physical inactivity. This study aimed to identify the shared risk factors of NCDs among school-going adolescents through structured diaries in the slums of Karachi, Pakistan.

Methods: We randomly selected ten government and private schools (5 each) in two urban slums. We enrolled 100 students in grades 5 and 6 after taking written assent along with parental consent. We provided students with structured diaries to record their dietary intake and physical activity patterns for four days (two weekdays and two weekends). The structured diaries included information about meals and snacks, as well as a physical activity log detailing type, frequency, and duration. An instruction sheet was attached to guide students throughout the diary completion process. We also measured the student's height and weight and calculated height for age z-scores (HAZ) (stunting) and body mass index for z-scores (BMIZ).

Results: Of the 100 students enrolled, 62 were girls, and 38 were boys, with a mean age of 11.4 ± 0.7 years. The anthropometry data revealed that 42 students were stunted (≤ -1 HAZ), with a higher proportion of stunting observed among boys (50%, n=19) than girls (37.1%, n=23). The average BMI was 15.8 ± 2.5 kg/m², with 57% being underweight (≤ -1 BMIZ) (girls: 58%, n=36 vs. boys: 55.2%, n=21) and 5% overweight/obese (≥ 1 BMIZ) (girls: 4.8%, n=3 vs. boys: 5.2% n=2). Of the 100 diaries distributed, 91 students completed (79 completed and 12 partially completed) the diaries, seven were blank, and two were misplaced. We found that 46.1% (42/91) of students skipped meals, either breakfast or lunch/dinner, over the 4 days, with girls (n=28) more likely to skip meals than boys. In addition, 70.3% (64/91) of students did not consume any fruit, 55% (50/91) did not eat vegetables, and 51.6% (47/91) did not consume milk or dairy products during the 4 days. Furthermore, 57.1% (52/91) students consumed meat or meat products for only 1 or 2 days, while 8.8% (8/91) did not eat any over the 4 days. Moreover, 67% (61/91) of students frequently consumed junk food (samosas, chips, and biscuits), especially during the school lunch break or snack time. Of the 85 students who completed diaries for physical activity, 27% (23/85) reported no activity, with the majority being girls (n=19), while 42.3% (36/85) reported activities one to two out of four days, and 24.7% (21/85) were active daily. Common physical activities among students were running, cricket, and football.

Conclusion: Our study found high rates of meal skipping, low fruit and vegetable intake, and frequent junk food consumption among school-going adolescents. Stunting and underweight were highly prevalent, particularly among boys. Physical inactivity was common, highlighting the need for school-based interventions.

Poster Session 1-H

CONTEXTUAL AND SOCIODEMOGRAPHIC FACTORS

Monday, April 28 | 2.45pm - 4.15pm

Location: Convention Level Foyer

P1-I-65 THE RELATIVE CONTRIBUTIONS OF INDIVIDUAL, FAMILY, AND NEIGHBOURHOOD SOCIAL FACTORS TO DEVICE-MEASURED ACTIVE OUTDOOR PLAY IN PRESCHOOL-AGED CHILDREN

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Introduction: Children's active outdoor play (AOP) has declined over the past few decades, despite its essential role in promoting healthy development. Ecological models suggest that AOP is shaped by multi-level factors, including individual, family, and neighbourhood contexts. However, few studies have explored how multi-level factors contribute to AOP in preschool-aged children (3–5 years). Moreover, a comprehensive measure of AOP for this age group is lacking, underscoring the need for further investigation. This study examined the relative contributions of multi-level factors to AOP in preschool-aged children, employing a novel measurement method.

Methods: Participants for this cross-sectional study included 106 preschool-aged children and their parents from Alberta, Canada. AOP was measured using a novel measurement method, which included data from two devices (accelerometer and GPS monitor), complemented by a subjective measure (time-use diary). Time-stamped data from the two devices were merged and processed using R and cross-referenced with the diary. Parents completed an online questionnaire covering individual (child age and sex), family (parental education, parental support, and home outdoor space/resources), and neighbourhood social (three aspects of neighbourhood informal social control: general informal supervision, civic engagement for a better neighbourhood, and educating neighbourhood children) factors adapted from previously validated tools. Hierarchical regression analyses were conducted.

Results: AOP was categorized by intensity into three distinct outcomes: total AOP, light-intensity AOP, and moderate- to vigorous-intensity AOP. Across all three outcomes, adding individual and family factors did not significantly increase the explained variance in the outcomes. However, the inclusion of neighbourhood social factors led to significant increases in the explained variance for all three outcomes: total AOP (10.9%), light-intensity AOP (9.9%), and moderate- to vigorous-intensity AOP (8.4%). Civic engagement for a better neighbourhood was consistently positively associated with all three outcomes.

Conclusion: Findings suggest targeting neighbourhood social factors may be important in interventions aimed at promoting AOP among preschool-aged children. In particular, civic engagement may enable collective action to address neighbourhood-level concerns, such as improving safety for children's AOP when individual efforts are insufficient.

P1-I-66 BIOLOGICAL AND SOCIO-ENVIRONMENTAL FACTORS DURING LATE CHILDHOOD AND EARLY ADOLESCENCE ASSOCIATED WITH PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR AMONG GHANAIAN YOUTH

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Introduction: Many biological and socio-environmental factors affect the ability to complete adequate physical activity (PA). Our objective was to determine which factors measured at 9-11y and 11-13y are associated with moderate to vigorous physical activity (MVPA) and sedentary behavior (SB) among Ghanaian adolescents at 11-13y.

Methods: This analysis uses data from the International Lipid-based Nutrient Supplements DYAD Ghana trial that enrolled 1320 pregnant women, with follow-up of their children conducted at 9-11y and 11-13y. In this long-term follow-up, a sub-sample of adolescents 11-13y underwent a 7-day PA assessment using wrist-worn accelerometers. Bivariate regressions were run for each factor measured at 9-11y and 11-13y with adolescent MVPA and SB. Factors found to be associated in bivariate models were included in a final multivariable model. For associated factors measured at both times, we created a residual variable representing the unexpected change over time.

Results: 305 adolescents (58% female) provided accelerometer data with a mean wear time of 6.9 days. Over the 7-day PA assessment, adolescents spent 5% of their time in MVPA and 65% in SB. Several biological factors (e.g., body mass index, maternal age, height-for-age z-score (HAZ), and child pubertal development) and socio-environmental factors (e.g., household food insecurity access score (HFIAS), and mean hours in school) were associated with MVPA and SB. Child pubertal development at 9-11y ($p=0.020$), HFIAS at 9-11y ($p=0.020$), and the residual change in HAZ from 9-11y to 11-13y ($p=0.005$) were negatively associated with MVPA. Similarly, HFIAS at 9-11y ($p=0.006$), maternal age at 9-11y ($p=0.005$), and the residual change in HAZ from 9-11 to 11-13y ($p=0.040$) were positively associated with SB.

Conclusion: Our analysis indicates that biological and socio-environmental factors during childhood may impact adolescent PA. Changes in HAZ and pubertal development may reflect the physiological demand for transitioning from late childhood into adolescence, which may lower MVPA. Additionally, higher HFIAS and greater maternal age may be household dynamics indicators contributing to increased time in SB. Further research is needed to better understand the complex relationships between biological and socio-environmental factors and adolescent PA.

P1-I-67 ADHERENCE TO THE PLANETARY HEALTH DIET: THE ROLE OF SOCIOECONOMIC AND LIFESTYLE FACTORS

Catarina Carvalho [1,2], Daniela Correia [1], Carla Lopes [1], Duarte Torres [1]

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Introduction: The Planetary Health Diet (PHDiet) proposed by the EAT-Lancet Commission is expected to bear benefits towards human health and the environment. The aim of this study was to examine the association between the adherence to the PHDiet with socioeconomic and lifestyle factors. Accordingly, an adapted PHDiet score was estimated at the individual level and its construct validity assessed.
Methods: This study used data from the Portuguese National Food and Physical Activity Survey conducted in 2015-2016, which covered a nationally representative sample of 3,852 adults who completed two non-consecutive 24-hour dietary recalls (8-15 days apart). The adherence to the PHDiet was measured through a score (ranging from 0-140), afterwards divided into terciles (T1-T3). Multinomial regression models were used i) to assess the score's construct validity through associations with diet quality based on WHO recommendations, intake of animal-sourced protein, and dietary environmental impact indicators (i.e., greenhouse gas emissions (GHGE); Land use (LU)); ii) to investigate associations between the PHDiet score and socioeconomic (sex, age group, educational level, degree of urbanisation, food insecurity) and health/lifestyle factors (BMI, chronic diseases, physical activity levels). The reference category of the models was the highest tercile of the PHDiet score. The prevalence of consumption of PHDiet components above and below the reference values was also estimated.
Results: The adherence to the PHDiet was generally low (36.0, 95%CI:35.4-36.6), essentially due to a high consumption of meat and added sugars, with low consumption of pulses, nuts, and whole grains. The score's construct validity was verified, as lower PHDiet scores were found for increased dietary environmental impact (GHGE: OR_{T1vsT3}:1.31;95%CI:1.26;1.37; LU: OR_{T1vsT3}:1.25;95%CI:1.21;1.29), higher animal protein levels (OR_{T1vsT3}:1.11;95%CI:1.06;1.16), and lower diet quality (OR_{T1vsT3}:0.70;95%CI:0.68;0.72). Moreover, higher odds of lower PHDiet scores were found for men (OR_{T1vsT3}:1.32;95%CI:1.12;1.55), intermediate-educated individuals (OR_{T1vsT3}:1.43;95%CI:1.16; 1.75), and people with food insecurity (OR_{T1vsT3}:1.79;95%CI:1.36;2.38).
Conclusion: The adherence to the PHDiet is low and is, apparently, determined by multiple socioeconomic factors. The findings from this study underline the need for targeted public health policies designed to promote healthier and more sustainable dietary patterns.

P1-I-68 EAT-LANCET DIET COMPONENTS ACQUISITION ACCORDING TO FOOD INSECURITY AND POVERTY STATUS IN BRAZIL: AN ANALYSIS OF THE NATIONAL HOUSEHOLD BUDGET SURVEY 2017-2018

Eduardo De Carli [1], Mariana Alves Ferreira [2], Dirce Maria Lobo Marchioni [3], Valéria Baltar [4]

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Introduction: With few considerations on accessibility or costs, the EAT-Lancet Commission proposed guiding ranges of sustainable consumption for specific food components, the planetary diet. However, there is little evidence, in developing countries, on how the limited resources of low-income and food-insecure families affect adherence to sustainable diets. This study aims to describe the profile of household food acquisition in Brazil considering food security, poverty situations, and the components of the EAT-Lancet reference diet.
Methods: We used data from the Brazilian Household Budget Survey 2017-2018, covering 57,920 households, aggregated into 575 strata as sampling units. Poverty and food insecurity were defined according to per capita family income, using a cutoff point defined by the World Bank and according to the Brazilian Food Insecurity Scale, respectively. Food available in households was recorded in a seven-day acquisition diary, then classified, aggregated into 16 components of the EAT-Lancet diet, and expressed as per capita daily averages (g, % of total available energy, and % of food expenditure).
Results: The prevalence of households in situations of food insecurity and poverty was 37.9% and 12.9%, respectively. Such households had per capita expenditure, total amount, and energetic availability of food, on average, that were 28.6%, 22.8% and 13.6%, and 46.2%, 35.6% and 29.6% lower compared to those in food security and above the poverty line, respectively. Deviations >90% were found for red meat, added sugars, nuts, and whole grains when the composition of foods available in Brazilian households was compared to the average recommendations of the EAT-Lancet reference diet. However, more pronounced imbalances were found among vulnerable households, which exhibited a fraction of total food energy availability higher from refined cereals in association with lower availability from fruits, vegetables, whole cereals, and nuts. Despite that, relatively lower energy sharing from dairy and red meat were found among households in food insecurity, and from vegetable oils and added sugars among those in poverty.
Conclusion: Brazilian households had an inadequate availability of healthy and sustainable foods, which is reinforced by the food insecurity and the poverty situations. These findings suggest that strengthening intersectoral public policies is essential to guarantee food security, reduce income inequalities, and promote healthy, fair, and resilient food systems.

P1-I-69 ASSOCIATION OF CONSUMPTION OF ULTRA-PROCESSED FOODS WITH SEX, RACE/COLOUR AND INCOME: BRAZILIAN NATIONAL DIETARY SURVEY 2017-2018

Valeria Baltar [1], Bruna Kulik Hassan [2], Daniela Canella [3]

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Introduction: Consumption of ultra-processed foods (UPF) are higher in high income countries; however, it has been growing specially in middle-income countries. The main objective was to assess the relationship between the energy intake from UPF in the diet and sex, race/colour, and per capita household income in the Brazilian population.
Methods: Data were collected from 46,164 participants of the National Food Survey of the 2017/2018 Household Budget Survey, which provided information on food consumption through two 24-hour dietary recalls (24hR). Food items were categorized based on the NOVA classification for UPFs. The average calorie intake from UPFs and total consumption over the two 24hRs was estimated, and the contribution of UPFs was calculated. A linear regression model was used to assess the relationship between UPF contribution and sex, race/colour, and per capita income, controlling for region, rural or urban areas, and age as potential confounders. Interactions between sex and race, sex and income, and race and income were tested; only sex and income remained in the final model. All statistical analyses were conducted using R version 4.3.2 with the survey package.
Results: The contribution of UPFs to the Brazilian diet was 16% (95% CI: 15.7; 16.3), higher in the South and lower in the North. The contribution was also greater in urban (16.8% [16.5; 17.2]) than in rural areas (11.3% [10.9; 11.8]). The model indicated that UPF consumption increases with income ($p<0.01$), and this increase differs by sex ($p=0.03$), being more pronounced in men, eventually reaching levels similar to those of women.
Conclusion: The contribution of UPFs to the Brazilian diet varies according to sociodemographic indicators and intensifies in higher income brackets, particularly for men.

P1-I-70 CONSUMPTION OF ULTRA-PROCESSED FOODS AMONG BRAZILIANS WITH OBESITY: DESCRIPTION AND ASSOCIATED FACTORS

Evelyn Frade [1,2], Ana Beatriz Garcia [3], Maria Laura Louzada [4]

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Introduction: Obesity prevalence has increased worldwide, and despite efforts, no country has effectively controlled the obesity epidemic. Growing evidence links high consumption of ultra-processed foods to the risk of developing obesity and several chronic diseases. However, there remains a gap in our understanding of ultra-processed food consumption among individuals with obesity. Therefore, we aimed to describe food consumption according to the Nova classification and examine the sociodemographic factors associated with ultra-processed food consumption among Brazilians with obesity.
Methods: The NutriNet Brazil study collects data from Brazilian adults using self-administered online questionnaires. We included participants with obesity (BMI >30.0) who completed surveys on diet and sociodemographic factors. Sex, age, race/ethnicity, and income levels were self-reported. Food consumption was assessed using the Nova-24h food recall—a questionnaire specifically designed to capture information about food processing. We investigated food consumption according to the Nova classification using the mean dietary contribution from two Nova-24h recalls. Crude and adjusted linear regression models were used to assess the association between ultra-processed food consumption and demographic characteristics.
Results: Unprocessed and minimally processed foods accounted for a mean of 46.18% (95% CI: 45.83–46.52) of total calories consumed, while culinary ingredients contributed 10.37% (95% CI: 10.22–10.53), processed foods accounted for 17.88% (95% CI: 17.61–18.15), and ultra-processed foods had a mean of 25.57% (95% CI: 25.23–25.90). In adjusted models, no significant associations were found between ultra-processed food consumption and sex. However, ultra-processed food consumption decreased by -0.20 percentage points (pp) for each additional year of age ($p < 0.001$) and was lower among Pardo (Brown) participants compared to Branco (White) participants, with a decrease of -1.29 pp ($p = 0.006$). It was higher among participants with lower income levels compared to those in higher income levels, with an increase of +1.77 pp ($p < 0.001$).
Conclusion: People with obesity consume a higher amount of ultra-processed foods, which is more pronounced in participants with lower income levels but lower among older and Pardo (Brown) participants. Sociodemographic disparities may harm the health prognosis of people with obesity, highlighting the need for improvements in healthcare.

Poster Session 1-J
INTERVENTIONS AND TRIALS
Monday, April 28 | 2.45pm - 4.15pm
Location: Convention Level Foyer

P1-J-71 PRELIMINARY RESULTS FROM THE MOTIVATE STUDY: FITBIT MONITORING OF PHYSICAL ACTIVITY IN A PILOT RANDOMIZED CONTROLLED TRIAL

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[1] McMaster University, [2] Brock University and McMaster University

Trainee Poster Presentation Award Nominee

Introduction: Young adulthood is a pivotal time for establishing health behaviours, including physical activity. We conducted a pilot randomized controlled trial to assess the feasibility of a 6-month behavioural and educational intervention to promote healthy behaviours for obesity prevention among young adults. As part of that pilot RCT, we sought to explore the use of Fitbit activity trackers to describe daily activity over a 6-month period.
Methods: Young adults aged 18-29 years at McMaster University, Canada, were recruited and randomized into either an intervention or control group. The intervention included individual motivational interviewing sessions with a trained interviewer and educational materials, while the control group received only educational materials. We evaluated the feasibility of using Fitbit activity trackers to monitor participants' physical activity levels from baseline to 6 months. A total of 100 individuals (intervention group: n=52; control group: n=48) were equipped with Fitbits. Data were collected via Fitabase, capturing minute-by-minute heart rate (HR) data to assess wear time, defined as days with at least 10 hours of monitored HR data.
Results: Out of 100 participants, 95 participants had usable data. Engagement levels varied: only 16 participants maintained a valid wear time (at least 10 hours per day) for 150 days, while 68 participants wore their Fitbit for fewer than 30 days. The median valid wear time was 73 days with a range of 159 days. Median physical activity metrics indicated that participants spent 21.3 hours (IQR = 9.96) in sedentary activity, 1.9 hours (IQR = 2.80) in light activity, and 0.0 hours (IQR = 0.22) in moderate and vigorous activity. The median daily step count was 4765 (IQR = 7439). Although initial engagement was promising, there was a noticeable decline in wear time over the study period, with participants exhibiting high levels of sedentary behaviour.
Conclusion: Preliminary results indicate variability in engagement levels regarding physical activity. Future analyses will provide deeper insights into the intervention's effects on health outcomes, particularly regarding physical activity patterns, and will explore trends beyond these initial findings to assess the feasibility of this obesity prevention intervention. These results aim to contribute to the primary prevention of chronic disease and have the potential to inform future public health and health promotion interventions.

P1-J-72 CHANGES IN OVERALL DIETARY INTAKE DURING FRUIT AND VEGETABLES INTERVENTION TRIALS: A POOLED ANALYSIS OF FIVE RANDOMIZED CONTROL TRIALS

Rachel Moore [1], Nour Elsahoryi [2], Charlotte Neville [2], Chris Patterson [2], Michelle McKinley [2], Francina Baldrick [2], Ciara Mulligan [3], Damian McCall [4], Rebecca Noad [4], Ciara Rooney [2], Ian Wallace [5], Claire McEvoy [2], Steven Hunter [5], David McCance [5], David Edgar [6], Stuart Elborn [2], Pascal McKeown [7], Ian Young [2], Anne Nugent [2], Jayne Woodside [2]

[1] Centre for Public Health, School of Medicine, Dentistry and Biomedical Sciences, Queen's University, [2] Queen's University Belfast, [3] Diabetes Department, Ulster Hospital, South Eastern Trust, Belfast, [4] Belfast Health and Social Care Trust, Belfast, [5] Regional Centre for Endocrinology, Belfast Health and Social Care Trust, Belfast, [6] St James's Hospital, Dublin 8, Republic of Ireland, [7] Belfast Health and Social Care Trust and Queen's University Belfast

Introduction: Dietary interventions have been conducted to investigate the health benefits of increasing fruit and vegetable (FV) intake. However, what dietary changes participants make beyond increasing FV intake in such trials is rarely reported. Pooled data from five previously conducted FV randomised controlled trials were used (complete dietary data available for n=388 participants) to explore changes in fruits, vegetables and other food groups, as FV intake increased.
Methods: The trials used were completed between 2004 and 2013 and included (n, duration): Aging and Dietary Intervention Trial (n=82, 16 weeks), Fruit and Vegetable in Diabetes study (n=55, 8 weeks), Dietary Intervention Study in Chronic Obstructive Pulmonary Disease (n=75, 12 weeks), Fruit and Vegetable and Insulin Resistance Study (n=83, 8 weeks), and Fruit and Vegetable Randomised Intervention Trial (n=93, 8 weeks). Dietary intake for each trial was recorded, at baseline and post-intervention, using self-reported diet diaries or histories. Dietary intake data were pooled, and food items were categorised into 56 distinct food groups. Spearman rank correlations were performed in each trial to examine the relationship between changes in intakes of daily portions of FV and changes in mean weighted daily intakes of fruit, vegetables, and other food groups. Correlation coefficients from each trial were then pooled using a random effects model. Statistical significance was set at a nominal level of $p<0.01$ to reduce the risk of type 1 error.
Results: Pooled spearman correlations (r_s) showed a weak yet significant negative relationship between increased FV intake and non-chocolate confectionary (r_s= -0.16). Highest significant positive correlations were shown amongst fruit subtypes, namely pommes (r_s=0.57), bananas (r_s=0.53), and fruit juice (r_s=0.52), A significant positive relationship was also observed with legumes, peas, beans, and pulses (r_s=0.32),
Conclusion: The findings provide useful insight into the complexities of dietary intervention and highlight additional positive dietary modifications individuals make when asked to increase FV intake. Dietary behaviour shifts observed in these FV RCTs highlight the synergy between increasing FV intake and changes in other dietary choices, which may impact overall diet quality and health outcomes.

P1-J-73 FUNCTIONALITY AND USABILITY OF THE FOODFLIP© APP IN INTERVENTION RESEARCH AMONG POST-SECONDARY STUDENTS

Hayun Jeong [1], Julia Do [1], Mary L'abbe [1]

[1] *University of Toronto*

Introduction: Mobile health (mHealth) apps are increasingly used for personal health management and intervention research, promoting behaviour change and improving health outcomes. Post-secondary students, who often have poor dietary habits and limited nutritional knowledge, are particularly at risk of poor nutrition and weight gain. This stage of life is critical for establishing long-term dietary habits, making post-secondary campuses ideal for targeted dietary interventions. In Canada, the new "high in" front-of-package (FOP) nutrition symbols aim to help consumers quickly identify foods high in sodium, sugars, or saturated fat, regardless of health literacy. This study evaluated the functionality and usability of the FoodFlip© mHealth app in delivering FOP symbols on campus menu items to post-secondary students.
Methods: As part of a larger randomized controlled trial, 89 students from the University of Toronto (St. George Campus) were recruited to use the FoodFlip app over two weeks when making food purchases on campus. Students submitted at least two receipts weekly, and 29 completed validated questionnaires on app functionality and usability post-trial. The study also explored why the 'high in' FOP symbol did not significantly influence food purchases and identified considerations for future interventions targeting post-secondary students.
Results: The FoodFlip© app showed moderate functionality and usability but had limited influence on food purchases due to environmental and behavioural factors. Improving app design and addressing barriers such as limited healthy options on campus are essential.
Conclusion: Future interventions with post-secondary students should integrate regular engagement strategies to sustain participation and effectively support healthier eating habits.

P1-J-74 IMPLEMENTATION FIDELITY OF REAL-WORLD SUGAR-SWEETENED BEVERAGE (SSB) TAXES: ASSESSING THE IMPLEMENTATION OF AN SSB TAX IN NEWFOUNDLAND AND LABRADOR, CANADA TO REDUCE TYPE III ERROR IN INTERVENTION RESEARCH

Rachel Prowse [1], Valerie Dawe [1], Kierra Dooley [1], Daniel Zaltz [2], Scott Harding [1]

[1] Memorial University of Newfoundland, [2] University of Toronto

Introduction: Newfoundland and Labrador (NL) was the first province in Canada to introduce a sugar-sweetened beverage (SSB) tax on September 1st, 2022. Since its start, critics have cited concerns about the ambiguity of the regulations, how to implement it, and effectiveness of the tax. The design and implementation of SSB taxes, such as the type, magnitude, and pass-through, must be examined to validly evaluate the effectiveness of the policy on behaviour and health. In a quasi-experimental study, we examined a series of outcomes (beverage pricing, purchasing, intake) to illustrate the impacts of the NL SSB tax design and implementation. This study aimed to investigate the fidelity of the SSB tax implementation to contextualize our research findings.

Methods: We completed a multi-component, multi-level pre/post quasi-experiment of the NL SSB tax between 2021 and 2023. In NL and similar regions without any sugar-sweetened beverage tax, we collected data from consumers, retail stores, and industry during periods before and after the tax was implemented in NL. We conducted implementation audits within a subset of 21 randomly selected stores to measure: (i) SSB tax visibility (% of shelf labels on which tax is displayed), (ii) SSB pass-through (% of the $0.20/L rate passed to consumers), and (iii) magnitude of price change (% of price increase).

Results: We found modest changes in beverage purchasing and intake in the expected direction in the year following the tax. However, the SSB tax was not clearly communicated through price changes to consumers, likely hindering its impact. The SSB tax was not visibly displayed for 75.6% of taxable SSBs (n=3688) with visible prices on shelves. For taxable SSB that displayed the SSB tax on the shelf (n=1189), the average pass-through rate was 96.7%. However, when all taxable SSBs for which the SSB tax should apply were included, the average pass-through on the shelf was 23.6%. Of taxed taxable SSB (n=1189), the SSB tax was an average of 8.5% of the regular price of the SSB (range 1.4%-46.8%).

Conclusion: Evaluations of real-life SSB taxes must be robust and comprehensive to understand the nuance of their implementation. Our analysis of the NL SSB tax reduces the risk of type III error whereby inadequate implementation of an intervention results in a conclusion that the intervention is ineffective. Implementation fidelity must be considered when evaluating the evidence on the impacts of SSB taxes.

P1-J-75 APPLICATION OF A DIETARY INTERVENTION TO STUDY METABOLIC BIOMARKERS AND VASCULAR RESPONSE TO A SHORT-TERM HIGH-CALORIE AND HIGH-FAT DIET IN HEALTHY HUMANS

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Introduction: Vascular response, such as capillary blood flow, in adipose tissue plays an important role in nutrient delivery (e.g., lipids and glucose) to the adipocyte after a meal. Adipose tissue capillary blood flow (ATBF) increases after the consumption of a mixed nutrient meal in healthy people, and this effect is blunted during states of insulin resistance such as type 2 diabetes. It is not known whether a short-term high-calorie, high-fat (HCHF) diet in healthy individuals impairs meal-stimulated ATBF, or whether changes in dietary energy or fat intake, along with other circulating metabolic biomarkers, correlate with ATBF.

Methods: Fourteen healthy adults (18-37 years) were recruited and placed on a 7-day HCHF dietary intervention (+50% energy intake, 40% from fat). ATBF and metabolic biomarkers were measured on day 0 (pre-) and day 8 (post-intervention) in a fasting state and after a mixed meal challenge (MMC). Participant's habitual dietary intake was assessed using the Australian version of the Automated Self-Administrated 24-hour Dietary Assessment Tool (ASA24) for 3 days (including two weekdays and one weekend day). Body composition was measured using Dual energy X-ray absorptiometry (DEXA) scan (iDEXA, Lunar GE Healthcare, Chicago, USA). Body composition data consisted of body fat%, trunk fat%, android fat%, gynoid fat% and visceral fat%. Metabolic biomarkers included fasting plasma glucose, plasma insulin, total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), and triglycerides (TG), and were measured by an Australian pathology lab. ATBF was measured using contrast enhanced ultrasound. Pearson bivariate correlations or Spearman correlations were used to evaluate associations between variables.

Results: Dietary energy and fat intake were not correlated with ATBF before or after the intervention. Total body fat, trunk fat, android fat, and gynoid fat, but not visceral fat, were inversely associated ($p<0.05$) with the ATBF response at pre-intervention. Fasting glucose, TC, LDL-C, and TG, but not fasting plasma insulin, were positively correlated ($p<0.05$) with ATBF response at pre-intervention. All correlations disappeared after the 7-day intervention.

Conclusion: Short-term high energy and fat intake impair ATBF in healthy individuals. This impairment in ATBF following a short-term HCHF diet cannot be explained by changes in dietary energy or fat intake assessed by ASA24, circulating metabolic biomarkers, or body fat composition, suggesting that other factors are involved.

P1-J-76 THE IMPACT OF MATERNAL NEWBORN AND CHILD HEALTH WEEK ON THE GROWTH OF CHILDREN UNDER FIVE ACROSS SEVEN HEALTH ZONES IN OYO STATE, NIGERIA, BETWEEN 2020 AND 2023

Abiodun Akande [1]

[1] *Oyo State Ministry of Health*

Introduction: Nigeria faces significant nutritional challenges, particularly among children and adolescents. The country has the second-highest global burden of stunted children, with 32% of children under five affected by stunting. This is primarily due to inadequate nutrition, including low exclusive breastfeeding rates and poor dietary diversity. Additionally, 6.5% of children suffer from wasting, 1.6% are overweight, and 55.1% of women of reproductive age experience anemia. In Oyo State, malnutrition among children is a concern, with 42% stunted, 25% underweight, and 9% wasted. The objective was to investigate the impact of MNCH Week on the health and growth of children under five across seven health zones in Oyo State, Nigeria.

Methods: This study used secondary data from the District Health Information System (DHIS 2) and conducted exit interviews with 14 parents (two per zone). Oyo State, which comprises 33 LGAs across seven health zones, was the study location. Growth Monitoring Registers maintained at health facilities captured important growth data. The aggregated monthly data were validated at both the local and state levels. A cross-sectional analysis of four years of data (2020–2023) on children aged 0–59 months was conducted, combined with exit interviews. Data were analyzed using descriptive and multivariate analysis via IBM SPSS Statistics.

Results: Multivariate analysis showed a significant relationship between MNCH Week interventions and improved growth outcomes for children under five ($p < 0.05$). These results offer valuable insights for policymakers and public health officials, helping to shape strategies for addressing child malnutrition.

Conclusion: MNCH Week significantly contributes to improving the health and growth of children under five. Its interventions have increased Vitamin A coverage, improved oral and mental health, and reduced stunting and wasting, emphasizing the need to continue and expand these efforts in Oyo State.

Poster Session 2-A

DATABASE DEVELOPMENT AND RESOURCES

Tuesday, April 29 | 3.00pm - 4.30pm

Location: Convention Level Foyer

P2-A-1 DIETARY-RELATED EXPOSURE ASSESSMENTS IN THE EUROPEAN PROSPECTIVE INVESTIGATION INTO CANCER AND NUTRITION (EPIC) COHORT: AN INTEGRATED MULTI-TIERED APPROACH USING THE FOODEX CLASSIFICATION SYSTEM

Inge Huybrechts [1], Geneviève Nicolas [1], Inarie Jacobs [1], Guri Skeie [1], Marc Gunter [2], Sofia Ioannidou [3]

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Introduction: Large-scale cohorts such as the European Prospective Investigation into Cancer and Nutrition (EPIC) (n~500,000) are invaluable for investigating health effects of dietary-related exposures such as food contaminants and additives. Dietary questionnaire intake data can be matched with food occurrence data to estimate individual dietary-related exposures. To provide a common link to the diverse food databases used by different European countries, EFSA has developed the FoodEx food classification system that standardises the identification and characterization of foods and that is used in the EFSA chemical monitoring and food consumption database. We aimed to develop an integrated approach for calculating new dietary-related indicators such as food contaminants, additives, and environmental food production indicators (e.g., greenhouse gas emissions) in EPIC.

Methods: Stepwise procedures were used to facilitate matching of novel food occurrence data classified via the FoodEx classification system. Initially, the simplified EPIC food list, which assembles the dietary questionnaire items (~12000 different foods reported), were categorized according to FoodEx. Thereafter, food occurrence data from the EFSA occurrence databases could efficiently be matched with the EPIC dietary intake data via their FoodEx coding. Finally, individual-level dietary exposures could be computed by multiplying EPIC individual dietary intakes (in g/day) with the food occurrence data (in µg/kg food) matched with the EPIC food list items.

Results: The end-user EPIC dietary exposure databases can be used to investigate associations between dietary exposures (e.g., contaminants, additives) and health risks (e.g., cancer risk, mortality). To consider uncertainties in food occurrence data, three different scenarios were calculated, namely a lower, middle, and upper bound approach. Results for cadmium exposures are used as an example to describe the different procedures and computations involved in these exposure calculations.

Conclusion: This work facilitates the further matching of diet-related indicators such as food contaminants and additives, but also planetary health indicators related to our food consumption data that were coded via the EFSA FoodEx classification. A detailed description of the

procedures used in EPIC and the problems encountered can be of interest for future projects aiming to link their food consumption data with the FoodEx classification system.

P2-A-2 ESTIMATING SUGAR SWEETENED BEVERAGE CONSUMPTION FROM 24-HOUR RECALLS USING GLOBODIET SOFTWARE DATA ENTRY MODE: INSIGHTS FROM THE EMDI-BRAZIL STUDY

Melyssa Costa [1], Claudia Almeida [1], Debora Silva [1], Mariana Macedo [2], Sylvia Franceschini [3], Sandra Crispim [1]

[1] Federal University of Paraná, [2] Federal University of the Jequitinhonha and Mucuri Valley, [3] Federal University of Viçosa

Introduction: Estimating sugar-sweetened beverages (SSBs) in dietary studies is challenging due to varying definitions and criteria. The lack of a global consensus, with some definitions focusing on added sugars and others on calorie thresholds, creates inconsistencies. This study aimed to present the definition and challenges in estimating SSB consumption using 24-hour recalls (R24H) with the GloboDiet software in the EMDI-Brazil study.
Methods: SSB consumption was estimated from 24-hour recalls in the cross-sectional Multicenter Study on Iodine Deficiency (EMDI-Brazil), which assessed iodine deficiency in Brazilian pregnant women. The study, conducted between September 2018 and April 2021, involved eleven collection centers across major Brazilian regions. Initially collected on paper, food data were entered into the Brazilian Data Entry version of GloboDiet. SSBs were defined as non-alcoholic beverages with caloric sweeteners like sugar, honey, or syrup, based on WHO guidelines. Excluded were beverages sweetened with artificial sweeteners or 100% fruit juices without added sugars. Preparations like "coffee with milk" or "milk with chocolate powder" were included if they exceeded 20 kcal/100 ml. Data were standardized to grams by converting milliliters using GloboDiet densities.
Results: Of the total sample (n=2231), 67.6% of pregnant women consumed SSBs, with an average total intake of 225.6 ml/1000 kcal (SD 176.6) among consumers. Several challenges arose in estimating SSB quantities, as the main study was not focused on SSB consumption. First, interviewers were instructed to record sugar intake separately from beverages in the paper-based R24h, but this was often not done, either due to a lack of respondent knowledge or omission by the enumerator. Second, when beverages could not be linked to exact sugar content data, a standard rate of 5% of the volume consumed (n=15) was used. Third, data aggregation was necessary when sugar intake was reported separately, requiring verification that the sugar was consumed with the beverage and no other foods. Finally, throughout the estimation process, the definition of SSBs was questioned, particularly regarding the cutoff point for inclusion.
Conclusion: The study highlighted the complexities of estimating SSB consumption due to inconsistent definitions and data collection

challenges. While GloboDiet provided structure, incomplete sugar description and quantification added further difficulties.

P2-A-3 PRESENCE OF SUGARS AND NON-SUGAR SWEETENING INGREDIENTS IN PROCESSED FOODS AND BEVERAGES – A EUROPE-WIDE OVERVIEW USING FABLE (THE FOOD AND BEVERAGES LABELS EXPLORER)

Joana Dias [1], Evangelia Grammatikaki [2], Jan Wollgast [1]

[1] European Commission, Joint Research Centre, Ispra, Italy, [2] European Dynamics, Milan

Introduction: With the goal to support public monitoring of the nutritional quality of the food offer, the JRC developed the web-based tool FABLE (Food Beverages and Labels Explorer - https://food-labels-explorer.jrc.ec.europa.eu). FABLE aims to not only be a repository of data from labels of food and beverage products, but to also make sense of such data by providing visualisations and other insights of their analysis. Analysis on the nutrient declaration of products collected in several European countries is already available in FABLE since 2023, and a new module on ingredients is planned to go live in spring 2025.
Methods: A new procedure was developed to allow for the extraction of separate ingredients from ingredient lists of packaged food and beverages. A FABLE reference ingredient list was created for different ingredient classes. Each separate ingredient was then corresponded to the appropriate FABLE reference ingredient list entry and assigned to the appropriate ingredient classes to allow for the analysis of the data at different levels of detail. Data collected from the Joint Action Best-ReMaP across 19 countries were used to assess the use of specific ingredients in packaged food and beverage products from 5 food categories (bread products, breakfast cereals, soft drinks, delicatessen meats, and dairy products).
Results: Sugars and non-sugar sweeteners were prioritised for analysis within FABLE; more ingredients will be added continuously. The percentage of products having sugars or non-sugar sweeteners varied across different countries for the same food categories and sub-categories. In addition, differences were observed in the proportions of products containing sugars or non-sugar sweeteners between sub-categories within the same food category.
Conclusion: The extraction and analysis of the use of sugars and non-sugar sweeteners from ingredient lists of packaged food and beverage products across Europe can give experts and the public better understanding of the food offer quality. The assessment of the differences across different food (sub-)categories and different countries can help policymakers and the industry set targets for food reformulations, as well as unlock a huge potential for better informed future policy decisions and industry standards.

P2-A-4 USING NATIONAL DIETARY INTAKE DATA TO ESTIMATE CONSUMPTION OF SOURCES OF LOW- AND NO-CALORIE SWEETENERS AMONG INDIVIDUALS IN CANADA

Lesley Andrade [1], Navreet Singh [1], Allison Sylvetsky [2], Michael Wallace [1,3], Kevin Dodd [4], Sharon Kirkpatrick [1]

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Introduction: Alongside efforts to reduce population-level intakes of free and added sugars, there are concerns about potential increases in the availability and use of low- and no-calorie sweeteners (sugar substitutes that impart sweetness to foods and beverages with few or no calories). While consumption of low- and no-calorie sweeteners has been examined in other jurisdictions, information on the extent to which individuals in Canada consume sources of low- and no-calorie sweeteners is lacking. We used national dietary intake data to estimate the proportion of individuals one year of age and older living in the Canadian provinces who consumed foods and beverages containing low- and no-calorie sweeteners, as well as tabletop sweeteners, on a given day.

Methods: Data were drawn from the 2015 Canadian Community Health Survey—Nutrition (n=20,483), which included administration of 24-hour dietary recalls coded using the 2015 Nutrition Survey System. Food codes that were likely sources of low- and no-calorie sweeteners were identified using a keyword approach (e.g., low calorie, diet). Using the first recall, survey-weighted proportions of individuals consuming sources of sweeteners were estimated by age, sex, and self-reported diabetes (adults only). The most frequently consumed sources of sweeteners were also identified.

Results: On a given day, 8% of children (1-13 years), 11% of youth (14-18 years), and 20% of adults (19+ years) consumed at least one source of sweeteners. A higher proportion of adults who self-reported diabetes consumed sources of sweeteners (42%) compared to those without diabetes (18%). Among those who consumed foods and beverages sweetened with low- and no-calorie sweeteners, soda was the most frequently consumed source, followed by tabletop sweeteners and yogurt/kefir.

Conclusion: Understanding the proportions of individuals in Canada who consume sources of low- and no-calorie sweeteners and the common sources can inform policies to support healthy eating. Ongoing robust monitoring requires more frequent dietary surveillance and enhancements to food composition databases, which contain information primarily for composite foods and beverages, to facilitate accurate identification of foods and beverages containing sweeteners.

P2-A-5 CHALLENGES IN DETERMINING SALT INTAKE IN THE DUTCH NATIONAL FOOD CONSUMPTION SURVEYS

Eline Sanderman-Nawijn [1], Marga Ocke [1], Janneke Verkaik-Kloosterman [1], Caroline Van Rossum [1]

[1] National Institute for Public Health and the Environment (RIVM)

Introduction: In the Dutch National Food Consumption Surveys (DNFCS), trends in salt intake of the Dutch population were determined. Estimating quantitative salt intake through food consumption research is difficult, since several assumptions need to be made.
Methods: Salt intake of the Dutch population (DNFCS 2019-2021) was analyzed in SPADE by determining salt content in foods and drinks using the Dutch Food Composition Database (NEVO 2021) and discretionary salt added during food preparation at home-cooked meals or at the table. Trends in total salt intake were analyzed by comparing results of DNFCS 2019-2021 to DNFCS 2012-2016. To distinguish whether trends in salt intake are the result of changes in food consumption or of changes in the salt content of foods, DNFCS 2012-2016 and 2019-2021 will be linked to NEVO 2016 and 2021. Moreover, changes in discretionary salt use will be explored.
Results: A reduction in salt intake was observed in the DNFCS 2019-2021 (6.6 g/day) compared to the survey of 2012-2016 (7.3 g/day). However, salt intake remains high. Possible explanations for this reduction could be due to reformulation, less consumption of food products with a high salt content, and less discretionary salt added at the table or during preparation. Several assumptions are made to determine salt intake. The amounts of discretionary added salt at home and in the industry may differ between various brands of a similar product or vary by individuals. Currently, a standard amount of salt added per food group is assumed, e.g., 0.625 g salt per 100 g of vegetables. Changes of salt content in foods were assumed to remain the same during the study period since one year data of the NEVO database was used (NEVO 2021 in DNFCS 2019-2021).
Conclusion: Determining salt intake in the DNFCS has its challenges. Therefore, the determined salt intake should be seen as an indication. Representative research into sodium excretion in 24-hour urines is therefore recommended as the gold standard for determining salt intake. Because a representative sample is not feasible in practice when researching 24-hour urines, the results of food consumption research and urine research are complementary. Additional research in which the standard amounts of salt added per food group are being revised will be conducted in 2024 and 2025.

P2-A-6 UNCONVENTIONAL FOOD PLANTS IN BRAZIL: NATIONAL DIETARY SURVEYS FROM 2008/09 TO 2017/18

Maria Eliza De Mattos Tobler Mastrangelo [1], Andreia Andrade Silva [1], Marina Campos Araujo [2], Marla Ibrahim Uehbe De Oliveira [3], Amanda Rodrigues Amorim Adegboye [4], Maria Beatriz Trindade De Castro [1]

[1] Federal University of Rio de Janeiro, [2] Escola Nacional de Saúde Pública Sergio Arouca, [3] Federal University of Sergipe, [4] Coventry University

Introduction: Unconventional food plants (UFP) are little-known plant species with high nutritional value. Most of them are spontaneous and easy to cultivate, in addition to preserving local biodiversity. UFP are linked to culture, Brazilian regionality, and the diet of traditional populations. Given their characteristics, they constitute fresh food options that can be used to promote healthy, sustainable eating and minimize the risks of food and nutritional insecurity. This study was carried out to classify UFP and characterize consumption among individuals in Brazil.
Methods: Data were from two National Dietary Surveys (NDS) from the Household Budget Surveys (HBS) conducted in 2008-2009 and in 2017-2018. Dietary data were obtained through food records and 24-hour recalls for two non-consecutive days in 2008-2009 and 2017-2018, respectively. At the end of the computerized data entry program, 1,121 (2009) and 1,832 (2018) foods and drinks were mentioned in NDS. To identify and classify UFP, checks were carried out based on plant parts: roots (roots, rhizomes, bulbs, and tubers); stems; leaves (leaves and flowers); fruits; or seeds. The final classification (families and species of the UFP) was reviewed by a taxonomist. Prevalence and 95% confidence intervals for consumption of UFP were estimated for each survey and stratified by Brazilian macroregions, household area, income, skin colour/race, sex, age group, education, and BMI. The estimates were calculated considering expansion factors and sample complexity.
Results: Thirty families of plants and 68 genera/species of UFP were identified, mainly composed of fruits (39 genera/ species) and leaves (14 genera/species). The prevalence of UFP consumption increased from 8.0% in 2008-2009 to 8.9% in 2017-2018. The most consumed UFP were feijão-verde, batata-doce, inhame, and almeirão. Higher prevalence rates were observed in the Northeast region (17.6% in 2008-2009 and 21.3% in 2017-2018) and in rural areas (14.9% in 2008-2009 and 16.1% in 2017-2018). UFP consumption was more frequent among individuals with low education levels (10.7%) and older adults (10.9%) in the 2017-2018 NDS.
Conclusion: Despite a slight increase in the prevalence of UFP consumption over ten years, the overall consumption of UFP remained low and it was more frequent among those in vulnerable regions and rural areas. Consumption of UFP should be promoted to increase food biodiversity as a strategy for improving food and nutritional security.

P2-A-7 NOVEL METHODS TO ANALYSE MICROBE-ACCESSIBLE NUTRIENTS IN DIET-MICROBIOME RESEARCH

Kerith Duncanson [1], Georgina Williams [1], Nicole Simm [1], Emily Hoedt [1]

[1] *University of Newcastle*

Introduction: Diet influences the microbiota. Current research focuses on dietary variables from food composition databases that relate to human digestion but are not specific to microbiota digestion. To understand diet-microbiome associations, dietary analysis methods need to quantify gut microbiome-relevant foods and nutrients. This study aimed to identify which foods and nutrients consumed by humans influence gut microbiome, determine which foods and nutrients are not quantified in an Australian food and nutrient database (AUSNUT), and test novel quantification methods for microbiota-relevant nutrients.
Methods: Dietary factors relevant to gut microbiome but not present in AUSNUT included specific fibres, gluten, natural food chemicals, amino acids, processed food classification, and phytochemicals. Publicly available AUSNUT-matched databases for microbiota-accessible nutrients were consolidated with AUSNUT. Data for other microbiota-accessible nutrients were imputed or extrapolated from published data. All data were synthesised into a comprehensive microbiome-relevant database.
Results: Thirteen microbiome-relevant variables were added to the 5740-item AUSNUT database. Total polyols were calculated from AUSNUT data for carbohydrates with and without sugar alcohols, and from imputed data for sorbitol and mannitol contents of similar foods from the reference Australian Food Composition Database (AFCD). Fructose and lactose were also calculated for all 5740 foods in AUSNUT from imputed AFCD data. The natural food chemicals (salicylates, amines, glutamate) contents in AUSNUT items were derived from ratings in the FoodWorks nutrition software program, combined with typical portion sizes for Australian adults. A systematic approach was used to estimate gluten content of AUSNUT items, using methods described by Hoppe et al (2013). Databases for resistant starches, soluble and insoluble fibres, cereal, and whole grain contents that had been systematically developed were added directly, as was the AUSNUT-applied novel processed food classification system (NOVA). Future database expansion includes adding amino acid and phytochemical data from imputed data, other databases, and direct analysis.
Conclusion: This study demonstrated the feasibility of adding microbiome-relevant data to food composition databases. There is considerable potential for secondary analysis of existing datasets and for improvements to specificity of diet-microbiota research that will enhance translational impact to clinical settings.

Poster Session 2-B

DATA ANALYSIS, DATA SCIENCE, AND MEASUREMENT ERROR

Tuesday, April 29 | 3.00pm - 4.30pm

Location: Convention Level Foyer

P2-B-8 DIETARY PATTERN ANALYSES: A COMPARISON OF DIFFERENT CLUSTERING METHODS

Esther Kok [1], Elise Talsma [1], Kim Maasen [1], Ming-Jie Duan [1], Phuong Nguyen [2], Gabriela Fretes [2], Mai T. Truong [3], Rock Zagre [3], Nga T. Hoang [3], Marie T. Ruel [2], Jef L. Leroy [2], Inge D. Brouwer [1]

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Introduction: Understanding dietary patterns and their determinants is necessary to identify leverage points in food systems transformation that can help achieve sustainable healthy diets. Several methods exist to analyse dietary patterns, but it remains unclear which method is better at capturing the variation in food consumption among individuals and at clustering consumers with similar dietary patterns in a population. This study compares dietary patterns identified using two methods in the same population.

Methods: Under the CGIAR initiative Sustainable Healthy Diets Through Food System Transformation (SHiFT), dietary intake data were collected using a multi-pass quantitative 24-hour recall in adolescents aged 11 to 19 years in low- to middle- income areas in small-town, peri-urban, and urban North Vietnam (n=2861). We compared dietary patterns identified using Latent Class Analysis (LCA) with patterns identified using Agglomerative Hierarchical Clustering (AHC). Healthiness of dietary patterns was evaluated as Global Diet Quality Score (GDQS-Healthy and GDQS Unhealthy components; a higher score reflecting higher diet quality).

Results: Using LCA, we identified five dietary patterns consumed by 26, 24, 20, 15, and 15% of the population. Pattern 5 had the lowest consumption of healthy foods (GDQS-Healthy 5 out of 32; GDQS-Unhealthy 12 out of 17) and mainly consisted of rice and poultry. Pattern 3 had the highest consumption of unhealthy foods, with high intakes of soft drinks and sweets. Pattern 4 had high intakes of both healthy and unhealthy food groups (GDQS-Healthy 11, GDQS-Unhealthy 12), characterized by intakes of fish, eggs, and liquid oil. AHC also identified five patterns, consumed by 41, 30, 14, 8, and 7% of the population. Pattern 3 was the least healthy, both in its low intake of healthy and high intake of unhealthy food groups (GDQS-Healthy 7, GDQS-Unhealthy 9). Main food groups consumed were soft drinks, deep fried foods, and sweets. Pattern 4 was the healthiest (GDQS-Healthy 8, GDQS-Unhealthy 12), with high intakes of fruits, leafy vegetables, cruciferous vegetables, whole grains, and dairy.

Conclusion: The dietary patterns identified differed in cluster size,

healthiness, and food intake. With AHC, one pattern had poor diet quality based on both low intake of healthy foods and high intake of unhealthy foods, whereas with LCA, these scores were divided over two distinct patterns. When analysing dietary patterns, results from data exploration guides method choices. We found comparing methods and understanding the consequences of underlying algorithms valuable to check their robustness before drawing conclusions.

P2-B-9 IDENTIFYING EATING EPISODES FROM TRI-AXIAL WEARABLE SENSORS: DEVELOPMENT OF MACHINE LEARNING MODELS IN THE WEALTH STUDY

Christoph Buck [1], Annika Swenne [1], Luis Sigcha [2], Jérôme Bouchan [3], Richard Cimler [4], Jean-Michel Oppert [5], Steriani Elavsky [4], Tomas Vetrovsky [6], Alan Donnelly [2], Antje Hebestreit [1]

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Introduction: The use of wearable sensors in monitoring human activity offers an opportunity to enhance the accuracy of identifying health behaviours through machine learning (ML) applications. The WEALTH study (WEarable sensor Assessment of physicaL and eaTing beHaviours) aimed to produce labeled data to develop ML models for classification of physical (PB) and eating behaviours (EB). This study focusses on the development of ML models for EB classification, e.g., eating episodes and gestures, using raw tri-axial data collected from consumer grade wearables.
Methods: In 2023, the WEALTH study collected data from 627 participants aged 18 to 71 years in Ireland, Germany, Czechia, and France. The study design included a 75-minute semi-structured protocol whereby participants performed specific PBs and EBs, e.g., sitting, walking, running or exercising, and particularly a 10-minute period of eating tasks while sitting. During the following nine-day free-living assessment phase, reactive ecological momentary assessment (EMA) prompts were used for labeling activities and self-initiated prompts were used to label eating episodes. Participants wore three sensors, i.e., ActiGraph GT3x (hip-worn), activPAL 3M (thigh-worn), and LifeQ enabled smartwatches (dominant wrist-worn). Classifiers for EBs were modeled based on raw tri-axial accelerometer data using multiple ML methods ranging from random forests as a benchmark model to convolutional neural networks (CNN) as deep learning applications. Feature extraction included time-frequency features using the fast Fourier transform. Performance of models was evaluated using balanced accuracy and F1-score. The semi-structured protocol dataset was divided into training (60%), validation (20%), and test (20%).
Results: The collection of a large set of labeled data from the WEALTH study, including reports on free-living eating episodes from participants, enabled us to train ML models for the classification of eating and drinking gestures and speed, use of cutlery, and eating episodes over the day (weekend and workday) and over the week. Models were further

calibrated using free-living sensor data that were weakly labeled via the EMA responses.
Conclusion: Our results provide valuable insights into the applicability and generalizability of different ML models for classification of EBs in a free-living context. These models, combined with the extensive labeled dataset, provide a robust foundation for further improving model performance.

P2-B-10 IDENTIFICATION OF DISTINCT METABOLIC RESPONSES TO NUTRITIONAL INTERVENTIONS BY MACHINE LEARNING-BASED PLASMA METABOLOME PROFILING

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Introduction: The consumption of berries is associated with beneficial effects on metabolic health. However, individual responses are heterogeneous, and the underlying mechanisms responsible for this inter-individual variability remain poorly understood. The objective of the present study was to develop an analytical framework for classifying responses to the consumption of red raspberries or blueberries, using metabolomic data.
Methods: In two randomized, double-blind, placebo-controlled intervention trials conducted with adults at risk of metabolic syndrome, cardiometabolic outcomes and plasma metabolite levels were measured before and after 8 weeks of consumption of either red raspberries (R study) or freeze-dried highbush blueberry powder (B study). Based on partial least squares discriminant analysis (PLS-DA), followed by hierarchical clustering (HCA) and sparse PLS-DA (sPLS-DA), individuals were classified into response subgroups according to their plasma metabolite levels. The differences in cardiometabolic status between the subgroups before and after the interventions were then assessed.
Results: In each study, two subgroups of participants—groups R1 (n=17) and R2 (n=5) (R study) and groups B1 (n=17) and B2 (n=5) (B study)—were identified based on HCA derived from PLS-DA. Approximately unbiased p-values greater than 95% were used to identify the subgroups. A total of 486 (R) and 478 (B) metabolites were used for the analyses, respectively. The classification error rates were 26% and 29% for the sPLS-DA. Individuals in groups R1 and B1 showed neutral to negative impacts on immune-metabolic clinical parameters after their respective interventions. In contrast, individuals in groups R2 and B2 showed neutral to positive effects on the same parameters. Changes in waist circumference (p=0.02), plasma fasting insulin (p=0.02), and CRP levels (p=0.02) were significantly different between groups R1 and R2, and changes in HDL- (p=0.0003), LDL- (p=0.04), and total-cholesterol

(p=0.03) levels were significantly different between groups B1 and B2.
Conclusion: The two interventions had different impacts on clinical parameters according to the machine learning-based plasma metabolome profiling used in this study. This metabolomics-based clustering approach may be an effective way to classify individuals according to their responsiveness to a nutritional intervention. Further studies integrating multi-omics data may improve the accuracy of the models.

P2-B-11 DYNAMIC CONCEPTUAL MODEL TO INVESTIGATE ADOPTION OF HEALTHY DIET IN BRAZILIAN HOUSEHOLDS WITH FOOD INSECURITY THROUGH AGENT-BASED MODELING

Lucas Moura [1,2], Leandro Garcia [3], Sophie Jones [3], Eduardo De Carli [1,2], Dirce Maria Lobo Marchioni [2,4]

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Introduction: One of the main goals of the 2030 Agenda for Sustainable Development is to eradicate poverty and food insecurity, particularly hunger. Achieving this sustainably requires ensuring access to adequate, healthy food. To this end, public policies must improve food environments, crucial components of food systems. This research aimed to develop a dynamic conceptual model to support the investigation of the influence of food environments, price changes, and socio-demographic factors on healthy food consumption behavior in Brazilian households with different levels of food security.
Methods: The conceptual model was developed through three steps: (1) analyzing available empirical data from national food and food environment surveys, (2) conducting a comprehensive literature review, and (3) obtaining evaluations from Brazilian experts.
Results: A set of 25 macro (intersectoral) and micro (household) level variables from national surveys, supported by the literature, were identified as candidates for inclusion in the model and to inform the Agent-Based Model. In the current model version, 69.2% of experts partially agreed, and 30.8% totally agreed. Key determinants of adopting a healthy diet include regional differences, participation in social programs, food prices, household socio-demographics, food security levels, food acquisition, availability of healthy food, and food choices. Healthy food consumption is influenced by food choices and acquisition. Food choices are shaped by household factors and food security levels, which are affected by household characteristics and social program participation. Regional differences significantly shape these relationships. Food acquisition is determined by choices, prices, and availability, which are themselves influenced by prices. Regional variations impact prices, affecting food environment dynamics. Public policies influence all pillars of food security - access, stability, availability, utilization, sustainability, and agency - which, in turn, shape the food environment.
Conclusion: The conceptual model developed in this study is well

supported by evidence and expert opinion. It will guide the design of an Agent-Based Model and can be applied in future research on food choices in households with different levels of food security.

P2-B-12 MULTIDIMENSIONAL DIETARY PATTERNS AND INTERSECTING SOCIODEMOGRAPHIC CHARACTERISTICS: AN EXPLORATION OF JOINT ASSOCIATIONS AMONG ADULTS IN CANADA

Joy Hutchinson [1], Dylan Spicker [2], Benoît Lamarche [1], Michael Wallace [3], Mélina Côté [1], Abel Torres Espín [3], Sharon Kirkpatrick [3]

[1] Université Laval, [2] University of New Brunswick, [3] University of Waterloo

Introduction: Dietary patterns are complex, consisting of multiple interrelated components that may be jointly influenced by numerous individual-level characteristics. However, studies assessing associations between sociodemographic characteristics and dietary patterns typically do not consider this complexity. This study aimed to examine joint relationships between dietary patterns and sociodemographic characteristics among adults in Canada using mixed graphical models.
Methods: 24-hour dietary recall data for adults ≥18 years were drawn from the 2015 Canadian Community Health Survey Nutrition (analytic sample n=14 097). Mixed graphical models identify conditional relationships and were applied to identify networks of 1) Sociodemographic characteristics, 2) Dietary components, and 3) Sociodemographic characteristics and dietary components. Models included amounts consumed (log transformed grams/d) of 30 food groups, sex, age in years, household food security status, income, employment status, education, geographic region, and smoking status. Model accuracy and reliability were assessed using 10-fold cross-validation and stability was assessed using bootstrapping. Results are expressed as (edge weight; [95% CI]).
Results: In Network 1, positive relationships were observed among vegetable groupings, with negative relationships among subgroups of each of animal foods, beverages, and grains. In Network 3, age was associated with grains (other) (-0.12; [-0.16, -0.09], coffee/tea (0.21; [0.17, 0.24], and whole grains (0.12; [0.08, 0.15]). Sex was associated with sweet beverages (0.11; [0.06, 0.17]), alcohol (0.18; [0.13, 0.24]), cured meat (0.20; [0.15, 0.26]), and red meat (0.16; [0.11, 0.21]). Smoking status was associated with whole grains (0.11; [0.06, 0.17]) and education with alcohol (0.10; [0.04, 0.17]).
Conclusion: The strongest relationships were observed among dietary components and among sociodemographic characteristics rather than between dietary components and sociodemographic characteristics. In some cases, pairwise relationships between dietary components suggest displacement, for example, of whole grains by refined grains. Age and sex were the characteristics most strongly connected to dietary components. Exploring joint relationships between intersecting sociodemographic characteristics and dietary patterns can assist with better understanding dietary heterogeneity to inform policies and programs to support healthy eating.

P2-B-13 DIETARY PATTERNS IDENTIFIED THROUGH GAUSSIAN GRAPHICAL MODELS DIFFER BY SOCIAL DEPRIVATION SCORES AMONG ADULTS IN THE NUTRIQUÉBEC COHORT

Joy Hutchinson [1], Gabrielle Rochefort [1], Mélina Côté [1], Marianne Rochette [1], Iris Gigleux [2], Catherine Laramée [2], Annie Lapointe [1], Simone Lemieux [1], Élise Carbonneau [2], Benoît Lamarche [1]

[1] Université Laval, [2] Centre Nutrition, santé et société, Institut sur la nutrition et les aliments fonctionnels, Université Laval

Introduction: Humans consume complex, multidimensional dietary patterns that vary across time and life context. Although it is well-established that inequities in dietary intake exist across a range of sociodemographic characteristics, studies rarely consider how these inequities may result in differences in intake across the total, multidimensional dietary pattern. The objective of this study was to examine how dietary patterns differ across a gradient of social deprivation, which reflects poor social network at the neighborhood level.
Methods: Dietary intake was assessed in the NutriQuébec cohort using the average of up to three baseline 24-hour recalls per participant (n=4694). Social deprivation was assessed using the Institut National de Santé Publique du Québec (INSPQ) Social Deprivation Index (SDI) 2021. Gaussian graphical models identified conditional relationships among variables, allowing insights into the internal structure of dietary patterns. Gaussian graphical models were applied to compare dietary pattern networks among low (quintile 1) and high (quintile 5) of the SDI. Networks included the amount consumed of 20 log-transformed food groups (reference amounts), with the strength of conditional relationships between food groups indicated by edge weights. Model accuracy and validity were assessed using 10-fold cross-validation.
Results: Positive linear relationships were observed in both Quintiles 1 and 5 of the SDI between fruits and vegetables (0.18, 0.16 respectively) and whole grains and nuts (0.17, 0.20 respectively), and negative linear relationships were observed among whole grains and refined grains (-0.20, -0.22 respectively). Intake of meats and fat were positively associated (0.13) in quintile 1 but not quintile 5 of the SDI. Inversely, intake of refined grains and dairy (0.18) and eggs and fat (0.17) were positively associated in quintile 5 but not quintile 1 of the SDI.
Conclusion: Gaussian graphical models revealed distinct dietary patterns among individuals in living in neighborhoods characterized as low or high SDI. Given known compromises in dietary intake for single foods, nutrients, and summary diet quality scores, this approach to explore the internal structure of dietary patterns provides added insights into potential disparities in dietary intake. Using a range of approaches to explore dietary patterns extends our understanding of these patterns and how they differ by indicators of inequity.

P2-B-14 EFFECT OF DIFFERENT TECHNIQUES FOR UNBALANCED DATA IN THE PERFORMANCE OF MACHINE LEARNING LOGISTIC REGRESSION MODELS FOR PREDICTING TYPE 2 DIABETES IN BRAZILIAN ADULTS

Lais Duarte Batista [1], Regina Mara Fisberg [2,3], Flavia Mori Sarti [4,5], Jéssica Eloá Poletto [6]

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Introduction: The potential for using machine learning (ML) techniques in disease prediction emphasizes the impact of advances in computer technologies on health. Thus, this study aimed to compare the performance of different ML techniques for correcting unbalanced data in predicting type 2 diabetes by logistic regression models in the Brazilian population.

Methods: This study included a representative sample of 21,690 adults (aged from the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey – VIGITEL, 2023). The dataset was divided into training and testing data, using a proportion of 70% and 30%, respectively, for training and validation of the models. The occurrence of diabetes was predicted based on dietary intake of different food groups, sociodemographic factors, and self-reported health status using ML techniques with and without adjustments for unbalanced data ("Synthetic Minority Over-sampling Technique – SMOTE" and "class-weight" techniques). The performances of different models were compared by accuracy, precision, recall, specificity, and area under the Receiver Operating Characteristic (ROC) curve (AUC). The analyses were performed using the open-source software RStudio, version 4.2.2.

Results: The reported prevalence of diabetes in the population was 13% (n=2,826). Despite presenting good accuracy in the training (87.5%) and test (87.2%) datasets, the unbalanced baseline model showed compromised performance in the other metrics in the test base, especially in recall (7.7%) and AUC (0.53), indicating that it has low capacity to predict true positives. The application of SMOTE improved the model performance, especially in identifying true positives, with the recall increasing to 67.7% with a 5-fold doubling of the minority class. Furthermore, validation on the test dataset also showed improvements in overfitting, with the ROC curves showing similar values between the training (AUC=0.74) and test (AUC=0.72) datasets. Similarly, the model adjusted with class-weight had a recall of 72.7% in the test dataset, showing an increased performance compared to the baseline model without adjustments.

Conclusion: The application of SMOTE and class-weight techniques improved the performance of the models, reinforcing the importance of considering data balancing when applying ML models, especially for classifying events/diseases with disproportional or unbalanced prevalence in the population.

P2-B-15 BIAS IN CHILD NUTRITION INDICATORS: A COMPARISON BETWEEN SURVEY AND REGISTRY DATA IN PERU (2015-2023)

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[1] Instituto Nacional de Salud, [2] Universidad Peruana Cayetano Heredia-PERU

Introduction: Child nutrition monitoring in Peru relies on sample surveys (ENDES) and administrative records (SIEN). While records offer greater temporal and spatial resolution, they may be biased. This study compares annual regional prevalences of overweight, underweight, stunting, and anemia in children under 36 months, assessing discrepancies and potential biases.
Methods: A secondary analysis of ENDES and SIEN data (2015-2023) was conducted. Annual prevalences by region and source were estimated, adjusting ENDES for survey design. A random-effects meta-analysis and binomial models were applied to assess selection and measurement biases.
Results: A total of 200 region-years were analyzed (99,996 records in ENDES and 9.3 million in SIEN). Significant bias was found in all four indicators ($p<0.001$), with variability by age, region, and year. SIEN overestimated anthropometric indicators and underestimated anemia.
Conclusion: Administrative records should not be assumed to be representative without adjustments. ENDES should be used as the national and regional reference. Improving records to minimize biases and strengthen nutritional surveillance is recommended.

P2-B-16 CONTROLLING FOR MEASUREMENT ERRORS IN DIETARY ASSESSMENTS: THE ASSOCIATIONS BETWEEN RED MEATS AND CORONARY HEART DISEASE

Xiao Gu [1], Molin Wang [2], Walter Willett [1]

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Introduction: The controversial association between red meat intake and coronary heart disease (CHD) could be attributed to unaccounted measurement errors in dietary data. This study aims to compare the risks of CHD associated with red meat intakes assessed only at baseline, repeated assessments over the follow-up, and statistically corrected for measurement errors.
Methods: Our study included 123,775 participants from the Nurses' Health Study and Health Professionals Follow-up Study. Red meat intakes were assessed with semiquantitative food frequency questionnaires (FFQs) at the study baseline and every 2 to 4 years thereafter. Cox proportional hazards models were used to estimate the associations of red meats, considered as continuous variables, with total and fatal CHD, adjusted for dietary and other potential confounders. To correct the associations for errors in dietary assessment with the regression calibration method, we used dietary intakes assessed by two 7-day weighed diet records as the standard in the Lifestyle Validation Study (n = 1,207).

Results: Over 3,395,082 person-years of follow-up, we documented 9,384 total CHD and 4,243 fatal CHD cases. For 1 serving/day of processed red meat in relation to total CHD, the hazard ratios and 95% confidence intervals (HRs, 95% CIs) were 1.12 (1.06, 1.17) for baseline only, 1.21 (1.09, 1.34) with calibration, 1.20 (1.12, 1.28) with repeated measures, and 1.36 (1.15, 1.61) with repeated measures plus calibration. For unprocessed red meat, the HRs (95% CIs) were 1.03 (0.99, 1.07) for baseline only, 1.06 (0.99, 1.14) with calibration, 1.09 (1.04, 1.15) with repeated measures, and 1.17 (1.03, 1.33) with repeated measures plus calibration. Associations between red meats and fatal CHD were more pronounced in analyses using repeatedly assessed dietary data than in those using baseline dietary data and were further strengthened after correcting for measurement error-induced bias.
Conclusion: The associations between red meat consumption and CHD risk could be substantially underestimated in epidemiological studies that rely solely on baseline dietary data. The use of repeatedly assessed dietary data reduces effects of measurement errors in long term intakes, and further statistical correction for measurement error reveals even stronger associations. Causality should be informed by additional types of evidence and substitution analyses.

P2-B-17 APPLYING LATENT CLASS ANALYSIS TO EXPLORE THE INTERPLAY OF FOOD PARENTING PRACTICES AND ADOLESCENTS' DIETARY HABITS – A COMPARATIVE PERSPECTIVE ON ACCOUNTING VERSUS NOT ACCOUNTING FOR MUTUAL INFLUENCE

Sophie Marshall-Beaucoup [1], Olivia De-Jongh Gonzalez [1], Louise Masse [1]

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Introduction: Adolescence marks a critical period for body image concerns, which are often associated with unhealthy dietary behaviors. Food parenting practices (FPP) play a pivotal role in shaping children's dietary intake and behaviors. While most studies explore individual FPP in isolation, emerging research employs Latent Class Analysis (LCA) to investigate how combinations of parenting practices influence dietary outcomes.
Objectives: This study aims to illustrate the utility of LCA for examining the influence of FPP on adolescents' unhealthy dietary behaviors (e.g., weight-loss dieting, meal skipping, and fad dieting) and overall dietary quality.
Methods: Data were collected in British Columbia from 670 parent-adolescent dyads with Grade 7 adolescents. Parents self-reported FPP using 14 items from the FLASHE study, assessing 8 constructs: modeling, rules and limits, facilitation, negotiation, encouragement, coercive control, monitoring, and compensatory feeding. Adolescents self-reported weight-loss dieting and completed three 24-hour dietary recalls (ASA24 Canada) to compute dietary quality indices, meal-skipping patterns, and fad dieting habits. LCA identified FPP typologies, and regression analyses examined relationships between individual FPP, FPP profiles, and

adolescents' dietary behaviors.
Results: Four FPP profiles were identified: low-engagement (38.2%), structure and autonomy-promoting (36.8%), controlling (8.3%), and high-engagement (16.7%). Adolescents with parents employing structure and autonomy-promoting FPP were less likely to engage in weight-loss dieting compared to those with controlling FPP. Low parental engagement in FPP was associated with poorer dietary quality compared to all other profiles. Individual FPP such as coercive control, rules and limits, emotional feeding, availability, and negotiation showed significant associations with unhealthy dietary behaviors in expected directions. Surprisingly, parental modeling was positively associated with meal skipping, an unexpected finding warranting further investigation.
Conclusion: The FPP profiles provided valuable insights that complemented findings from individual FPP analyses. Notably, the impact of controlling FPP varied depending on the broader parenting context. LCA revealed the importance of examining FPP holistically, underscoring the need to consider overall parenting profiles in research on adolescent dietary behaviors.

P2-B-18 TASKS AND JOURNEYS - A FRAMEWORK FOR DESCRIBING AMBULATORY BEHAVIOUR

Craig Speirs [1,2], Malcolm Granat [3]

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Introduction: The waking day can be divided into periods of ambulatory (on your feet) and seated activities. In this study, we characterized the time spent in these two behaviours in a working age population. Ambulatory Behaviours can be divided into two classes of activity: 1) Ambulatory Tasks - standing interspersed with short stepping and 1) Ambulatory Journeys - prolonged walking, running, or cycling. These behaviours are distinct, with Ambulatory Tasks having an intermediate metabolic cost and generally taking place in a single location. Ambulatory Journeys have a higher metabolic cost and are typically transitions between locations or periods of exercise.
Methods: We identified 3,350 individuals from the BCS70 study with seven days of valid activity data and demographic data. Periods of standing and stepping shorter than one minute were classified as Ambulatory Tasks. Stepping bouts longer than one minute were classified as Ambulatory Journeys. We calculated per individual mean daily time spent in sitting, Ambulatory Tasks, and Ambulatory Journeys. Sex related differences in Ambulatory Tasks and Ambulatory Journeys were investigated using t-tests. We explored the relationship between time spent in seated activities, Ambulatory Tasks, and Ambulatory Journeys using linear regressions.
Results: The mean daily time in Ambulatory Tasks was 5.9 hours (SD ± 1.8). Compared to males, females spent an additional 25 minutes per day in Ambulatory Tasks. The mean time in Ambulatory Journeys was 40

minutes (SD ± 25). Compared to males, females spent 4 minutes per day less in Ambulatory Journeys. There was a moderate relationship between time spent in Ambulatory Task time and sitting time (r^2 = 0.52). Changes in time spent in Ambulatory Journeys was not associated with changes in Ambulatory Task time (r^2 < 0.01).
Conclusion: In this population of working-age adults, decreases in sitting activities were associated with an increase in time in Ambulatory Tasks. From a public health perspective, interventions aimed at decreasing sedentary time should promote activities associated with increased standing tasks. The absence of a relationship between Ambulatory Tasks and Ambulatory Journeys suggests that these behaviours should be considered separately when assessing their impact on health.

Poster Session 2-C
METHODS DEVELOPMENT, FEASIBILITY, AND VALIDATION
Tuesday, April 29 | 3.00pm - 4.30pm
Location: Convention Level Foyer

P2-C-19 REPORTING PRACTICES RELATED TO THE VALIDITY AND RELIABILITY OF DIETARY ASSESSMENT METHODS IN PUBLISHED NUTRITION RESEARCH

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Introduction: Dietary assessment tools have different levels of validity and reliability, and these vary in relation to the population, context, and purpose for which the data are used. For example, a tool that estimates intake with a high level of accuracy among adults may not do so among children. The Strengthening the Reporting of Observational Studies in Epidemiology-Nutritional Epidemiology (STROBE-nut) guideline, intended to improve reporting in nutritional epidemiology research, encourages detailing the validity of dietary assessment tools.
Methods: A systematic review characterized the extent to which and how validity and reliability were reported in recently published nutrition research. Articles published in the American Journal of Clinical Nutrition, the British Journal of Nutrition, the Journal of the Academy of Nutrition and Dietetics, the Journal of Nutrition, and Public Health Nutrition in 2016, 2019, and 2022 (n=1782, n=1558, n=1768, respectively) were screened for the use of quantitative self-reported dietary intake data (n=393, n=325, n=365). A random sample of 20% from each year (n=78, n=62, n=73) was selected for data abstraction, resulting in 213 records.
Results: In each year, about half of the articles included some reference to the validity and/or reliability of the dietary assessment methods used. Reporting was often limited to statements indicating that tool(s) used are valid or validated or have shown reliability. Of the articles mentioning the

validity and/or reliability of the dietary assessment tools used, 54%, 48%, and 71% in 2016, 2019, and 2022, respectively, described examinations of validity and/or reliability as part of the current study and/or the results of previous validation studies. About half of studies did not explicitly mention validity and/or reliability.
Conclusion: The lack of detail on the properties of dietary assessment tools used within published research makes it challenging for readers to appropriately interpret the findings. To ensure that study findings can be used to their full potential to inform future research priorities and policies and programs, continued development of capacity related to psychometrics within the nutrition research community is needed. The broad adoption of guidelines such as STROBE-nut by journals, authors, and peer reviewers may support a shift in reporting practices, leading to a stronger overall nutrition epidemiology evidence base.

P2-C-20 IMPROVING DIETARY ASSESSMENT FOR INDIGENOUS POPULATIONS: THE CHAKHESANG TRIBE CASE STUDY

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Introduction: Standard food assessment tools evaluate eating patterns and nutrient intakes. Using the Chakhesang tribe of Nagaland, India, known for their reliance on Indigenous and wild food varieties, provides a valuable case to examine gaps in standard food assessment tools. This study aims to assess the weaknesses of existing dietary assessment tools and their repercussions on the nutritional assessment of Indigenous peoples.
Methods: This paper uses data from a 2017 cross-sectional study of 558 households, 540 mothers with children, and 661 adolescents. A 24-hour dietary recall, food frequency questionnaires (FFQ), and other standard dietary assessment tools were tested to see how well they measured Indigenous food consumption. Indicators of nutritional status, including micronutrient deficiencies and non-communicable diseases (NCDs), were assessed and compared to the national data.
Results: The Chakhesang diet is rice-based, supplemented with other cereals like millets, job's tears, maize, and various wild foods including insects. The large dietary diversity provided sufficient macro- and micronutrients, revealing improved nutritional status, decreased micronutrient deficiency, and low prevalence of NCDs compared to national data. However, one core limitation lies in the non-coverage of the variety of Indigenous foods collected from the wild by standard dietary assessment methods and the lack of a nutrient database of Indigenous foods, which makes the dietary data analysis highly challenging.
Conclusion: Current dietary assessment tools should capture the biodiversity of foods consumed and nutrient diversity within a given

species. Creating food composition databases of Indigenous foods and developing culturally appropriate survey tools are important steps toward assessing diet quality more accurately. Addressing these issues will highlight the role of Indigenous food systems in offering sustainable solutions to agricultural challenges and improving global nutrition, particularly amid climate change.

P2-C-21 DEVELOPMENT AND VALIDATION OF AN INSTRUMENT TO ASSESS THE COGNITIVE, BEHAVIOURAL, AND ENVIRONMENTAL FACTORS RELATED TO SODIUM INTAKE IN ADULT CANADIANS

Rola Al Ghali [1], Michael Prashad [1], Anisha Mahajan [1], Alicia Tavares Da Silva Gomes [2], Beatriz Franco-Arellano [1], Katherine Jefferson [1], Joanne Arcand [1]

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Trainee Poster Presentation Award Nominee

Introduction: High sodium intake is a leading risk factor for non-communicable diseases, with most Canadians exceeding the recommended amount. The World Health Organization endorses monitoring sodium knowledge, attitudes, and behaviours (KAB) along with sodium reduction policies. However, sodium KAB has not been monitored in Canada for >10 years. While KAB is helpful, it does not describe the broader set of known drivers of behaviour towards sodium. Currently, there are no tools to capture theory-driven determinants of sodium intake. This study describes the development and validation of an instrument to assess the cognitive, behavioural, and environmental factors related to sodium intake in Canadian adults.

Methods: The items were developed using a prior national sodium survey, findings from a Canadian qualitative study conducted specifically for this purpose, a literature review, and behaviour theories. Content validity was assessed by eight experts over two rounds and evaluated by computing the content validity index (CVI) for the items (I-CVI) and the overall survey average (S-CVI/Ave). Face validity was verified qualitatively over two rounds of one-on-one interviews with 10 Canadian adults (>18 years). Item response theory (IRT, n=444) analysis validated the knowledge construct, while exploratory factor analysis (EFA, n=444) was performed for other constructs. Intraclass correlation coefficients (ICC, n=113) and Cronbach's alpha assessed reliability.

Results: Iterative changes were made based on the experts' feedback from the first validation round, rendering a value of S-CVI/Ave=1 in round two; indicating high content validity. Results from cognitive interviews (50% men, 23-62 years) showed that most items were found clear with minor revisions. Items were improved until achieving saturation. IRT analysis showed that most knowledge items were within the acceptable range of difficulty and discrimination. EFA resulted in six factors: reading food labels, barriers to reduce sodium, actions to lower sodium, attitudes, hedonics, and perceived control/self-efficacy. The ICCs of knowledge items were generally low (<0.5); all other constructs were ≥0.5, indicating the ability to generate reproducible results. Cronbach's alpha showed

acceptable values of >0.7.
Conclusion: The developed instrument proved to be psychometrically valid and will be administered to a national sample of Canadian adults in a pioneering study exploring factors affecting sodium intake beyond traditional sodium KAB.

P2-C-22 CROSS-CULTURAL ADAPTATION OF A BILINGUAL ELECTRONIC NUTRITIONAL ASSESSMENT TOOL FOR CANADIAN ATHLETES.

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Introduction: The literature suggests that many athletes fail to meet dietary recommendations and that quality assessment tools are lacking in this population. The Athlete Diet Index (ADI) is an electronic nutritional assessment tool developed in collaboration with dietitians and athletes in Australia (Capling et al., 2019). The aim of this project was to adapt the ADI for Canadian athletes.
Methods: The cross-cultural adaptation began with a preliminary revision by three sports dietitians. This version was then reviewed using a modified Delphi process involving eight sport dietitians affiliated with the Canadian sport system. The forward-backward translation method was applied to obtain the French version. A pilot study was conducted with a sample of 49 athletes aged 16 years and older competing in a variety of sports. After completing the tool, the participants rated its relevance, perceived comprehension, and duration using an electronic questionnaire. They were also given the opportunity to provide verbal comments to enhance their feedback. A subgroup of 11 bilingual participants evaluated the English and French versions in parallel to assess equivalence.
Results: At the preliminary revision stage, 67 of the 112 questions were modified for reasons of language (65), respect for the Canadian dietary context (35), and relevance (4). In the modified Delphi process, two rounds of feedback, interspersed with a roundtable meeting, were needed for the panelists to agree on the modification of 56 questions, the addition of five, and the deletion of four. The final revision following translation resulted in 48 additional changes to the French and English versions to improve terminology alignment (32), syntax (9), and to ensure compliance with the modified Delphi decisions (7). Of the 49 participants in the pilot study, 44 considered the tool relevant/very relevant and 39 found it easy/very easy to understand. The verbatims derived from the verbal comments supported these results. The French and English versions were judged equivalent without modification by nine of the 11 bilingual participants.
Conclusion: The Canadian adaptation of the ADI meets the needs of Canadian athletes for a nutritional assessment tool adapted to their dietary context and available in the language of their choice. This could provide access to a more appropriate dietary assessment method for all

in this population. The next phase will aim to assess its validity and fidelity criteria.

P2-C-23 NAVIGATING DATA COLLECTION CHALLENGES IN ASSESSING DIETARY INTAKE AND NUTRITION BEHAVIORS: A PILOT STUDY IN THREE TORONTO SCHOOLS

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Introduction: A national school food program is crucial for ensuring children receive nutritious meals, especially given Canada's recent federal commitment to developing a national school food policy. Since children spend one-third of their day in school, aligning school food programs with their nutritional needs is vital to fostering healthy eating habits. This pilot study explored navigating the challenges of data collection on students' dietary intake, perceptions of school food programs, and nutrition-related knowledge, attitudes, and behaviors within the Toronto District School Board (TDSB).

Methods: This mixed-methods pilot study was co-created with the Toronto District School Board's Nutrition Liaison Team. Data collection took place in classrooms at selected schools around Toronto. Dietary records were collected from students, while questionnaires were administered in group settings to assess students' nutrition knowledge, attitudes, and behaviors. Additionally, informal conversations with school staff, including food service personnel and administrators, supplemented student data to capture insights into school food program operations and challenges. Logistical factors like research space and time were monitored to refine data collection. Meetings with school food coordinators enabled menu reviews and planning for classroom observations.

Results: The process revealed several logistical and methodological challenges, including navigating diverse school environments, varying participation levels, and the complexities of accurately capturing self-reported dietary data from children and adolescents. We identified the need for a dedicated research space, addressing students' hesitation to participate in mixed-grade focus groups by ensuring adequate time and safe environment for interview, the importance of early meetings with school food coordinators to review menus, and focusing on one classroom at a time to improve organization and reduce confusion.

Conclusion: Despite these challenges, in-person data collection provided valuable insights into barriers and enablers to healthy eating in schools. Overall, this pilot study underscores the importance of in-person data collection for obtaining nuanced, real-world insights into students' nutritional behaviors and the effectiveness of SFPs. The findings will guide future research and policy to better align SFPs with students' needs, fostering a supportive school food environment that promotes healthy eating.

P2-C-24 USING ONLINE TOOLS TO ENRICH A CANADIAN COHORT STUDY WITH COMPREHENSIVE DIETARY INTAKE AND MOVEMENT BEHAVIOUR DATA: A DATA COLLECTION PROTOCOL

Sharon Kirkpatrick [1], Jennifer Vena , Alyssa Milano [2], [1]Benoît Lamarche [3], Dylan Spicker [4], Michael Wallace [5], Charles Matthews [6], Gabriel Hayman [7], Jason Hicks [7], Ellen Sweeney [7], Trevor Dummer [8], Guy Faulkner [9], Rachel Murphy [8]

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Introduction: A lack of comprehensive dietary intake and movement behaviour data within cohort studies in Canada has precluded advancing our understanding of the nexus between diet, movement behaviour, and health. Using established online tools, it is now possible to collect detailed dietary intake and movement behaviour data in very large studies.

Methods: We are leveraging the Canadian Partnership for Tomorrow's Health (CanPath) to create the largest known repository of dietary intake and movement behaviour data in Canada. CanPath comprises seven regional cohorts, spanning ten provinces, with a total sample of over 330,000 adults. Cohorts have administered baseline and follow-up surveys, resulting in a wealth of behavioural, environmental, genomic, and clinical data, including biological samples. Participants have also consented to linkage with administrative health data. Participants are asked to complete two to four 24-hour recalls using the Automated Self-Administered Dietary Assessment Tool (ASA24)-Canada and two to four 24-hour recalls using the Activities Completed over Time in 24 Hours (ACT24). Screeners and questionnaires capturing usual intake and movement behaviour over the past 30 days and past year are also administered. In Québec, data are from 10,000 CanPath participants who are enrolled in the NutriQuébec cohort. The participant data are complemented by up-to-date geospatial measures of built and food environments.

Results: It is anticipated that dietary intake and movement behaviour data will be available for over 100,000 CanPath participants, facilitating numerous inquiries related to dietary intake, movement behaviour, and health. The large sample with participants from all provinces will allow consideration of how factors such as gender, income, and urbanicity interact in relation to diet and movement behaviour. The inclusion of repeat recalls in combination with other assessment tools supports methodological research, including expanding strategies to mitigate error in diet and movement behaviour data. This effort will also build capacity in the collection, processing, and harmonization of dietary intake and movement behaviour data among cohorts and provide a training ground for emerging diet and activity researchers.

Conclusion: Continued advances in assessment methods will enable large longitudinal cohort studies such as CanPath to capture detailed data on these key exposures while minimizing burden for researchers and respondents.

Poster Session 2-D
BRIEF INSTRUMENTS
Tuesday, April 29 | 3.00pm - 4.30pm
Location: Convention Level Foyer

P2-D-25 ASSESSING SUSTAINABLE AND HEALTHY DIETS IN LARGE MULTI-COUNTRY SURVEYS: VALIDITY AND APPLICABILITY OF A BRIEF FOOD GROUP PROPENSITY QUESTIONNAIRE BASED ON THE EAT-LANCET PLANETARY DIET

Agustin Miranda [1], Anna Maria Murante [2], Federica Manca [2], Fabio Consalez [2], Anant Jani [3], Eric Verger [1]

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Introduction: Nutritional strategies ensuring healthy diets within planetary boundaries are essential. In 2019, the EAT-Lancet Commission proposed the planetary health diet, prompting the creation of several indices to measure intake. However, these methods may be impractical for large-scale surveys due to complexity, respondent burden, and resource demands. Thus, concise and valid tools measuring intake frequency can enhance response rates, reduce costs, and simplify administration. This study aimed to develop a simplified and practical tool for representing EAT-Lancet diet adherence in large-scale multi-country surveys.
Methods: First, an intake frequency index for EAT-Lancet diet food groups (ELFI) was developed using data from the INCA3 survey (n=1,645) and applying a quantile based-scoring system. ELFI was validated by correlating it with a valid EAT-Lancet index (ELI), nutritional health measures (nutrient adequacy and diet quality), and environmental impact (Agribalyse). Second, ELFI applicability for large surveys was tested in the FEAST survey of 27,417 adults from 27 European countries. Analyses included reliability, structural validity (exploratory and confirmatory factor analyses), concurrent validity (multivariate regression), and structural equation modeling (SEM).
Results: Expected associations with demographic variables confirmed ELFI concurrent validity (age, gender, income, education; $p<0.05$). ELFI correlated with ELI (0.43, $p<0.001$), and food groups correlation ranged from 0.10 to 0.48 ($p<0.001$). ELFI food groups correlated with quantities consumed (-0.15–0.49, $p<0.001$). SEM showed that higher ELFI subscores were associated with better Nutritional Health ($\beta=0.73$ and 0.37, $p<0.001$) and lower Environmental Impact ($\beta=-0.22$ and -0.38, $p<0.001$). Regarding applicability in the FEAST survey, ELFI mean score was 20.43 (3.48), with red meats scoring lowest (1.08 (0.91)) and oils highest (1.79 (0.92)). ELFI showed strong reliability ($\omega=0.82$), and factor analysis revealed a two-factor solution (40% variance; KMO=0.86): one for whole grains, vegetables, fruits, legumes, nuts, fish, and oils; and another for red meats, poultry, eggs, fats, tubers, sugars, and dairy. All models in confirmatory factor analysis demonstrated adequate fit, with the bifactor model supporting the use of ELFI.

Conclusion: The ELFI approach represents a valuable and easy-to-implement tool for evaluating adherence to sustainable and healthy diets in large-scale studies.

P2-D-26 NOVA SCREENER: AN EASY-TO-OPERATE INSTRUMENT BASED ON FOOD PROCESSING FOR MONITORING HEALTHY AND SUSTAINABLE DIETS

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Background: The Nova screener is an easy-to-operate and low-cost instrument designed to assess food consumption according to the degree of food processing. It allows for the generation of two diet quality scores: the Nova score for ultra-processed foods (Nova-UPF) and the Nova score for minimally processed plant-based foods (Nova-WPF). Despite its potential, the use of this instrument in evaluating healthy and sustainable diets requires further study. Therefore, the present project aims to evaluate whether the scores generated by the screener predict adherence to a healthy and sustainable diet.
Methods: Data from the NutriNet-Brasil Study, an ongoing entirely online multicentric cohort, were used. A sample from the study (n=812) responded to the Nova screener and a 24-hour dietary recall (R24h) on the same day, allowing for a comparison between the Nova scores and diet indicators obtained through the R24h. Nova-WPF and Nova-UPF scores were computed based on the reported frequency of consumption (yes/no) of 33 varieties of WPF and 23 varieties of UPF, and each score was categorized as follows: Nova-WPF 0-4, 5-6, 7, 8-9, and 10+, while the Nova-UPF was categorized as 0, 1, 2, 3, 4, and 5+. WHO cutoff points determined a simple inadequacy score (0-6 points) for nutrients related to non-communicable diseases: added sugars, saturated fat, trans fat, fiber, sodium, and potassium. Adherence to a sustainable diet was evaluated using the Planetary Health Diet Index (PHDI), a diet index that ranges from 0 to 150 points.
Results: Participants with a frequency of 10+ on the Nova-WPF had, on average, 16.5 points higher on the PHDI compared to participants with scores of 0-4. Additionally, these individuals showed, on average, a decrease of 1.12 points in nutrients critical to human health. Those with a frequency of 5 or more ultra-processed foods (i.e., 5+ on the Nova-UPF) showed, on average, a decrease of 5.07 points on the PHDI and an increase of 0.72 in the consumption of critical nutrients.
Conclusion: Nova diet quality scores, evaluated throughout the Nova screener, are associated with indicators of healthy and sustainable diets, suggesting their potential for comprehensive dietary quality monitoring.

P2-D-27 DEVELOPMENT OF A SHORT FOOD FREQUENCY QUESTIONNAIRE TO ESTIMATE THE CONSUMPTION OF PLANT-BASED MEAT AND OTHER ANIMAL FOODS ANALOGUES: PRELIMINARY RESULTS FROM A FRENCH COHORT

Sébastien Demange [1], Julia Baudry [1], Justine Brevet [1], Cédric Agaësse [1], Alexandre De Sa [1], Selim Aloui [1], Mathilde Touvier [1], Emmanuelle Kesse-Guyot [1], Benjamin Allès [1]

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Introduction: The consumption and supply of plant-based analogues of meat and animal products (analogues), such as plant-based drinks made from soya or oats and patties or burgers made from cereals or pulses, have increased considerably in recent years. However, there is no questionnaire that is both short and comprehensive enough to provide a detailed estimate of the diversity of consumption of these relatively new foods. The main aim of this study was to create a short food frequency questionnaire (FFQ) targeting these products. The secondary objective was to analyse the data obtained from this questionnaire to estimate the consumption of these foods in a large sample from a prospective French cohort.

Methods: The questionnaire was designed on the basis of a literature review, with a focus on existing FFQs. A survey of products available on the French market was also carried out. The design of the FFQ items was based on validated methods of measurement of both frequencies and quantities from the SU.VI.MAX and NutriNet-Santé studies. Preliminary descriptive statistics aimed to describe the frequency of consumption of analogues, in the total sample and by groups of individuals following diets that reduce or exclude animal products (vegetarians), using univariate statistical tests.

Results: The literature search and market survey enabled us to identify 1,941 foods that were gathered into 6 dietary analogue groups based on their main ingredient (e.g. legumes or cereals), corresponding to 128 food items in the final questionnaire. The three groups of analogues for which we observed the highest frequencies of participants declaring to consume them weekly, were vegetable drinks (13.8% of the sample), vegetable patties, burgers or steak (7.9%), and tofu (3.9%). The percentages of individuals consuming these analogues on a weekly basis varied by type of diet and were highest among vegetarians and vegans.

Conclusion: The questionnaire enabled detailed measurement of the consumption of plant-based meat and other animal foods analogues. Consumption of these analogues was found to be non-negligible in the population, especially for people who declared reducing or excluding meat from their diet. This questionnaire should provide a better understanding of the impact of these analogues on health over time.

P2-D-28 TRIDIET-OLD: DIETARY SCREENER FOR BRAZILIAN OLDER PEOPLE

Jacqueline Pamela Calixto Barros [1], Agatha Nogueira Previdelli [2], Marta Ferreira Bastos [1], Rita Aquino [1]

[1] São Judas University, [2] Universidad Autonoma de Chile

Introduction: A dietary screener tool is composed of a pre-specified food list and set of behavioural questions and captures long-term diet and past intake of a limited number of foods, relies on generic memory, and is not affected by reactivity. The purpose of this study was to carry out cross-cultural adaptation, content validation, and face validation of a dietary screening tool to identify nutritional and dietary risk in community-dwelling older people.
Methods: The dietary screening instrument studied was the DST (Dietary Screening Tool) from the US, developed by Bailey et al (2009). Nutritionists specializing in food consumption and gerontology and older adults aged ≥60 years were recruited to stages. The initial stage was the translation of the instrument into Portuguese and the back-translation into the original language. Subsequently, cross-cultural adaptation was carried out by a committee of 5 researchers. Content validity (CV) was carried out by a group of 13 nutritionists and assessed the clarity and relevance. Face validity (FV) was carried out by a group of 27 older adults and assessed the clarity.
Results: In the first stage, the questions regarding the consumption of vegetable sources, vitamin A, and the alcoholic beverages did not reach the adequate content validity index (CVi > 0,8), requiring revisions. In the face validity (FV), all questions resulted in an adequate level of understanding.
Conclusion: Based on the results obtained, there is sufficient evidence of validity in the dietary screener tool to continue the validation process.

P2-D-29 DEVELOPMENT AND VALIDATION OF A BRIEF TOOL TO ASSESS DIET QUALITY DURING PREGNANCY IN INDIVIDUALS LIVING IN VULNERABLE CONTEXTS

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Introduction: Nutritional assessment tools used during pregnancy are often lengthy and poorly adapted to pregnant individuals living with socioeconomic vulnerability. This research aimed to develop and validate a brief and easy-to-use questionnaire to measure adherence to nutritional recommendations among pregnant individuals living with socioeconomic vulnerability, ultimately contributing to better nutritional care. This research is carried out in partnership with Alima, a community organization that implements a perinatal social nutrition intervention for individuals living in vulnerable conditions, particularly those with precarious migratory status.

Methods: The initial phase consisted of the development of the questionnaire in collaboration with an expert panel comprising researchers and dietitians with experience working with a diverse range of pregnant individuals. Then, the questionnaire was pretested among individuals receiving nutritional follow-up care at Alima (n=12) to assess face validity. Finally, a validation study involving individuals receiving intervention at Alima (n=35) was undertaken. The questionnaire was administered by the research team one to three days before a routine follow-up by the dietitian, who was then asked to independently identify the top nutritional recommendations to prioritize from the 13 recommendations assessed by the questionnaire. The content validity of the questionnaire was evaluated by comparing results of the questionnaire with the nutritional priorities identified by the Alima dietitians using percentage agreement.
Results: A 37-item questionnaire assessing 13 nutritional recommendations was developed, and the pretest led to the modification of 13 questions based on participants' feedback. The face validity assessment demonstrated that the questionnaire was deemed adequate for the target population, particularly due to the clarity of the items and the relatively brief completion time (approximately 12-15 minutes). For the 13 recommendations, the interval of total agreement between the questionnaire and the dietitian ranged from 33.33% to 82.35%. When combining total and partial agreement, the interval ranged from 81.82% to 100.00%.
Conclusion: A 37-item questionnaire was developed, validated, and deemed suitable for the target population. A final version of the questionnaire will be created based on the present analyses, allowing for its implementation at Alima.

Poster Session 2-E
FOOD FREQUENCY AND ACTIVITY QUESTIONNAIRES
Tuesday, April 29 | 3.00pm - 4.30pm
Location: Convention Level Foyer

P2-E-30 DEVELOPMENT AND VALIDATION OF THE THAI MIXED-DISH SEMI-FOOD FREQUENCY QUESTIONNAIRE FOR THAI POPULATION AT RISK OF METABOLIC SYNDROME

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Introduction: Semi-food frequency questionnaire (semi-FFQ) is one of the tools for assessing relationship between diet and risk of diseases. The objectives of this study are to develop and validate the semi-FFQ for people at-risk for metabolic syndrome.
Methods: In the development phase, we used single food items data, referred from Thailand national food consumption survey (2016), to

analyze the list of food and proportionate amounts. However, data on Thai mixed-dish food were lacking. The data were collected from 5 canteens at Siriraj Hospital in Thailand. The three sampling dishes from each menu were weighted for the major ingredients. The nutritive values were calculated using the Thai food composition software program. The nutrient profiling criteria (NP) was used to classify those menus. In the validation phase, we recruited participants from Siriraj-health cohort study. The reference indicator to compare with the semi-FFQ was the biochemical results of the participants.
Results: Ninety-seven food items in 8 food groups and 5 serving size choices were included in the semi-FFQ. The food groups were fruits (n=18), beverages (n=10), snacks and Thai desserts (n=29), Thai mixed-dishes (n=32), egg menus (n=3), and dressing (n=5). The Thai mixed-dish group was classified into 3 groups: a la carte, noodles, and rice with toppings. The content validity of semi-FFQ was evaluated by 3 nutrition specialists. The validation results were associated between three major nutrients for metabolic syndromes (sugar, fat, and sodium) and biochemical results (fasting blood glucose, lipid profiles, blood pressure and 24-hour urine sodium). Ninety-four participants were in the validation phase (54 unrequired urine collection, 40 required urine collection). Level of biochemical results of each key metabolic syndrome nutrient significantly increased with the rise of semi-FFQ estimated intakes. Correlation coefficients (r): fasting blood glucose; r=0.293 in fruits, r=0.285 in desserts. Triglyceride; r=0.252 in a la carte-dish. LDL-cholesterol; r=0.205 in rice with toppings-dish. Systolic blood pressure; r=0.272 in snacks and r=0.190 in a la carte-dish.
Conclusion: The final semi-FFQ was useful for assessing dietary food patterns of Thai populations who are at risk for non-communicable diseases.

P2-E-31 DEVELOPMENT OF THE PHENOLQUEST: A NOVEL FOOD FREQUENCY QUESTIONNAIRE TO ASSESS (POLY)PHENOL INTAKE

Soline Chaumont [1], Dorian Teissandier [2], Charlotte Gillet [3], Wiame Lasri [4], Sylvie Mercier [3], Laetitia Demaretz [1], Marie Lefebvre [3], Christine Morand [3], Claudine Manach [3]

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Introduction: Assessing dietary (poly)phenol intake remains challenging due to the diversity of (poly)phenols types and their vast distribution in our diet. While Food Frequency Questionnaires (FFQs) are widely used as cost-effective tools for large population studies, there is no reference FFQ specifically design for measuring (poly)phenols intake. Standard dietary assessment instruments designed to capture the overall diet are currently used, resulting in imprecise data on poly(phenols) intake. The objective of this study is to develop a semi-quantitative FFQ, named PhenolQuest, specifically designed to cover a wide range of polyphenols for researchers and practitioners to use in cohorts with a European-style diet.

Methods: To develop the FFQ, a list of polyphenol-rich foods was established based on expert knowledge and a literature review. For greater precision, additional detail levels were introduced for certain foods to account for known variation factors (e.g., fruit peeled or not.). To make the questionnaire quantitative, a standard portion size or a choice between several portion sizes was defined for foods and beverages on the list. A third stage was to create the frequency responses for food consumption. For foods with seasonal variation in consumption, an additional question about the number of months of consumption was included along with the frequency of consumption. Finally, the ergonomics of the questionnaire was evaluated by a panel of 50 French participants.
Results: PhenolQuest includes 178 polyphenol-containing foods from 12 food groups including fruits, vegetables, legumes, alcoholic beverages, non-alcoholic beverages, cereal products, chocolate, oil, herbs and spices, processed fruits, nuts, and soy products. The completion time for PhenolQuest when administered as an electronic version on RedCap is about 20 min.
Conclusion: Used in conjunction with a companion table of food composition for a hundred (poly)phenols, PhenolQuest is expected to significantly enhance the accuracy of polyphenol intake assessment and the related ranking of subjects in epidemiological and intervention studies.

P2-E-32 ASSESSMENT OF DIETARY INTAKES AND NUTRITIONAL STATUS BIOMARKERS IN MEAT-EATERS, FLEXITARIANS, FISH-EATERS, VEGETARIANS, AND VEGANS IN THE FEEDING THE FUTURE STUDY: A FEASIBILITY STUDY

Izabella Lawson [1], Christopher Maronga [1], Timothy Key [1], Keren Papier [1, 2]

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Introduction: The Feeding the Future (FEED) dietary questionnaire is an online food frequency questionnaire (FFQ) adapted from the EPIC-Oxford study FFQ. It was developed to assess dietary intake in the FEED study, an online study of six thousand UK adults following different plant-based diets and diets containing meat and fish. We set up a nested study with FEED participants to compare the performance of the FEED FFQ against two 24-hour dietary recalls and 10 blood biomarkers and evaluate the feasibility of collecting blood from online study participants using home testing kits.
Methods: In the FEED study, dietary intake was collected using the FEED FFQ at baseline (Feb 2022-Dec 2023) in all ~6,700 recruited participants. We sent 3,748 invitation emails to the 56% of FEED participants who had consented to future contact and provided an email address. Participants were invited to complete the repeat FEED FFQ using REDCap, two 24-hour recalls using the Intake24 platform, and to take part in capillary blood

collection using a self-testing kit from Thriva Ltd. Ten biomarkers were assayed, including circulating concentrations of haemoglobin, lipids (LDL-C, HDL-C, non-HDL-C, total cholesterol, triglycerides), and vitamins B12 and D.

Results: To date, a total of 637 participants (17%) consented to take part in the repeat survey (29 Nov 2024-29 Jan 2025). Of these, 582 completed the repeat FFQ, 457 completed one 24-hour recall, and 359 completed a second 24-hour recall, 19 days later on average. A total of 577 (15%) participants consented to blood collection and completed the mail-order form to receive a blood kit. Of the 577, 397 participants also completed at least one 24-hour recall and provided enough information to be included in the first round of blood collection, making them eligible to receive blood kits. A total of 265 (67%) kits were returned, with 31% of these yielding results for all biomarkers, 57% yielding partial results (average number of successful tests per participant = 8), and 12% void. Lipids and vitamins B12 and D had the lowest sample failure rates (all <10%). The main reasons for void or incomplete samples were haemolysis (32%), insufficient volume (29%), and clotted samples (15%).

Conclusion: Most participants successfully completed all dietary assessment measures. The response rate for blood samples was moderate, and the capillary collection we tested was adequate for chemistry but not for haematology.

P2-E-33 VALIDITY AND RELIABILITY OF THE KOREAN VERSION OF THE NEIGHBORHOOD PHYSICAL ACTIVITY QUESTIONNAIRE

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Introduction: Given that a substantial number of daily activities take place in neighborhoods, a convenient and effective method for measuring the physical activity of individuals is needed. Therefore, we tested the validity and reliability of the Korean version of the Neighborhood Physical Activity Questionnaire (K-NPAQ), which was developed through translation and back-translation of the NPAQ.

Methods: The K-NPAQ was administered twice, with a 1-week interval, to participants in the study who were recruited at a health promotion center. We assessed energy expenditure and compliance using an accelerometer and an activity diary. The Kappa statistic and Spearman correlation coefficient were used to evaluate the test-retest reliability of the K-NPAQ, and the Spearman rank correlation was used to assess the validity.

Results: Of the 122 participants, 43 were excluded owing to a lack of compliance. The Kappa values for all items that were used to assess walking or cycling within or outside the neighborhood were >0.424; 0.251–0.902 for 5 items related to the purpose of the physical activity; 0.232–0.912 for most items related to the number of times and the duration for each types of physical activity. The total energy expenditure and the

energy expenditure in the neighborhood were significantly correlated with the K-NPAQ and the accelerometer, with correlation coefficients of 0.192–0.264.
Conclusion: The K-NPAQ is a valid and reliable tool for measuring physical activity in the neighborhood, and it can be used for individual education and counseling to augment physical activity in specific neighborhood environments.

Poster Session 2-F
RECALLS AND RECORDS
Tuesday, April 29 | 3.00pm - 4.30pm
Location: Convention Level Foyer

P2-F-34 VALIDATION OF THE "CC24" A WEB-BASED SELF-ADMINISTERED CLOSED 24-HOUR RECALL TO MEASURE CHILDREN'S DIETARY INTAKE IN MEXICO

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Introduction: 24-hour recalls (24HR) are a reference instrument for dietary assessment, but low-cost options are needed. We developed the CC24, a web-based automated and self-administered closed 24HR, based on the principles of the Oxford WebQ. A predefined list of foods (as in an FFQ) is presented and consumption on the previous day is reported. We conducted a validation study to compare the CC24 with an interviewer-administered open 24HR.
Methods: A sample of 120 parents of children aged 5-10 years that have previously participated in a web-based cohort participated in this validation study. During a videocall, the following steps were conducted: 1) study introduction and sociodemographic information collection, 2) self-administered completion of the CC24, 3) opinion questions on the CC24 asked (with interviewer), 4) open 24HR completed (with interviewer), 5) opinion questions about the 24HR asked (with interviewer). Both questionnaires were in relation to their child's intake the previous day.
Results: Almost all (97.5%) participants were women, and their average age was 38y. The highest education degree was college or higher for 52%, high-school for 35%, and middle-school or less for 13%. The median completion time of the CC24 was 16 min (IQR: 12, 20min), whereas for the interviewer-administered, it was 20 min (IQR: 17, 25). Regarding participants' opinion about the CC24, the majority (97.5 to 99%) agreed or strongly agreed that the duration was appropriate, that the foods consumed by their child were well captured, that the amount options were appropriate, that the portion size guides were useful, or that the questionnaire was easy to answer. Yet, 12.5% thought it was tedious. Forty-seven percent reported reading the instructions carefully and 49% quickly; while 58% reported looking at the graphical example carefully

and 38% quickly. Two hypothetical questions were included to test participants understanding of the portion-size related questions, with 54% answering correctly the first and 40% the second. Sixty-two percent answered the CC24 on a cellphone, 35% on a computer, and 3% on a tablet. When asked about which method they would prefer in a future study, the self-administered CC24 or scheduling a videocall for the 24HR, 43% preferred the CC24.
Conclusion: The CC24 is a well-accepted self-administered tool that can be completed within a reasonable time. Analysis to compare the energy, nutrients, and food group intake reported in each of the tools is underway.

P2-F-35 VALIDATION OF THE INTERVIEWER-BASED 24-H DIETARY RECALL APP 'CATCH-24' FOR DIETARY ASSESSMENT IN LMIC

Karin Borgonjen-Van Den Berg [1], Elise Talsma [1], Taonga Chirwa [2], Edith Feskens [1], Desiree Lucassen [1]

[1] Wageningen University & Research, [2] University of Zambia

Introduction: Dietary assessment in low- and middle-income countries (LMIC) is difficult due to the unavailability of effective tools and population specific databases, making the preparation and execution time consuming and burdensome for both researchers and participants. Catch-24, an interviewer-based 24-h dietary recall (24hR) tablet app, is specifically developed for use in small-scale studies in LMIC as it can easily be adapted to new study areas and requires minimal data preparation. This study aimed to evaluate the intake of energy and nutrients assessed with Catch-24 against traditional pen-paper 24hRs and independent urinary recovery markers.
Methods: Dietary intake was assessed in a cross-sectional study in urban and rural areas of two districts in Zambia. In total, 357 women (18-49 years) completed 6 non-consecutive 24hRs on randomly non-consecutive days, over a period of 3 weeks (3x 24hRs with Catch-24, 3x 24hRs with pen-paper). A subgroup of 52 women completed 24-h urine collection to determine urinary nitrogen excretion. Perceived usability of Catch-24, by the interviewers, was assessed using an evaluation questionnaire.
Results: According to the interviewers, Catch-24 was easy-to-use, and the app supported the structure of the interview. Average intakes of energy and nutrients (except alcohol) were slightly lower when assessed with Catch-24 24hRs compared to pen-paper 24hRs (energy 2974±951 kcal vs 3173±1072 kcal, protein 78.3±28.8 g vs 84.8±29.7 g; fat 77.7±34.3 g vs 85.0±35.6 g; carbohydrates 460±156 g vs 484±180 g). Urinary protein was lower than dietary protein intake assessed with pen-paper 24hRs. Correlation coefficients between 24hR methods ranged from 0.40 to 0.70 for energy and macro nutrients and from 0.29 to 0.51 for micro-nutrients, except for calcium (0.23). Reproducibility for intake of energy and nutrients was comparable for both 24hR methods.
Conclusion: Dietary intake assessed with Catch-24 was slightly lower for

energy and almost all nutrients, compared to pen-paper 24hRs, with predominantly acceptable to good correlations. Subsequently, pen-paper 24hRs seem to overestimate compared to urinary protein, which may suggest that Catch-24 24hRs are more accurate than pen-paper 24hRs. Overall, Catch-24 was easy-to-use and guided the interview process, and therefore supported the overall estimation of dietary intake. Catch-24 has the potential to significantly reduce the researcher burden in diet-related studies in LMIC and is a valid tool to assess dietary intake.

P2-F-36 FEASIBILITY STUDY ON ACCEPTABILITY AND LIMITATIONS OF SELF-ADMINISTRATED 24-HOUR RECALL IN VARIOUS AGE CATEGORIES IN THE SWISS CONTEXT USING ASA24

Aline Troxler [1], Corinne Jotterand Chaparro [2], Sophie Bucher Della Torre [2]

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Introduction: Dietary intake assessment tools should be accurate and user-friendly. The gold-standard CAPI and CATI-based 24-hour recall (24HDR) is burdensome. Self-administered 24HDRs provide greater flexibility and faster completion. This study assessed the acceptability and usability of the self-administered 24HDR ASA24, alongside the technological literacy of different age groups in Switzerland, to identify challenges for a new national nutrition survey tool.
Methods: In 2022, validated, multilingual, licensable 24HDR tools available in a Swiss national language were reviewed. The French Canadian ASA24 was selected for its detailed data collection, automatic feedback, and similarity to the Swiss GloboDiet software in use. Participants included adults (18–64 years), parents of children (3–6 years), adolescents (13–17 years), and seniors (65+ years), who completed: i) two non-consecutive 24HDRs via ASA24, ii) an online survey including the System Usability Scale (SUS), and iii) a semi-structured interviews in a subgroup.
Results: Of 92 participants, 80 completed the study. Overall, 73% completed ASA24 via computer, while 58% of adolescents used smartphones, 71% of whom needed parental assistance. The mean SUS score was 65±17, scoring between acceptable and good (58±24 for seniors, 71±17 for adults aged 18–35 years). Completion time averaged 35±18 minutes for the first 24HDR and 28±15 minutes for the second, with seniors taking in average (52±26 and 42±20 minutes). Length was rated as “far too long” by 15% of participants, particularly among those aged 35–64 years (24%). Interviews revealed positive feedback from parents, adolescents, and young adults (18–35 years), while adults (36–64 years) found the tool complex and time-consuming. Seniors had mixed opinions. Suggested improvements included entering quantities after choosing foods, simplifying, and adding recipes via web or photo.
Conclusion: The self-administered 24HDR ASA24 appears suitable for Switzerland, with adaptations to Swiss standards (e.g. unit of measurement). It was particularly effective for adults aged 18–35 years. Adolescents needed parental assistance, seniors took nearly twice as

long to complete, and adults aged 36–65 years showed less patience. Assistance via online desk sharing, CATI with photobook, or CAPI may improve usability for older aged groups. Adding features for faster food search, recipe entry, and direct quantity input could improve usability. These study results are considered in the new tool development.

P2-F-37 ACCEPTABILITY AND COST-COMPARISON OF THREE TECHNOLOGY-ASSISTED 24-HOUR DIETARY RECALL METHODS: A RANDOMIZED CROSSOVER FEEDING STUDY

Daniel G Belay [1], Megan Rollo [1], Clare Collins [2], Tracy McCaffrey [3], Clare Whitton [4], Sharon Kirkpatrick [5], Fengqing Zhu [6], Christina Pollard [1], Satvinder S Dhaliwal [1], Richard Norman [1]

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Introduction: Comparing the costs and respondent burden of administering 24-hour dietary recalls (24HR) provides crucial information for guiding decision making in population surveillance. There is limited published data on acceptability and costs associated with administering 24HR methods. The aim was to compare the acceptability and estimated cost in terms of participant time of three 24HR methods—Automated Self-Administered Dietary Assessment Tool-Australia (ASA24); Intake24-Australia (self-administered); and Image-Assisted Interviewer-Administered 24-hour recall (IA-24HR).
Methods: In a randomized crossover-controlled feeding study, participants (age 32 ± 11 years) consumed three meals on three separate days, followed by a 24HR on each subsequent day. Participants (n=128) who undertook all three 24HRs indicated acceptability and preferences for the methods. Based on a median hourly rate of AU$36.00, the cost of the time participants spent completing each method was estimated. For the IA-24HR, interview time was used, not including app installation or image upload time. The differences in the estimated costs by method were assessed using repeated measures ANOVA.
Results: Most participants were willing to undertake the 24HRs again (68.8% ASA24; 79.7% Intake24; 89.1% IA-24HR strongly agree/agree). Based on asking participants if they were to undertake a recall again, which recall method they would choose, 83 (64.8%) chose IA-24HR, followed by Intake24 (n=19; 14.8%), and ASA24 (n=4; 3.1%) with 19 (14.8%) willing to do any method and 3 (2.3%) preferring not to do a 24HR again. The estimated cost associated with the time spent completing recalls was AU$16.84 for ASA24, AU$12.97 for Intake24, and AU$10.88 for IA-24HR. Participants spent a total of 3481 minutes completing recalls using ASA24, costing AU$2,088.60. The total time completing recalls using Intake24 was 2680 minutes, costing AU$1,608.00, and the total time completing IA-24HR was 2248 minutes, costing AU$1,348.80. Tobit regression analysis showed a 6 times (β=−6.4; 95% CI: -8.11, -4.71) and 4 times (β= -4.7; 95% CI: -5.85, -2.46) lower cost associated with participant time when using IA-24HR and Intake24, respectively, as compared to ASA24.

Conclusion: These findings on acceptability and participant costs provide preliminary data on the cost associated with participants providing 24HR data. This analysis did not include researcher costs and future analysis should explore these factors.

P2-F-38 COMPARING SUGAR INTAKE FROM A STRUCTURED QUESTIONNAIRE AND A 24-HOUR RECALL: INSIGHTS FROM THE ENANI-2019-BRAZILIAN SURVEY

Elisa Lacerda [1], Letícia Carneiro [1], Natália Oliveira [1], Raquel Schincaglia [2], Nadya Alves-Santos [3], Gilberto Kac [1], Sandra Crispim [4]

[1] Federal University of Rio de Janeiro, [2] Federal University of Goias, [3] Federal University of Pará, [4] Federal University of Paraná

Introduction: The consumption of added sugars has been associated with detrimental health effects in children. Brazilian health authorities advise against sugar consumption for children under 2 years old and recommend limiting sugar intake after that. Estimating sugar consumption is challenging due to the difficulty of accurately recalling eating habits. We aim to compare sugar consumption using two sources: a structured questionnaire (SQ) and a 24-hour dietary recall (24HR), both derived from the Brazilian National Survey on Child Nutrition (ENANI-2019).
Methods: ENANI-2019 is a household survey on food and nutrition for children under 5 years, conducted in 123 municipalities across all 26 Brazilian states and the Federal District. SQ included 40 questions designed to develop indicators of children's feeding practices, as proposed by the World Health Organization. A 24-hour application was developed for ENANI-2019 utilizing the USDA's multiple-pass method. Sugar consumption in the SQ was assessed based on caregivers' positive response to the addition of sugar/honey/syrup to meals. For the 24HR, we considered the presence of sugar/honey/syrup in the reported foods.
Results: In Brazilian children under 5 years, the frequency of consumption of sugar based on the SQ was 30.1%, with significantly higher rates in the North (43.2%) and Northeast (32.6%) compared to the Southeast (23.1%), South (20.1%), and Midwest (20.1%). The 24-hour data indicate an overall consumption frequency of 14.7%, with significantly higher consumption frequency in the North (17.1%), Northeast (17.6%), and Southeast (16.2%) in contrast to the South (7.2%) and Midwest (6.6%).
Conclusion: The difference in sugar intake between the SQ and 24HR methods indicates that the 24HR method may not accurately reflect true sugar consumption. Underreporting of sugar intake in 24-hour dietary recalls is still an issue, despite the list of commonly forgotten foods (USDA step 2). Researchers need improved methods for accurately assessing dietary sugar intake from participants. For ENANI-2024, the team has chosen to inquire about sugar consumption whenever caregivers mention the consumption of milk or fruit-based preparations, such as porridge or juices, without referencing sugar. Improving how we measure dietary sugar intake will enhance our understanding and monitoring of children's sugar consumption.

P2-F-39 ESTIMATING ANIMAL AND PLANT PROTEIN INTAKE IN DIET MEASURED BY ASA24 - FINDINGS FROM THE IDATA STUDY

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Introduction: Despite great interest in the health benefits of plant over animal protein intake, animal (AP) and plant protein (PP) intake estimates are not available from the online self-administered 24-hour recall (ASA24), a commonly used dietary assessment instrument in the US. We report a protocol for estimating AP and PP intakes in ASA24.
Methods: Over 12 months, 452 women and 444 men aged 50-74 years from the Interactive Diet and Activity Tracking in AARP (IDATA) Study completed up to six ASA24s (2011 version). A total of 4,942 ASA24s were available for analysis. Foods, nutrients, and MyPyramid equivalents were estimated using the USDA Food and Nutrient Database for Dietary Studies (FNDDS) (version 4.1)/USDA National Nutrient Database for Standard Reference (SR22) and the USDA MyPyramid Equivalents Database (MPED) (version 2.0).
Results: A total of 3,171 unique foods were consumed in our population. We first identified the foods with a single protein source (plant or animal) vs. mixed source using the MPED output. For single-source foods (n = 604), protein was assigned as AP or PP based on the source. For mixed-source foods (e.g., fruit yogurt, n = 2567), an FNDDS 4.1-SR22 linkage file was used to break down the FNDDS codes to ingredient level foods (SR codes). Then, AP or PP values for the single source SR ingredient codes (n = 1,493) were assigned. For mixed-source single SR ingredient codes (e.g., canned mushroom soup, n = 270) that could not be broken down any further, we used the Nutrition Data System for Research (NDSR) database that has information on AP and PP content to find the best appropriate match. Unmatched mixed-origin SR ingredients (n = 11) were assigned a protein composition of 50% AP and 50% PP. Using the proposed protocol, mean AP and VP intake in this population was 47.4 g/d (95%CI: 46.0, 48.9) and 24.9 g/d (24.5-25.3), respectively. The protein estimated by this protocol was 79.9 g/d (95% CI: 78.8-80.9). The mean difference in total protein intake between the original ASA24 estimate [80.3 g/day (95% CI: 79.26-81.34)] and our estimate was -0.48 g/d (SD=2.69). The proportion of foods with new protein estimates that were 15% smaller or greater than the original ASA24 estimate were 1.6% and 2.6%, respectively.
Conclusion: The newly proposed protocol for estimating AP and PP generated total protein intake that was similar to the original value and can be used in future ASA24 studies on the health effects of protein quality.

P2-F-40 ACTIVITIES COMPLETED OVER TIME IN 24-HOURS (ACT24): INSTRUMENT DESIGN, VALIDATION, AND APPLICATION

Charles Matthews [1], Sarah Keadle [2], Erikka Loftfield [3], Alaina Shreves [4], David Berrigan [5]

[1] National Cancer Institute, National Institutes of Health, [2] California Polytechnic State University, [3] Division of Cancer Epidemiology & Genetics, National Cancer Institute, National Institutes of Health, [4] University of Oxford & National Cancer Institute, [5] US NCI Division of Cancer Control and Population Sciences, Behavioral Research Program

Introduction: Activities Completed over Time in 24-Hours (ACT24) is a freely available internet-based previous day recall system that is an efficient and valid method to capture detailed estimates of sedentary time and physical activity. It is suitable for large epidemiologic studies, population surveillance, and evaluation of intervention studies. Instrument design, validation, and selected applications of the instrument will be discussed.

Methods: ACT24 was developed by an interdisciplinary team at the US National Cancer Institute. It is a self-administered instrument that asks participants to provide open-ended reports of how they spent their time in the previous day by selecting from ~190 individual activities organized in 15 major categories (e.g., Household, Work, Exercise). Estimates of sleep, sedentary time, and physical activity are calculated in real time, including the type/context (i.e., domain) for each activity, similar to the American Time-use Survey lexicon. Each activity is linked to the Compendium of Physical Activities, enabling estimation of daily energy expenditure overall, and for physical activity alone. ACT24 has been evaluated against objective criterion measures and has been deployed in nationwide surveys in the US.

Results: In comparison to doubly labeled water, accelerometers, and direct observation ACT24 has been shown to be accurate at the group level with good correlations (r=0.50-0.65), including for domain specific activities (e.g., work, transport, leisure) versus criterion measures. Use in nationwide surveys demonstrated efficiency by collecting more than 1,000 recalls/wk with a high completion rate. These surveys estimate that United States (US) adults spend about 60% of their waking day (9.5 hrs/d) sedentary mostly accumulated at home, work, and during leisure-time. Results also suggest that 39% of US adults are physically active (PAL > 1.6) on a given day, and most physical activity in the population is accumulated at home and work, with just a modest contribution from exercise.

Conclusion: The ACT24 system is an efficient and valid method to capture detailed estimates of sedentary time and physical activity at the population level. The instrument is freely available for use and previously collected nationwide data are available for secondary analysis (search NCI ACT24 for details).

Poster Session 2-G

WEARABLES, MOBILE DEVICES, AND IMAGES

Tuesday, April 29 | 3.00pm - 4.30pm

Location: Convention Level Foyer

P2-G-41 COMPARISON OF SELF-REPORTED VS. OBJECTIVELY ASSESSED MEAL AND SNACK FREQUENCIES ON WEEKDAYS AND WEEKENDS

Carly Von Halle [1], Beatriz Dos Santos Bechara [1], Edward Sazonov [2], Tonmoy Ghosh [2], J. Graham Thomas [3], Janine A. Higgins [4], Megan A. McCrory [5]

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Introduction: Eating frequency, snacking, and meal skipping may influence or associate with energy intake, obesity, and chronic disease risk. Obtaining accurate measurements of such eating patterns is challenging. Questionnaires are often used to assess meal and snack frequencies due to ease and cost-effectiveness; however, few have been validated. We compared meal and snack frequencies obtained via two simple questions with those from a wearable camera, hypothesizing no significant difference between methods.

Methods: Participants (n=42; aged 18-60 y; BMI 27-45 kg/m²) with overweight and obesity used a wearable camera (Automatic Ingestion Monitor v2, or AIM-2) for 7 consecutive days. AIM-2 images were annotated for eating occasions (breakfast, lunch, dinner, and snacks), and meal and snack frequencies were calculated separately for weekdays (WD) and weekends (WE). At the end of the 7 days, participants also completed a questionnaire on eating habits over the past 1 month, which included two simple questions: 'How many main meals do you usually have on a typical weekday? On a typical weekend?' and 'How many times a day do you usually snack on a typical weekday? On a typical weekend?' Most data were not normally distributed; therefore, measures of central tendency are reported as medians. The non-parametric Wilcoxon signed rank test was used to compare results between the two methods.

Results: Preliminary results were available for n=30 (21F, age 42.0±13.1 y, BMI 33.8±4.7 kg/m^2). Self-reported meal frequencies were 3.0 on both WD and WE and did not differ significantly from those measured by the AIM-2 (2.4 and 2.5, respectively). Self-reported snack frequencies were 2.5 on WD and 3.0 on WE and differed significantly from AIM-2 assessed snack frequency only on WE (WD: 2.5; WE: 2.0) (p=0.019). When the analysis was limited to participants who were compliant with wearing the AIM-2 (n=12), defined as wearing the device for ≥8 h/d and having ≥ 2 eating occasions/d on all 7 days, there were no significant differences between the two methods on WD or WE. Results were similar whether Fridays were considered a WD or a WE day. Median AIM-2 wear duration was 11h, 28m in all participants and 13h, 1m in compliant participants.

Conclusion: Simple questions may be used to obtain crude data on eating frequencies and rank participants accurately relative to objective assessment. Additional studies in larger sample sizes are warranted.

P2-G-42 DIETARY INTAKE ASSESSMENT IN RURAL AND URBAN GHANAIAN MOTHERS USING WEARABLE CAMERAS COMPARED WITH WEIGHED FOOD RECORDS

Prince Osei [1], Megan A. McCrory [2], Matilda Steiner-Asiedu [3], Tom Baranowski [4], Edward Sazonov [5], Tonmoy Ghosh [5], Viprav Raju [5], Mingui Sun [6], Wenyan Jia [6], Gary Frost [7], Benny Lo [8], Daniel Hall [9], Jingying Gao [9], Christabel Domfe [10], Sina Gallo [11], Alex Anderson [11]

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Introduction: Traditional self-report dietary assessment methods are prone to misreporting mainly due to their lack of objectivity. However, accurate dietary intake data are essential for monitoring dietary habits, examining associations between diet and disease risk, and developing strategies to manage nutrition-related health conditions. The Automatic Ingestion Monitor v2 (AIM-2) (a wearable camera worn on eyeglasses) and e-Button (worn on neck lanyards or chest area) have the potential to improve upon the limitations of traditional dietary assessment methods. We compared energy and nutrient intakes (macronutrients, fiber, iron, and folate) in eating occasions measured using AIM-2, e-Button, and image-assisted 24-hour dietary recall (IA24-HR) with those from researcher-conducted weighed food records (rWFR).
Methods: This cross-sectional study used a purposive sample of 54 mothers (26 rural, 28 urban). The rWFR, AIM-2, e-Button, and IA24-HR assessed eating occasions during breakfast, lunch, and dinner on 2 weekdays and 1 weekend day. Nutritional analysis was conducted using custom AIM Annotation Software, programmed with West African, Kenyan, Ugandan, and USDA food composition databases. Seven dietary variables (energy (kcal), carbohydrate (g), fat (g), protein (g), fiber (g), iron (mg), and folate (mcg)) were examined. Mean intakes were compared across AIM-2, e-Button, IA24-HR, and rWFR by performing repeated measures of variance analysis.
Results: Mean (SD) ages (years) were 35.8 (11.6) for rural mothers and 44.4 (7.6) for urban mothers. Pairwise comparisons showed significant differences between pairs of methods, except for the following: IA24-HR vs e-Button for rural mothers' energy ($p = 0.633$) and urban mothers' fat ($p = 0.701$) from dinner, urban mothers' energy ($p = 0.098$), protein ($p = 0.944$), and fiber ($p = 0.117$) from breakfast; AIM-2 vs rWFR for rural mothers' energy from breakfast ($p = 0.228$), urban mothers' fat from breakfast ($p = 0.625$), and urban mothers' folate from lunch ($p = 0.125$).

Conclusion: Generally, there were significant differences in mean intakes by method of assessment. The AIM-2, IA24-HR, and e-Button underestimated intakes compared to rWFR; however, AIM-2 provided estimates closest to rWFR. The findings highlight the need for further improvement and exploration of the wearable cameras for dietary assessment in Ghanaian mothers

P2-G-43 PROVIDE OR BRING YOUR OWN WEARABLE DEVICE? DIFFERENCES IN REPRESENTATION, COMPLIANCE AND ADHERENCE AMONG PARTICIPANTS IN THE ALL OF US RESEARCH PROGRAM

Heidi Guyer [1], Carlos Macuada [1], Margaret Moakley [1]

[1] RTI International

Introduction: The goal of the All of Us Research Program (AoU) is to enroll 1,000,000 individuals to advance health care with a focus on populations typically underrepresented in research. AoU began in 2018 and currently includes close to 850,000 participants. Participants are asked to share their health records, complete surveys, and provide biological samples. In 2019, AoU expanded data collection to include wearable fitness trackers using a Bring-Your-Own-Device (BYOD) approach. Participants who already owned a Fitbit device could link their Fitbit data to the AoU database; over 15,500 have provided data to date. Fitbits were provided to 10,000 participants in 2021 to achieve the goals of diverse representation. Heart rate and physical activity data were first released in 2022, followed by data from additional participants and sleep measures in April 2023. Data from those that were provided a Fitbit will be released at the end of January 2025.
Methods: Sociodemographic characteristics of the BYOD group will be compared with those who were provided a Fitbit. Characteristics will include age, gender, race/ethnicity, education, and income level, as well as self-reported health status. Differences in compliance and adherence will be assessed, including consent rates, average wear time, and average days per month and minutes per day. Differences in physical activity, heart rate, and sleep duration and quality will be compared between the two groups.
Results: The BYOD Fitbit users are more likely to be White, female and in older age groups than represented in the AoU participant population. Participants who were female, younger, Black, Hispanic, and of lower education or income wore the device fewer days per month and minutes per day. Participants reporting better health status were more compliant and wore the device more days per month and minutes per day and per night than those who reported fair or poor health status. These analyses will be enhanced with the new data released from those participants provided with a Fitbit.
Conclusion: These findings will help inform future research to determine the potential differences that may occur when either a BYOD, device provision, or both strategies are used. Additionally, there is a need for

researchers to better understand the factors related to adherence to develop study design strategies to reduce respondent burden and improve adherence and representation in health research.

P2-G-44 USABILITY OF A MOBILE APPLICATION FOR DIETARY ASSESSMENT OF BRAZILIAN SCHOOLCHILDREN - CADE – FOOD CONSUMPTION AT HOME AND AT SCHOOL

Marina Araujo [1], Anelise Navi De Lima [2], Thaís Silva Santos [2], Maria Luiza Damasceno Martins [1], Jennifer Calazans Da Conceição [2], Diana Barbosa Cunha [3], Bárbara Da Silva Nalin De Souza [4], Josilene Valporto Do Nascimento [2], Olibário José Machado Neto [5]

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Introduction: Assessing food consumption during childhood is essential for understanding nutritional status and preventing diseases later in life. However, dietary assessments in schoolchildren face challenges due to their physical, cognitive, and emotional development, as well as the onset of dietary autonomy. While technological advancements have made data collection easier, there are still few tools tailored for this age group in Brazil. To address this gap, we developed the mobile application CADE (Food Consumption at Home and at School), which integrates dietary assessments in both school and home settings. This study aimed to evaluate the usability of the CADE application among schoolchildren.
Methods: Two schools in Niterói, Rio de Janeiro, Brazil, were conveniently selected for the study. The usability test involved evaluating the application's interfaces in both school and home environments, conducted by 50 undergraduate or recent nutrition graduates and 14 parents or guardians of the children, all selected for convenience. In the school setting, users reported the child's dietary intake by recording a meal consumed at school. At home, a 24-hour dietary recall was utilized. We applied the System Usability Scale (SUS) questionnaire, which consists of 16 questions to assess user experience, yielding a score from 0 to 100, classified from F (highly negative perception) to A (highly positive perception).
Results: The average SUS scores were approximately 78 in the school environment and 70 in the home environment, resulting in an overall average score of about 76. Based on user experience classification, the overall assessment of the application and the interfaces for both environments were rated as C (good usability). The non-response rate among users in the home setting was notably high at 70%.
Conclusion: The CADE application demonstrated good usability, particularly among users in the school environment. To enhance the reporting of children's dietary consumption in the home setting, strategies to increase user engagement are necessary. The findings will inform further improvements to the application.

P2-G-45 HARNESSING ARTIFICIAL INTELLIGENCE TO IMPROVE DIETARY ASSESSMENT FOR PRECISION NUTRITION

Christabel Domfe [1], Aulo Gelli [2], Boateng Bannerman [3], Silas Bempong [4], Peter McCloskey [5], Charles Arnold [1], Gloria K. Folson [3, 4], David P. Hughes [5], Lauren E. Au [1]

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Introduction: Technologies for precision nutrition research are in high demand in part because nutrition impacts the health of individuals differently. However, the effectiveness of precision nutrition research can be hindered by a lack of accurate tools and the reliance on time-intensive methods for assessing individual dietary intake. Leveraging artificial intelligence (AI) has the potential to enhance the accuracy of dietary intake assessment. The objective was to conduct a pilot study of the PlantVillage Food Recognition and Nudging Insights (FRANI) mobile AI application by capturing images, recording portion weights of commonly consumed foods, and performing image annotation.

Methods: Data collection occurred in the University of California Davis Dining Commons (DC) during the summer of 2024, following a 2-week menu cycle. It involved image capture and weighing of foods in two waves: Wave 1 consisted of real-life images of foods taken right before consumption, while Wave 2 consisted of images taken in two contexts – single foods in four standard portions and combination foods as they are typically eaten. Seasonal foods that were not served during the summer are being captured in the fall and winter quarters to expand the food database further. Image annotation and subsequent semantic segmentation model training are currently underway to train PlantVillage FRANI to recognize foods in images.

Results: Approximately 4,000 images representing 251 food classes, along with food portion data (in grams), were collected during the 2024 summer menu cycle. The initial semantic segmentation model was trained with 984 annotated images and achieved a Mean Intersection over Union (MIOU) = 0.441. While these initial results were promising, visual inspection of the prediction masks suggested that additional Wave 1 training images would help further improve the model's performance.

Conclusion: Collaboration with the dining commons demonstrated the ease and feasibility of collecting food data in a U.S. college setting to train the AI model. The outcome of this pilot will set the stage for a validity study that compares the accuracy of FRANI to weighed food records and a feasibility study that will investigate the effectiveness of FRANI for future precision nutrition interventions.

Poster Session 2-H

FOOD ENVIRONMENTS, PURCHASING, AND PRICES

Tuesday, April 29 | 3.00pm - 4.30pm

Location: Convention Level Foyer

P2-H-46 USING PUBLIC DATA TO DESCRIBE SCOTLAND'S FOOD ENVIRONMENT

Deksha Kapoor [1]

[1] *The University of Edinburgh*

Trainee Poster Presentation Award Nominee

Introduction: The environments where people live influence their health behaviors, including their diets. Differences in food environments may be contributing to health disparities in Scotland, but no study has described them nationally. The study objectives were to (1) characterize food outlets across Scotland and (2) explore how food outlets vary by neighborhood deprivation.

Methods: Public data of food businesses registered in Scotland in 2024 (n=31,257) were from the Food Standards Agency. We manually categorized businesses as out of home (OOH, including restaurants, pubs, cafés, and takeaways), retail (including supermarkets and other establishments that primarily sell non-food products and a very limited range of food products such as pharmacies) or other (mobile caterers, charity organizations and home caterers). Differences in the proportion of OOH and food retail versus other outlets between quintiles of neighborhood deprivation were evaluated using a chi-square test. Neighborhood deprivation was quantified using the Scottish Government's official tool, the Scottish Index of Multiple Deprivation, calculated using data from seven domains: income, employment, education, health, access to services, crime, and housing.

Results: In Scotland, 59% of food outlets were OOH, 29% were retail, and 13% were other. The density of OOH outlets was more than double that of retail (1.9 per km^2 versus 0.8 per km^2, respectively). Glasgow City had the greatest number of food outlets (n=5,000), including OOH (n=3,222) and retail (n=1,137), and the highest density of OOH outlets, 9 times higher than the national average (18.4 per km^2). Argyll and Bute, Western Isles, and Highland had the lowest OOH (0.03 per km^2 for all three local authorities) and food retail (0.01, 0.02, 0.03 per km^2, respectively) density. On average, the least deprived neighborhoods had a greater proportion of OOH outlets than the most deprived neighborhoods (64% versus 57%, respectively) and lower proportion of food retailers (24% versus 32%), $p<0.001$.

Conclusion: In an average square-kilometer of Scotland, OOH outlets far outnumber food retail outlets and this is true even in the least deprived neighborhoods. Policies are needed to stop the flood of unhealthy food options across all of Scotland.

P2-H-47 ENHANCING NUTRITION EQUITY: ASSESSING & TRANSFORMING PEEL REGION'S FOOD ENVIRONMENT FOR OPTIMIZING HEALTH

Mavra Ahmed [1], Daniel Sellen [1], Chloe Camacho [2], Anuoluwa Popoola [3], Hayun Jeong [4], Mary L'abbe [4]

[1] Joannah and Brian Lawson Centre for Child Nutrition, University of Toronto, [2] Dalla Lana School of Public Health, University of Toronto, [3] Temerty Faculty of Medicine, University of Toronto, [4] Department of Nutritional Sciences, King's College London

Introduction: The Peel Region in Ontario is particularly impartial to immigrants but has the highest prevalence of type 2 diabetes (T2D) at 15.5% compared to the rest of Canada (10%) or Ontario (9.8%). Research on municipal food environments is limited, with few studies assessing barriers and enablers of healthy eating for culturally and linguistically diverse groups. The Peel Environment Action on Food (PEAF) project is a community-based evaluation to characterize Peel Region's current food environment in terms of the availability, nutritional quality, and affordability of healthier versus less healthy foods, and assess the barriers and facilitators to healthy eating to better inform equitable policies impacting diet and subsequently, health outcomes.
Methods: Leveraging the Food Label Information and Price (FLIP), a database of Canadian pre-packaged branded food and beverage products, the nutritional quality and prices of foods available in ethnic supermarkets were assessed. Nutritional quality was analyzed using Health Canada's High-in Front of Pack Labelling thresholds (HI-FOPL). A culturally sensitive nutrition knowledge, attitudes, and behaviour survey was developed and validated, using literature reviews, adaptations of current survey tools, and expert review.
Results: 55% of ethnic grocery store items would have at least 1 or more HI-FOPL, with certain food categories displaying a higher percentage of all three HI-FOPL (e.g., dairy). Products with HI-FOPL were higher in price compared to products with 1 or none HI-FOPL. A culturally sensitive nutrition KAB survey was organized by knowledge, attitudes, beliefs on healthy eating, barriers, facilitators, accessing, and chronic diseases. Nutrition experts identified relevance, clarity, and comprehensiveness of each question item.
Conclusion: Findings identify areas of intervention to improve nutritional quality for ethnic grocery food products and development of equitable measurement tools to understand the lived experiences of culturally and linguistically diverse groups. This study has implications on the design of locally applied and culturally relevant resources and interventions in transforming the food environment for T2D prevention and management.

P2-H-48 USING CITIZEN SCIENCE TO EXPLORE BARRIERS AND FACILITATORS FOR HEALTHY FOOD HABITS AND ACTIVE TRANSPORTS AMONG OFFICE WORKERS

Katarina Bälter [1], Oskar Halling Ullberg [1], Abby C. King [2], Susanna Toivanen [1]

[1] Mälardalen University, [2] Stanford Prevention Research Center, Department of Medicine, Stanford University School of Medicine

Introduction: Today, much is known about the benefits of healthy and pro-environmental food habits and active transports to promote good health and wellbeing. However, facilitating the shift towards more sustainable lifestyle is still a challenge. The socio-ecological model states that individual behaviors at work are shaped by the interactions between individuals and their environments. Thus, this study used citizen science to gain insights into which elements of the built, social, and organizational environment in the workplace and surrounding neighborhoods were perceived as barriers to or facilitators of healthy and sustainable behaviors at work.
Methods: Participants in the eight-week Sustainable Office Intervention pilot study (SOFIA) (n=33) were cluster-randomized into an experimental arm (sustainable lifestyle) or a control intervention arm (healthy lifestyle). They used the Our Voice Healthy Neighborhood Discovery Tool mobile app to document contextual elements at their workplaces.
Results: In total, 114 photos and text-based narratives were recorded, and four themes emerged: built environment, building design, office ergonomics, and food and beverages. Eighteen percent of the photos were linked to pro-environmental behaviors, all exclusively captured by the experimental arm. Twelve barriers and solutions for improving the workplace environment were identified during discussions with participants in both arms.
Conclusion: The findings provide insights for designing office spaces and urban planning to promote healthier and more sustainable lifestyles for office workers, with a focus on healthy food habits and active transports.

P2-H-49 REGIONAL DISPARITIES IN FOOD CONSUMPTION AMONG URBAN BRAZILIAN ADULTS ACCORDING TO COMMUTING TIME TO WORK

Gabriella Costa [1], Ana Carolina Mululo [1], Marina Araujo [1]

[1] Fiocruz

Introduction: Considering the relationship between workers' quality of life, urban mobility, and food consumption, this study aims to describe regional differences in food consumption among the urban adult population in Brazil according to commuting time to work (CTW).
Methods: This cross-sectional study used data from the 2017-2018 Family Budget Survey, including 17,141 adults in urban areas. CTW was categorized into four groups (≤5min; 6-30min; 31min-1h; >1h). Data from the first 24-hour recall from the National Dietary Survey were analyzed. The mean per capita consumption of 19 food groups and confidence

intervals were calculated by CTW categories across Brazil's five regions. The analysis was adjusted for confounders including sex, age, skin colour, income, and education. SAS software was used, considering sample complexity and weighting factors.
Results: The Southeast region had the highest proportion of long commuting times (CTW > 1 hour) and the lowest of short CTW (up to 30 minutes), indicating a higher average CTW. In contrast, the South had shorter average CTWs. Statistically significant differences in mean per capita consumption by CTW were found for fruits, meat, and root vegetables. In the Central-West, adults with the shortest CTW consumed 70% more fruit than those with a 6-30-minute CTW (92g vs. 54g). In the Southeast, the shortest CTWs had 50% higher fruit consumption than the longest (69g vs. 47g), and in the South, the difference between short and medium CTW was 70% (104g vs. 60g). Meat consumption in the Northeast was 40% higher in the 6-30-minute CTW compared to the longest CTW (65g vs. 47g). In the North, root vegetable consumption was three times higher in the shortest CTW compared to the longest (17g vs. 4g). No significant differences in adjusted mean per capita consumption were observed across the five regions of Brazil.
Conclusion: There are regional disparities in food consumption among Brazil's urban population according to commuting time to work, likely influenced by sociodemographic factors such as skin colour, income, and education.

P2-H-50 MEAL DELIVERY APP: EVALUATION OF PROMOTIONAL OFFERS IN BRAZILIAN CONTEXT

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Introduction: The use of meal delivery apps (MDAs) has become part of the practice of purchasing food prepared outside the home in recent years. The availability of offers on apps and the influence of sales and advertising resources can influence user's food habits. The objective of this abstract was to evaluate food offer changes in a delivery app for food prepared outside the home between 2021 and 2023.
Methods: Data were from a longitudinal study that evaluated promotional offers of a food delivery app, in three-time intervals and for seven consecutive days, in two periods: during the social isolation of the COVID-19 pandemic (2021) and at the end of the pandemic (2023). We evaluated 14,363 promotional offers (6,021 in 2021 and 8,342 in 2023) in a Brazilian food delivery app.
Results: The fast-food combo category represented the majority of offers in both 2021 and 2023, being offered more often at night. Sugar-sweetened beverages increased in 2023 (from 0.8% to 14.4%), although fast-food combos decreased (from 50.9% to 39.6%). There was an increase in the frequency of promotions for sweets and cookies and a decrease in the frequency for main meals and alcoholic beverages. The

frequency of main meals was concentrated in the morning and afternoon in both years and, in 2023, on weekdays. The chance of offering ultra-processed food was 1.47 times higher on weekends and evenings compared to other days of the week and times of day.
Conclusion: There was an increase in the total number of promotional offers and, despite the reduction in fast-food combos, there was an increase in the offers of sugar-sweetened beverages and sweets and cookies, confirming that the digital food environment of delivery apps for food prepared outside the home resembles an obesogenic food environment.

P2-H-51 INDICES OF DIETARY QUALITY FOR THE ASSESSMENT OF SCHOOL FOOD PROGRAMS' NUTRITIONAL QUALITY IN CANADA

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Introduction: While the potential of school food programs (SFPs) to influence healthy eating behaviors and improve child health outcomes is recognized globally, Canada's national school food policy was only recently released in 2024 and has yet to be implemented. The decentralized nature of SFPs across Canada has resulted in a limited understanding of their nutritional quality. This study aims to identify priority areas for improvement in the current school food landscape by 1) proposing a method of SFP nutritional quality assessment and 2) providing a baseline of SFP nutritional quality before federal policy implementation.
Methods: SFP menu data were collected from school food providers across Canada. The mean content of nutrients of public health concern (sodium, total sugars, saturated fat, iron, calcium, and protein) were calculated and two indices of dietary quality representing adherence to national nutrition guidelines were modified as necessary and applied to SFP menu data: the Healthy Eating Food Index 2019 (HEFI-2019) reflecting adherence to the 2019 Canada's Food Guide (CFG) and the Healthy Eating Index Canada (HEI-C) 2010 reflecting adherence to the 2007 CFG.
Results: Nutritional quality results from 70 SFPs serving over 20% of Canadian schools revealed approximately 51% adherence to the 2019 and 2007 CFGs, which is similar to whole day diet quality in school-aged populations. Vegetables and fruits accounted for the greatest proportion of a meal across all meal types, while plant-based proteins were consistently low. Snacks tended to be high in total sugars but low in protein, and sodium was high across all meal types.
Conclusion: Given the limited resources and capacity of Canadian SFPs, these findings indicate that though school food providers are serving relatively healthy choices, a federally harmonized school food policy and program (including the development of national school food guidelines) can further improve the nutritional quality of school meals in Canada.

P2-H-52 FACTORS INFLUENCING FREE SCHOOL MEAL UPTAKE AND DIETARY CHOICES IN CHILDREN: A SYSTEMATIC REVIEW GUIDED BY THE SOCIO-ECOLOGICAL MODEL

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Introduction: Food insecurity, defined as not having enough money to buy food, is prevalent among children in many countries. Free school meals (FSM), which are means-tested in the UK, aim to reduce food insecurity, improve nutrition, and address dietary inequalities. However, despite increasing FSM eligibility in the UK (15.4% in 2019 to 20.8% in 2021), uptake remains suboptimal, with significant school-level variability. Around 20% of eligible pupils do not participate, potentially limiting the impact of this intervention. Factors such as stigma, school systems, eating environments, and social dynamics influence uptake. FSM represent a vital source of nutrition for food-insecure children, but the extent to which they impact overall diet quality is unclear. This review aims to identify factors influencing FSM uptake and explore its impact on children's dietary outcomes. The systematic review will investigate the individual, interpersonal, organizational, community, and policy-level factors influencing FSM uptake among children aged 4-18 years and assess how FSM participation impacts diet quality.

Methods: This systematic review, guided by PRISMA-P, uses the Socio-Ecological Model to categorize factors affecting FSM uptake and dietary choices. A comprehensive search will be conducted in MEDLINE, EMBASE, Web of Science, and other databases, supplemented by grey literature from organizations such as the UK Department for Education and The Food Foundation. Eligible studies (quantitative, qualitative, or mixed methods) published from 2004 onwards in high-income countries with school meal systems comparable to the UK will be included. Quantitative studies will provide statistical associations, while qualitative data will offer contextual insights into key drivers. Results will be synthesized using thematic analysis. Meta-analysis will be conducted where appropriate.

Results: This review will provide evidence on factors influencing FSM uptake and its effects on dietary quality. Findings will inform school, local authority, and government-level interventions, including improved policies to increase FSM participation and reduce stigma. By identifying multi-level influences, this review has the potential to improve children's nutrition, address food insecurity, and reduce socioeconomic dietary inequalities in the UK and other high-income settings.

Conclusion: FSM are a cornerstone intervention to combat food insecurity and improve nutrition. By examining factors influencing FSM participation and the impact on diet, this review will provide actionable insights to strengthen FSM programmes, ensuring they are accessible, equitable, and effective.

P2-H-53 ADHERENCE OF MENU OFFERINGS IN LONG-TERM CARE TO THE 2019 CANADA'S FOOD GUIDE RECOMMENDATIONS ON HEALTHY FOOD CHOICES

Caroline Middleton [1], Jennifer Lee [2], Mary L'abbe [1]

[1] University of Toronto, [2] Toronto Metropolitan University

Introduction: The 2019 Canada's Food Guide (CFG) provides evidence-based recommendations on healthy eating, emphasizing the importance of vegetables, fruits, whole grains, and protein foods. Adhering to these guidelines is essential in long-term care (LTC) settings, where older adults with unique nutritional requirements rely on provided meals to support their overall health and well-being. Therefore, the objective of the study was to evaluate LTC menu adherence to CFG recommendations, using Healthy Eating Food Index-2019 (HEFI-2019) scores and nutrient targets for calories, protein, fibre, calcium, and key vitamins and minerals, including vitamin D, B12, B6, E, and K, as well as magnesium, potassium, folate, and zinc.

Methods: Daily LTC menus were assessed using the HEFI-2019 to evaluate adherence to the 2019 CFG. Nutrient content was analyzed by comparing the daily totals of key nutrients to intake targets, defined as meeting at least 75% of the Recommended Dietary Allowance (RDA) or Adequate Intake (AI). HEFI-2019 components, including vegetables and fruits, whole grains, protein foods, and beverages, were assessed, and the proportion of menus meeting the recommended nutrient targets was calculated.

Results: The average daily HEFI-2019 score for LTC menu offerings was 56.6 out of 80, with adherence varying significantly across components. While 50.4% of meals met the recommended intake for vegetables and fruits and 80.9% adhered to whole grain guidelines, protein food adherence was moderate at 60.5%, with plant-based proteins notably underrepresented at just 17.0%. Most menus met calorie and protein targets, while fibre intake was lower, with only 63.0% of meals meeting the guideline. Key nutrients like calcium, vitamin B12, and vitamin B6 had high adherence (96.3%), while vitamin D (7.4%) and vitamin E (3.7%) were significantly lower. Minerals such as magnesium, potassium, and zinc consistently met 100% of daily targets.

Conclusion: While LTC menus generally adhered to calorie, protein, and calcium recommendations, significant gaps were identified in fibre, vitamin D, and vitamin E intake. Despite some alignment with the CFG, greater emphasis is needed on incorporating more fruits, vegetables, and plant-based proteins to achieve full adherence to the guidelines. Adjusting menu planning to address these shortfalls could significantly improve the nutritional quality of meals and better support the health of LTC residents.

P2-H-54 FLEXIBLE INTERRUPTED TIME SERIES ANALYSIS TO DETERMINE CHANGES IN FOOD PURCHASE DATA BEFORE, DURING AND AFTER COVID-19 EPIDEMIC IN DIFFERENT POPULATION GROUPS IN FINLAND

Suvi Ahtinen [1], Reija Autio [1], Hannu Saarijärvi [1], Henna Vepsäläinen [2], Maijaliisa Erkkola [2], Mikael Fogelholm [2], Jaakko Nevalainen [1]

[1] Tampere University, [2] University of Helsinki

Introduction: During the COVID-19 epidemic, lockdowns, other security measures, and remote work changed our behavior in many ways that were also reflected by changes in food consumption. Our primary aim was to compare food purchasing overall and among different population strata defined by demographic and socioeconomic factors before, during, and after COVID-19 epidemic in Finland. Moreover, we investigated to what extent these could be explained by changes in food related behaviors and working life.
Methods: Food purchase data were obtained from the largest food retailer in Finland. We focused on the period from March 1, 2019, to October 31, 2023, and on participants whose self-reported loyalty to the retailer was more than 40% and who answered a questionnaire on food related behaviors during the pandemic. Weekly purchases of selected food groups were analyzed by interrupted time series models (ITS) with smoothing splines. Our algorithm combines population strata using a data-driven method and results in overall profiles as well as identification of strata with very different change profiles. Questionnaire data were used as explanatory variables in the model.
Results: ITS models with smoothing splines offered a flexible tool to understand changes in purchasing of food groups during the epidemic as well as the recovery time after the epidemic, and we found which population groups changed their behavior the most.
Conclusion: Food purchase data are powerful for understand changes over the COVID-19 pandemic in population food consumption. ITS models with smoothing splines can flexibly model differences in each stratum in shorter or longer term in different food groups. The analysis also allows explaining the differences in food related behavior and working life caused by lockdowns and other security measures.

P2-H-55 THE FINNISH LOCARD COHORT: A NATIONWIDE, LONGITUDINAL STUDY INVESTIGATING FOOD-RELATED BEHAVIORS THROUGH PARTICIPANTS' GROCERY PURCHASES

Anna-Leena Vuorinen [1], Anssi Nurminen [1], Satu Kinnunen [2], Henna Vepsäläinen [3], Jelena Meinilä [3], Elviira Lehto [2], Hannu Saarijärvi [4], Maijaliisa Erkkola [3], Mikael Fogelholm [3], Jaakko Nevalainen [4]

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Introduction: Grocery purchase data accumulated in retailers' loyalty programs hold vast potential to gain novel insights into our food-related

behaviors by providing objective, longitudinal, and high-resolution information that traditional research instruments cannot capture.
Methods: In collaboration with Finland's leading grocery retailer, with a 47.3% market share and nationwide coverage, we contacted members of their loyalty card program through email invitations. Members were invited to consent to their grocery purchase data being used for research and to respond to an online questionnaire covering topics such as socioeconomic status, loyalty (concentration rate of food purchases to the food retailer), and nutrition literacy. Grocery purchase data were pseudonymized and linked with the questionnaire. Each purchase record included the following information: product group (excluding brand level information), time stamp, quantity (kg), and expenditure (€). Food items were further reclassified for research purposes.
Results: The Finnish LoCard cohort consists of two separate subcohorts, LoCard II and LoCard III. LoCard II includes 47,066 participants with follow-up time for grocery purchases ranging from 2016-09-01 to 2018-12-31. LoCard III included 42,340 participants with follow-up from 2019-01-01 to 2024-12-31. Of these individuals, 36,621 (78%) and 37,220 (88%) responded to the questionnaire. In both subcohorts, women, middle-aged individuals, those with higher education, and employed individuals were overrepresented whereas individuals with lower education, those with children, and those under 30 years of age were underrepresented. We have conducted a thorough quality assurance by developing methodologies to address selection bias in relation to whole Finnish population, by comparing purchase data with a self-reported food frequency questionnaire, and by adjusting for individual food consumption. In addition, we have enriched the data by linking the food items with a national food composition database to obtain nutrient contents and with environmental impact data.
Conclusion: The Finnish LoCard cohort includes almost 90,000 individuals with grocery purchases over an 8-year period, capturing significant societal changes such as COVID-19 pandemic and high inflation. The cohort includes diverse SES groups that are frequently underrepresented in health studies. Future plans include data linkages with novel data sources.

P2-H-56 ASSESSING FREE SUGAR CONTENTS IN THE LOCARD FOOD PURCHASE DATA

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Introduction: Free sugars include any sugars added to food or drinks as well as sugars in honey, syrups, juices, smoothies, and similar products in which the structure has been broken down. Due to adverse effects of high intake, the updated Nordic Nutrition Recommendations 2023 instruct limiting the intake of free sugars to <10 E%. As naturally occurring and free sugars are chemically alike, many food composition databases are

unable to distinguish between them, and sucrose is often used as an indicator of free sugars. To address this challenge, we introduce formulas for calculating free sugar contents and compare them with sucrose contents.

Methods: We have obtained data covering the food purchases of 47,066 Finnish loyalty-card holders during 09/2016–12/2018. The data consisted of 3368 product groups classified into 31 larger categories. Of the product groups, 1377 (41%) were screened by nutrition scientists to include free sugars. Where applicable, we utilized pre-existing formulas developed by the research group to calculate the free sugar content of the product groups. For product groups without an appropriate existing formula (e.g., pizza, lasagna), new formulas were developed based on their nutrient contents and recipes. We averaged and compared sucrose and free sugar contents for all product groups.

Results: For most product group categories, sucrose and free sugar contents were fairly similar. For 11 categories (35%), sucrose content was clearly lower than the calculated free sugar content. An example is the category sweeteners, which includes artificial sweeteners, honeys, sugars, and syrups. By contrast, for six categories (19%), sucrose content was noticeably higher than the calculated free sugar content. This was the case for example for fruit and berries.

Conclusion: Sucrose can be used as a rough proxy for free sugar content for many food groups. However, depending on the food group, sucrose content may largely under- or overestimate the amounts of free sugars. Underestimation is likely for food groups that have large amounts of non-sucrose sugars, such as honey and syrup that are rich in fructose and glucose. For food groups with high amounts of naturally occurring sugars (e.g., fruit and berries), overestimation is probable. Thus, more detailed information on free sugar contents should be used whenever possible, especially when investigating frequently used food groups that include large amounts of non-sucrose sugars or naturally occurring sucrose.

P2-H-57 ADULTS' PERCEPTIONS OF THE 2022 FOOD PRICE CRISIS AND ITS IMPACT ON FOOD PURCHASING: A CROSS-SECTIONAL COMPARISON AMONG FIVE HIGH- AND UPPER-MIDDLE-INCOME COUNTRIES

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[1] Université Laval, [2] Institut sur la nutrition et les aliments fonctionnels (INAF), [3] University of Waterloo, [4] Deakin University

Introduction: Rising food prices are a major global concern, with food inflation reaching record levels in 2022. This study examined consumer perceptions of the changes in food prices from 2021 to 2022 and their impact on food purchasing in five countries.

Methods: Adults (≥18 years) from Australia, Canada, Mexico, the United Kingdom, and the United States (US) completed a cross-sectional online survey in 2022 as part of the International Food Policy Study (n=20,433).

Respondents indicated if they perceived that food had become more expensive for them in the last 12 months. Those reporting higher food costs then indicated whether, because of food prices, they bought more, less, or made no change to the quantities purchased of three core foods (CF) categories (fruits/vegetables; meat; milk/cheese) and four non-core foods (NCF) categories (snacks; desserts; non-alcoholic beverages; pre-prepared meals). Logistic regression models adjusted for age, sex, ethnicity, education, perceived income adequacy, presence of children in the household, and food security status were used to examine differences among countries.

Results: Overall, 82.8% of respondents indicated that food had become more expensive over the last year. Respondents in Mexico were more likely to report higher food prices than those in the US (AOR=1.23, 99%CI=1.01-1.50). Among respondents who reported higher food prices in the last year, 55.2% reported buying less of at least one CF because of food prices, while 76.2% reported buying less of at least one NCF. Respondents in Canada were the most likely to have purchased less of at least one CF in the last year due to food prices, followed by Australia ($p<0.009$ for comparisons with all countries). Participants from Mexico were most likely to have purchased less of at least one NCF in the last year ($p<0.001$ for comparisons with all countries).

Conclusion: Most adults perceived rising food prices across countries, which led to reduced CF purchases, potentially affecting food security and health. Even greater reductions in NCF purchases, could, however, have positive health implications. Policies supporting healthier food access during periods of high food costs remain essential.

P2-H-58 EXAMINING THE RELATIONSHIP BETWEEN DIET COSTS AND DIETARY INTAKES AMONG CANADIAN ADULTS

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Introduction: Dietary factors are a main risk for premature preventable death and disability. Diet costs have been proposed as a predictor of dietary adequacy. No Canadian study has made use of nationally representative dietary intake data and food price data to examine diet costs. The purpose of this study was to examine the association between diet costs and the adequacy of dietary intakes contributing to the burden of diseases among Canadian adults 19 years and older.

Methods: We used the reported intakes from a single 24-hour dietary recall as administered in the 2015 Canadian Community Health Survey-Nutrition to estimate energy density of intakes (kcal/g) and gram weight intakes of total fibre, sodium, fruits, vegetables, processed meats, and caloric beverages among the Canadian population, aged 19 years and older. The Canadian Consumer Price Index national long food price list was matched to food sources of intakes to estimate individual daily diet

costs (g/day). We fit seven linear regression models to examine the relationship between energy density and gram weight intake measures of the food groups and nutrients while controlling for socio-demographic factors that have been identified as independent influences on food expenditure.
Results: Daily diet costs varied significantly across the Canadian population, from an average of $4.86/day in the lowest tertile of diet cost, to $16.55/day in the highest tertile. Higher daily diet costs were associated with lower energy density of the diet, but also higher intakes of sodium and vegetables. When comparing intakes within tertiles of diet costs, the pattern was the same for energy density, sodium, and vegetables; those in the middle tertile of diet costs consumed significantly greater quantities (g) of fibre and fruits as compared to those in the lower tertile of diet costs. No significant differences were noted for caloric beverages and processed meats, but some differences were noted within sociodemographic strata.
Conclusion: This analysis demonstrates that higher diet costs are associated with both the consumption of foods that can reduce the burden of diet related diseases as well as those that exacerbate the burden. Continued monitoring and surveillance measures are needed to examine how dietary intakes continue to shift in light of diet costs and how consumers make food purchasing and consumption decisions within a given diet cost.

P2-H-59 FOOD PRICE AS A VARIABLE IN FOOD CONSUMPTION

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Introduction: Food environments are the physical, economic, political and socio-cultural contexts in which people engage with the food system to make their decisions. Food price is a central part of the food environment that influences what we buy and eat. Last year, the Norwegian health authorities introduced new food based dietary guidelines (FBDG) and nutritional recommendations, and there has been a debate whether the healthy food choices that are promoted are affordable for all. Our objective was to assess the price of a diet in line with the FBDG compared with the Norwegian contemporary diet, which is not in line with the FBDG.
Methods: To investigate this question, we made two menus, each over 14-days, with one based on the mean intake as reported in the national dietary surveys (todays' menu) for each of the household members, whereas the comparative is a menu based on the FBDG (FBDG menu). The menus were made for a household of four: one woman, one man, one 4-year-old girl, and one 13-year-old boy. We made the menus and found prices for all food items, either as ingredients, whole food, or ready-made food, depending on how the food was made and eaten. The food prices vary from day to day, so the food prices were collected during one single

day, at the website of a home delivery grocery shop service ("Oda"), along with speciality shop websites. To ensure that the value of the menus was comparable, the cheapest price for each food item was chosen, but special value sales were avoided.
Results: The energy intake was set to 8.8 MJ per day for the woman. The largest differences between the menus when looking at food groups was the increased intake of fruit and vegetables from 350 g/day to 600 g/day in the FBDG menu, which amounted to ca. 2 €/day, while the reduction in purchased beverages, including alcohol, saved ca. 2 €/day.
Conclusion: Including price of foods as a variable in food calculation programs gives opportunities to investigate economical perspectives in the food environment that contribute to increased knowledge about diet related social inequality in the population.

P2-H-60 IMPACT OF DEMOGRAPHIC COMPOSITION AND SPATIAL DISTRIBUTION ON THE ENVIRONMENTAL, NUTRITIONAL, AND ECONOMIC COSTS TRADE-OFFS OF CANADIAN DIETS

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Introduction: There has been a surge of interest in sustainable diets due to the growing climate crisis across the globe. In response, several attempts to estimate sustainable dietary intake scenarios have emerged for many countries, including Canada. Yet, the influence of age, gender, and spatial distribution details have not been adequately incorporated into the existing proposed dietary scenarios. These factors vary the type, quantity, and nutrient quality requirements of dietary intake and in turn, may impact the associated environmental implications. Therefore, this study examines the variations induced by age, gender, and spatial distribution in the environmental, nutritional, and economic implications of dietary intake among Canadians.
Methods: Dietary intake data from the Canadian Community Health Survey, CCHS 2015, are examined with the SPSS Statistical software and Microsoft Excel models. Environmental impact data from dataFIELD and Our World in Data were sourced for environmental calculations. Food price data from the Food Price Hub of Statistics Canada were employed to compute the dietary cost.
Results: The results indicate significant variations in mean food intake quantities across the various life stages and provinces and by immigrant status. Conspicuous among the results are that Quebec recorded the highest mean intake of red meat, and dairy intake decreased progressively across the various age groups for all provinces. However, there was little variation in the associated greenhouse gas emissions and cumulative energy demand values. Red meat remained the most essential source of iron and protein regardless of its high environmental impacts.
Conclusion: The impacts associated with dietary intake across the life

stages and provincial locations are highlighted as well as spatial hotspots. The results are useful for outlining easy-to-adopt targeted sustainable dietary patterns for Canadians in the global bid to build sustainable and resilient food systems. Moreover, these findings form the basis for further work focused on designing sustainable dietary transition scenarios for all consumers in Canada. It is necessary to design easy-to-adopt targeted sustainable dietary guidelines for Canadians.

Poster Session 2-I
INSIGHTS FROM SURVEILLANCE AND EPIDEMIOLOGY
Tuesday, April 29 | 3.00pm - 4.30pm
Location: Convention Level Foyer

P2-I-61 ADHERENCE TO THE DUTCH VITAMIN D SUPPLEMENTATION ADVICE AMONG YOUNG CHILDREN, WOMEN OVER 50 AND ELDERLY IN THE NETHERLANDS

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Introduction: To prevent vitamin D deficiency, specific subgroups in the Netherlands are advised to take a vitamin D supplement daily. Knowledge of the adherence to this advice is limited. For young children, women over 50 years, and elderly, the supplementation advice is independent of sunlight exposure. This study aimed to investigate adherence to the supplementation advice for these age groups in the Dutch population.
Methods: Data on young children (1-3 yr, n=703), women (50-69 yr, n=451), and elderly (70-79 yr, n=331) from the Dutch National Food and Consumption Survey (DNFCS) 2019-2021 were analysed for vitamin D-containing supplement use. In the general questionnaire, information was collected on frequency of use of specific sub-types of supplements (vitamin D, vitamin D & calcium, multivitamin, or multivitamin-mineral). With the 24h recall, data on use of dietary supplements were collected on each recall day with details on dosage and brand.
Results: Vitamin D-containing supplements were used by 70-80% of young children, 37-55% of women, and 39-50% of elderly. Of the supplement users, 54-70% of young children, 14-30% of women, and 22-35% of elderly used the advised dosage. The advised dosage in the correct frequency was used by 41-48% of young children, 7-15% of women, and 11-18% of elderly. Most participants (72-87%) consumed one type of supplement, often a vitamin D-only supplement. (Almost) daily use was reported most frequently, for example, by 76-87% of vitamin D-only supplement users.
Conclusion: Adherence to vitamin D supplementation advice in this study was highest in young children 1-3 yrs old and could be most improved among women 50-69 yrs old and elderly 70-79 yrs old. Studies measuring vitamin D status, though fairly dated, show a similar image, i.e. lower prevalence of deficiency in young children and higher prevalence in

women over 50 years and the elderly. It is important to monitor status and adapt the supplementation advice if required but for now, there also seems to be cause for improving vitamin D intake. This study showed that data collected within DNFCS allows for in-depth analysis of supplement use, combining information from 24h recall and the general questionnaire. However, data collection could be refined with data on supplement brand and dosage in the general questionnaire. Additionally, insight into skin complexion and sunlight exposure is recommended to study adherence to the supplementation advice in groups for which the advice is related to these factors.

P2-I-62 A STUDY OF FOOD CONSUMPTION PATTERN, NUTRIENT INTAKE, AND PHYSICAL ACTIVITY PROFILE OF THE TRIBES OF KORAPUT DISTRICT OF ODISHA, INDIA

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Introduction: Food security is a prerequisite for sustaining life and activity. It provides the essential nutrients for physical growth, development, normal body functions, physical activity, and good health. Tribal populations living in remote areas in the Koraput district of Odisha in India face food insecurity as they live in jungles and survive on agricultural and forest foods. They do not live in a fast-paced and technology-driven world. Prolonged periods of an imbalanced diet are reflected in their health parameters such as increased occurrence of diseases like sickle cell anemia and incidence of increased infant mortality. In this pretext, the present study will evaluate the food consumption patterns, dietary intake, and physical activity patterns of the ethnic tribes of Koraput in Odisha.
Methods: The data for the present study will be collected through direct observation and personal interview methods. Demographic, anthropometric, and biochemical data will be determined. Anthropometric measurements will be done at the household level. 24-hour diet recalls and the frequency of consumption of different food items will be collected. A physical activity questionnaire will be developed and validated for assessment. Appropriate statistical methods will be applied. Ethical approval will be sought on the finalization of the study protocol. A custom-built database management system (DBMS) based on an open-source Structured Query Language (SQL) software platform will be developed for managing the data collected.
Results: Dietary and activity patterns will be analyzed and tabulated. Latent classes for generic meal intakes, overall daily intakes (g/day or ml/day) of selected food groups by latent class, mean daily macronutrient and micronutrient intake by latent class, most dominant class in the study participants, daily food intakes by the most dominant class, and clinical and biochemical variables by most dominant latent class will be examined.
Conclusion: It is anticipated that with appropriate diet and activity

assessment and intervention, based on geographical locations, maternal and child mortality will fall substantially and malnutrition will be reduced.

Poster Session 2-J
DIET, ACTIVITY, AND HEALTH
Tuesday, April 29 | 3.00pm - 4.30pm
Location: Convention Level Foyer

P2-J-63 DAILY STEP COUNTS, STEP INTENSITY, AND MORTALITY RISK AMONG US ADULTS

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Introduction: Global physical activity committees have emphasized the need for prospective studies on stepping and health outcomes to inform future stepping-based guidelines. Although higher daily step counts have been associated with lower mortality rates, fewer studies have been done in diverse nationally representative samples. We investigated associations between wrist-based stepping behaviours and mortality using data from the National Health and Nutrition Examination Survey (NHANES), which included an oversampling of racial and ethnic minority groups.
Methods: We examined a representative sample of US adults (aged 40+ years) from NHANES who wore wrist-based accelerometers for up to 9 days (2011-14). Machine learning models ("stepcount") derived stepping behaviours. All-cause mortality was ascertained through December 2018. Cox proportional hazards regression models estimated hazard ratios (HR) and 95% confidence intervals (CI), adjusted for demographic factors, smoking, alcohol, body mass index, self-reported health, mobility limitations, and seven chronic conditions.
Results: Among 5,377 individuals (mean age=58 years, [standard deviation (SD)=12]; 2,812 [52%] women), the mean daily step count was 8,395 [4,646]. During a mean follow-up of 6.8 years [1.6], there were 772 deaths. A 1,000-step increment in daily step counts was associated with an 11% lower risk of mortality (HR=0.89, 95%CI:0.86–0.91) overall and among men (HR=0.91, 0.88–0.94) and women (HR=0.85, 0.81–0.89). Similar associations were observed for non-Hispanic white (HR=0.89, 0.86–0.91), non-Hispanic Black (HR=0.89, 0.84–0.94), and Hispanic individuals (HR=0.92, 0.93–1.01).
Conclusion: A higher daily step count was associated with lower all-cause mortality among U.S. adults across different sex and race/ethnicity groups. These findings are consistent with previous studies, and our analysis provides additional estimates for specific demographic

subgroups. Future research should investigate cadence metrics and whether the frequency of stepping bouts is associated with mortality risk.

P2-J-64 JUST-IN-TIME ADAPTIVE INTERVENTION TO ENCOURAGE SITTING LESS AND MOVING MORE IN PEOPLE WITH TYPE 2 DIABETES: A PROOF-OF-CONCEPT STUDY

Reza Daryabeygikhotbehsara [1], Ralph Maddison [1], David Dunstan [1], Sheikh Mohammed Shariful Islam [1], Mohamed Abdelrazek [1]

[1] *Deakin University*

Introduction: Interrupting extended periods of sitting by incorporating brief intervals of activity such as standing and short bouts of walking has been proven to be beneficial for individuals diagnosed with type 2 diabetes (T2D) in improving blood glucose, lipid profile, and blood pressure. Smartphones and wearables have great potential to improve access and delivery of support for reducing sedentary behaviour (SB) and promoting physical activity (PA). The primary aim of this study was to explore the effectiveness of mobile app based motivational Sit Less and Move More intervention in decreasing sitting time and increasing standing and walking time among individuals with type 2 diabetes.
Methods: A proof-of-concept micro-intervention was carried out among six people with T2D. Participants were assigned randomly to receive Sit Less, Move More messages, or no intervention messages, at various intervals during each day over a duration of six days. The Sit Less, Move More intervention comprised of a mobile application (iMOVE), a customised activity sensor (SORD), a messaging system, and a secure database. The study outcomes were the duration of standing and walking within one hour after the push notification (proximal outcome) and the average time spent sitting, standing, and walking over a six-day period. Analysis of variance (ANOVA) and weighted and centred least-squares (WCLS) were used to analyse the overall as well as individual level effectiveness.
Results: Across five decision times (morning, lunchtime, early afternoon, late afternoon, and evening), the mean duration of time spent in non-sitting activities was 17.5 minutes (standard deviation±9.2). Over the six days, the intervention conditions (Sit Less and Move More) resulted in a 17% increase in non-sitting time compared to the control condition. On average, this corresponds to an additional non-sitting time of 2.97 minutes ($\beta 0 = 0.16$, $p=0.05$, 95% CI = 0.01 to 0.30). The causal effects of the Sit Less intervention on the 1-hour non-sitting time were averaged over five decision times, regardless of the conditions (e.g., location); $\beta 0 = 0.18$ ($p=0.03$, 95% CI = 0.01 to 0.33), which was equivalent to a 19% increase in the average 1-hour non-sitting time compared to the no-intervention condition.
Conclusion: The overall findings supported the proof-of-concept, showing small yet significant effects of the intervention on both SB and PA measures.

P2-J-65 ASSOCIATION OF PHYSICAL ACTIVITY VOLUME AND INTENSITY WITH CARDIORESPIRATORY FITNESS AND WEIGHT STATUS IN 9–11-YEAR-OLD KENYAN SCHOOLCHILDREN

Stanley Kinuthia [1], Nils Swindell [2], Lucy-Joy Wachira [1], Festus Kiplamai [1]

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Introduction: Physical activity (PA) is essential for children's health, significantly impacting cardiorespiratory fitness (CRF) and weight management. Despite its importance, limited research exists on the PA profiles of Kenyan children, particularly in contrasting rural and urban settings. This study aimed to examine the activity profiles of school-aged children from Nairobi (urban) and Kitui (rural) counties.
Methods: The study involved 537 school-aged children (51.58% girls, aged 9-11 years) selected through stratified multistage random cluster sampling. Participants continuously wore Axivity AX3 accelerometers on their non-dominant wrist for 24 hours each day over seven days to measure average acceleration (AvgAcc) and intensity gradient (IG). Raw accelerations were averaged in 5-second epochs to determine AvgAcc, while IG illustrated the relationship between intensity and time log values. Participants' CRF was assessed by counting the laps completed in a 20-meter multistage fitness test. Anthropometric measurements (mass and height) were taken to compute BMI z-scores, classifying children into weight status groups based on International Obesity Task Force cut-offs. Data were analyzed to identify PA differences between groups and their associations with BMI z-scores and CRF.
Results: Significant differences were observed between AvgAcc and sex ($p < .001$), weight status ($p < .001$), and CRF ($p < .001$). Similar differences were noted for IG. AvgAcc was negatively associated with BMI z-scores ($\beta = -0.02$, $p < .001$) and positively associated with CRF ($\beta = 0.21$, $p < .001$), independent of IG and potential covariates. IG had a significant negative association with BMI z-scores ($\beta = -1.27$, $p = 0.003$) and a significant positive association with CRF ($\beta = 18.93$, $p < .001$), dependent on AvgAcc.
Conclusion: The findings underscore the role and importance of PA intensity and volume in managing weight and enhancing CRF among children. The study findings will inform targeted interventions and policies aimed at improving the health and well-being of children in both urban and rural contexts in Kenya.

P2-J-66 ISOTEMPORAL SUBSTITUTION OF SEDENTARY TIME, PHYSICAL ACTIVITY, AND SLEEP IN RELATION TO METABOLIC SYNDROME IN MIDLIFE WOMEN

Abeer Aljahdali [1], Erica Jansen [2], Michael Kaye [2], Alejandra Cantoral [3], Martha Maria Tellez-Rojo [4], Aria Grabowski [2], Libni Torres-Olascoaga [4], Karen Peterson [2]

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Introduction: Sedentary behavior, physical activity, and sleep duration have been related independently to cardiometabolic outcomes across the life cycle. Methods that account for the compositional nature of these behaviors over the 24-hour day can inform more nuanced public health guidelines for women in midlife, when risk of metabolic syndrome (MetS) increases markedly. We evaluated whether substituting sedentary behavior for sleep, light activity, or moderate/vigorous physical activity (MVPA) related to MetS risk.

Methods: Among 411 women with a mean age of 48.1 (SD 6.2) years participating in the Mexico City-based ELEMENT cohort study, we obtained 7-day accelerometry with a Gt3X-BT device worn on the nondominant wrist and clinical biomarkers of MetS. For individuals with at least 4 valid days of accelerometry, average daily sleep duration was calculated with the R package ActiSleep and duration of sedentary, light, and MVPA was calculated with GGIR. MetS components and MetS were classified based on the ATP II criteria. Isotemporal substitution models were estimated for replacing 30 min of sedentary behaviors with sleep, light activity, or MVPA using pair-wise log ratios and adjusting for age, socioeconomic status, education, menopausal status, alcohol consumption, and smoking. Meeting the criteria for individual components of MetS and overall MetS were assessed through logistic regression. Continuous components of MetS were assessed via linear regression.

Results: Half of women (49.6%) were classified with MetS. The daily mean duration of sleep was 406 min, sedentary behavior 720.3 min, light PA 201 min, moderate 108.6 min, and vigorous 4.3 min. In adjusted logistic models, substituting 30 min of sedentary behavior with MVPA was associated with a 0.20 decrease ($p = 0.021$) in log odds of having MetS and a 0.25 ($p = 0.002$) decrease in log odds of having elevated serum glucose or of taking medicine to control elevated serum glucose. In adjusted linear models, substituting 30 min of sedentary behavior with MVPA was associated with a 0.82 mg/dL increase ($p = 0.046$) in HDL. Replacing sedentary behavior with sleep was not related to improved cardiometabolic health.

Conclusion: Among midlife Mexican women, substitution of sedentary behavior with MVPA but not light activity or sleep was related to lower log odds of MetS and elevated glucose and with higher HDL.

P2-J-67 EFFECTS OF EXERCISE ON MASLD USING NON-TARGETED METABOLOMICS IN ADIPOSE TISSUE, PLASMA, URINE, AND STOOL

Ambrin Farizah Babu [1], Ambrin Farizah Babu [1], Ville Männisto [2], Milla-Maria Tauriainen [1], Heikki Pentikäinen [2], Kai Savonen [2], Anton Klåvus [3], Ville Koistinen [1], Ursula Schwab [1], Kati Hanhineva [1]

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Introduction: The mechanisms by which exercise benefits patients with metabolic dysfunction-associated steatotic liver disease (MASLD), the most common liver disease worldwide, remain poorly understood. A non-targeted liquid chromatography-mass spectrometry (LC–MS)-based metabolomics analysis was used to identify metabolic changes associated with MASLD in humans upon exercise intervention (without diet change) across four different sample types including adipose tissue (AT), plasma, urine, and stool.

Methods: Altogether, 46 subjects with MASLD participated in this randomized controlled intervention study. The intervention group (n = 21) performed high-intensity interval training (HIIT) for 12 weeks while the control group (n = 25) kept their sedentary lifestyle. The participants' clinical parameters and metabolic profiles were compared between baseline and endpoint.

Results: HIIT significantly decreased fasting plasma glucose concentration ($p = 0.027$) and waist circumference ($p = 0.028$) and increased maximum oxygen consumption rate and maximum achieved workload ($p < 0.001$). HIIT resulted in sample-type-specific metabolite changes, including accumulation of amino acids and their derivatives in AT and plasma, while decreasing in urine and stool. Moreover, many of the metabolite level changes especially in the AT were correlated with the clinical parameters monitored during the intervention. In addition, certain lipids increased in plasma and decreased in the stool. Glyco-conjugated bile acids decreased in AT and urine.

Conclusion: The 12-week HIIT exercise intervention has beneficial ameliorating effects in MASLD subjects on a whole-body level, even without dietary changes and weight loss. The metabolomics analysis applied to the four different sample matrices provided an overall view of several metabolic pathways that had tissue-type specific changes after HIIT intervention in subjects with MASLD. The results highlight especially the role of AT in responding to the HIIT challenge and suggest that altered amino acid metabolism in AT might play a critical role in improving fasting plasma glucose concentration.

P2-J-68 EXAMINING THE INTEGRATION OF WEIGHT AND MODIFIABLE LIFESTYLE FACTORS AS PREDICTORS OF CANCER RISK IN ADULTS AT HIGH RISK OF DIABETES

Ashley Tjaden [1], Audrey Goldbaum [2,3], Sharon Edelstein [1], Brandy Heckman-Stoddard [4], Jill Reedy [3], William Herman [5], Mary Hoskin [6], William Knowler [1], Mathias Schlögl [7], Karla Temple [8], Elizabeth Venditti [9], Karol Watson [10], Marinella Temprosa [1], Marissa Shams-White [11]

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Introduction: Modifying lifestyle factors may reduce the burden of obesity, diabetes, and cancer. We examined how alignment with the evidence-based 2018 World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) Cancer Prevention Recommendations using the 2018 WCRF/AICR Score was associated with the incidence of lifestyle-related cancers in adults at high risk of type 2 diabetes in the randomized controlled clinical trial Diabetes Prevention Program (DPP, 1996-2001) and follow-up DPP Outcomes Study (DPPOS, 2002-2020).
Methods: Participants were randomized to lifestyle, metformin, or placebo intervention (mean 3 years [y]) and continued in DPPOS for an additional 19y. The 2018 WCRF/AICR Score (range: 0-7 points) was calculated by integrating body weight, physical activity (PA), diet (plant-based foods, red/processed meat, sugar-sweetened drinks, fast foods), and alcohol measures at multiple timepoints (0, 1, 5, 6, 9, 15y from randomization). The endpoint was incident adjudicated cancer based on the 2018 WCRF/AICR 3rd Expert Report (18 cancers linked to obesity, diet, and PA). Adjusted Cox proportional hazards models estimated associations between the Score and cancer risk. The Score was represented as: baseline only (exposure pre-intervention), change from 0-1y (active intervention effect), and as a time-dependent variable (time-dependent changes). Intervention group, age, sex, race/ethnicity, smoking history, and HbA1c were controlled as confounders and tested as potential effect modifiers. Models also explored the independent associations of each Score component.
Results: Participants' (N=3000) mean baseline WCRF/AICR Score was 3.2 (SD=1.1); there were 403 incident cancers. Mean Scores improved after 1y and 15y (mean increase=0.43 and 0.27 points, respectively, both $p<0.001$) for all intervention groups. Baseline Score was not associated with cancer risk (Hazard Ratio (HR): 0.96, 95% confidence interval (CI): 0.88, 1.06). However, every 1-unit Score improvement from 0-1y and time-dependent Scores was associated with a 14% lower risk (CI: 0.76, 0.97) and 9% lower risk (CI: 0.83, 0.997), respectively, with no evidence of effect modification. In exploratory by-component analyses, no single component was individually associated with cancer risk.
Conclusion: Alignment with WCRF/AICR Recommendations may lower cancer risk in adults with prediabetes, highlighting the importance of lifestyle factors in cancer prevention.

P2-J-69 ASSOCIATION OF DIET AND PHYSICAL ACTIVITY ON SKIN DISEASES AMONG CHILDREN IN RURAL NEPAL: A CROSS-SECTIONAL STUDY

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Introduction: Skin diseases are one of the major burdens among children in low-income countries, particularly in resource-constrained nations like Nepal. In spite of well-documented evidence regarding the association of nutrition and lifestyle with various skin diseases, few studies have been conducted that consider the interaction between dietary patterns, physical activity, and skin diseases among children. The present study used validated tools for determining the association in rural Nepal.
Methods: A cross-sectional study was conducted among 178 children aged 1-18 years. All the skin examinations were done by dermatologists using validated protocols according to the International Society of Dermatology (ISD). Dietary habits were assessed by an FFQ modified to the local food habit. Physical activities were assessed using the Physical Activity Questionnaire for Older Children-PAQ-C validated in South Asian children. Demographic and socio-economic data were collected by a structured questionnaire. Statistical analysis was performed using SPSS, version 26. Association between skin diseases, dietary habits, and physical activities was analyzed by using the prevalence, chi-square test, and logistic regression.
Results: This study showed that skin diseases are present in 60.9% of the children. The top five leading skin diseases are dermatophyte infections (10.8%), eczema (9.2%), pityriasis alba (8.4%), acne (7.1%), and pyoderma (6.5%). Dietary habits lacking fruits, vegetables, and proteins were found to be associated with higher prevalence of eczema and pityriasis alba, with adjusted odds ratio of 1.62, 95% CI 1.21-2.17, p-value <0.01. Sedentary life and lower amounts of physical activities, particularly among adolescent children, is significantly associated with acne, adjusted odds ratio of 1.89, 95% CI 1.33- 2.67, p-value <0.001. Children from families with low dietary diversity and sedentary behavior had a twofold increased likelihood of developing skin conditions compared with their counterparts who consumed better nutrition and were more active (p<0.001).
Conclusion: This study identifies the high burden of pediatric skin diseases in rural Nepal and its strong association with diet and physical activity. Measuring diet using the FFQ and physical activity by the PAQ-C help assure robust data for actionable insight. Public health measures addressing nutrition and an active lifestyle may go a long way toward easing the burden of pediatric skin diseases in resource-poor settings.

P2-J-70 INTERACTION BETWEEN DIET AND PHYSICAL ACTIVITY WITH HYPERTENSION: INSIGHTS FROM REGISTER-BASED DATA

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Introduction: Physical activity is documented to improve blood pressure. However, recent studies show that high occupational physical activity (OPA), as in physically demanding jobs, may not offer the same cardiometabolic health benefits as leisure physical activity. OPA is characterized by low intensity, sustained activity with insufficient recovery that can lead to inflammation and thereby increase the hypertension risk. People in these jobs often also have poorer diet that increases risk. Thus, people with both high OPA and poor diet may either have an increased hypertension risk or reduced risk due to the increased energy expenditure from the high OPA mitigating the health effects of poor diet. The hypertension risk due to the combination of OPA and poor diet is unknown. Thus, we investigated the interaction between OPA and poor diet in people primarily engaged in physically demanding jobs in Denmark.

Methods: At baseline, 821 people wore thigh accelerometers to measure OPA and leisure activity and completed a questionnaire. Poor diet was measured by averaging two items with four response options (rarely to every day). Antihypertensive medication data were retrieved from the Danish National Prescription Registry over a 4-year follow-up. Hypertension cases were those who redeemed antihypertensive medication. A compositional logistic regression model, adjusted for age, sex, BMI, smoking, socioeconomic status, leisure moderate-to-vigorous physical activity (MVPA), and hypertension cases within last year from baseline, was used to assess the interaction effect between occupational MVPA, diet, and hypertension.

Results: We observed 241 (29%) hypertension cases. Poor diet (OR=0.96, P=0.79) and occupational MVPA (OR=0.91, P=0.74) were not independently associated with hypertension. However, we found a positive association between high MVPA and poor diet increasing the odds of hypertension (P = 0.048). For example, increasing MVPA by 20 min/day and changing poor diet from rarely to every day was associated with 99% increased odds of developing hypertension.

Conclusion: Having both high OPA and poor diet may considerably increase hypertension risk compared to the individual effects of each factor alone. Thus, people with both factors might have an amplified hypertension risk. The results challenge the belief that high energy expenditure from OPA could mitigate the risk of poor diet. Further research with longer follow-up is needed to confirm the results.

P2-J-71 AN EXPLORATORY STUDY ON YOUNG GERMAN CHILDREN'S PHYSICAL ACTIVITY, SLEEP AND MENTAL WELL-BEING USING ACCELEROMETRY

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Introduction: Positive associations between mental health, physical activity (PA), and sleep have been reported in children and adolescents, indicating that youth who engage in higher intensities of PA experience better physical and mental health compared to their more sedentary peers. However, for children <7 years, there is a lack of research that objectively measures potential associations between PA, sleep, and emotional/behavioural wellbeing. Therefore, the purpose of this study was to explore whether objectively measured sleep and PA are associated with the mental wellbeing of young children over a 1-year period.
Methods: For this preliminary investigation, baseline and 1-year follow-up accelerometer data from a subsample of children (N=240; aged 2 to <7 years) enrolled in the Germany-wide 'JolinchenKids – Fit and Healthy in Daycare' were used. This intervention study was conducted in daycare facility (DF) settings across Germany. The Family Health Climate Scale was used to assess how the family environment influenced each child's PA and sleep behaviours. Children's mental health was evaluated using the Strengths and Difficulties Questionnaire (SDQ). Both questionnaires were completed by the child's parent(s). Sleep and PA were measured using accelerometers (GENEActiv; 100Hz; left wrist; 7 days; 24 hours/day). Raw accelerometer data were processed using the GGIR package (v. 3.1.1) in R (v. 4.4.0). The Euclidean Norm Minus One with Adjustment method was used, applying the Roscoe (2017) cut point for PA metrics and the Van Hees (2015) sleep algorithm. The PA variables computed included light PA (LPA), moderate-vigorous PA, total PA, and inactivity (used as a proxy for sedentary behaviour). The sleep variables computed included total sleep time, wake after sleep onset, and sleep efficiency.
Results: Linear regression analyses (α=0.1; reflects exploratory nature of study) revealed that in children with mental health difficulties, as measured by the SDQ, there was a positive association between SDQ and an increase of 8.24 min of LPA per day ($p = 0.097$).
Conclusion: Minimal evidence was found linking wellbeing, PA, and sleep in these young German children, likely due to factors beyond control in a DF setting. Future research should gather data on hyperactivity, attention disorders, and sports club participation to better understand the mechanisms connecting mental health, PA, and sleep in young children.

P2-J-72 MEAL TIMING AND RISK OF DEPRESSIVE SYMPTOMATOLOGY IN A FRENCH COHORT

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Introduction: Circadian misalignment is a hallmark of depression, but whether circadian disruption linked to meal timing can affect the occurrence of depression has not been studied. The objective was to investigate associations between meal timing and risk of depressive symptomatology.

Methods: We included 51726 participants (77% women, mean age 44.9±14.7) from the French NutriNet-Santé cohort (2009-2022), with no prevalent depression or antidepressant use at inclusion or during the first two years of follow-up. Dietary intake was assessed by averaging data from repeated sets of three non-consecutive 24-hour records, administered at inclusion and every six months over two years. Meal timing indicators included: time of first and last food intake, nighttime fasting duration, eating jetlag (difference in eating midpoint between working and non-working days), and the percentage of energy intake after 5 p.m. Depressive symptoms were assessed using the CES-D scale every 2 years, and cases were defined according to French thresholds. Multivariable Cox models, adjusted for sociodemographic, lifestyle factors, and dietary patterns, were used.

Results: During a median follow-up of 8.5y, 9839 incident cases of depressive symptomatology were identified. Compared to those with a first food intake between 7:30-8:30 a.m., participants eating earlier (HR=1.09, 95%CI 1.03–1.14) or later (HR=1.14, 95%CI 1.08–1.20) than this range had higher risk of depressive symptomatology. Having a last food intake after 9 p.m. compared to between 8–9 p.m. was associated with higher risk (HR=1.07, 95%CI 1.01–1.13). Consuming over 60% of daily energy intake after 5 p.m. was linked to a higher risk (HR=1.40, 95%CI 1.23–1.59) compared to consuming ≤35%. A shorter nighttime fasting (≤11 hours) was associated with a higher risk (HR=1.08, 95% CI 1.01-1.15) compared to those with night fasting between 11-12h, only among those with a first meal ≤ 8 a.m. Compared to an eating jetlag intensity ≤ 1h, those with 1-2h had higher risk (HR=1.06, 95%CI 1.01–1.11).

Conclusion: This study suggests that altered meal timing patterns may increase the risk of depressive symptoms. These findings, if replicated in other cohorts, unravel a potential role of meal timing as a prevention strategy for mental health.

P2-J-73 DIETARY PATTERNS, ANXIETY AND DEPRESSION IN ADULTS: A SYSTEMATIC LITERATURE REVIEW

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Introduction: Depression and anxiety are common mental disorders associated with a decline in individuals' quality of life and societal and public health impacts. Traditionally, studies examining the association of diet on mental health focus on isolated nutrients or foods. However, it is essential to identify evidence that considers diet in its complexity through dietary pattern analysis. The objective was to conduct a systematic literature review on the association between dietary patterns and anxiety and depression in adults.

Methods: A systematic search was performed in the Scopus, PubMed, LILACS, Web of Science, Embase, and Cochrane databases, following a study protocol registered in the International Prospective Register of Systematic Reviews (PROSPERO - No. 581354). After screening titles and abstracts, 75 studies were selected for full-text review. Inclusion criteria: Original articles analyzing dietary patterns in relation to anxiety and/or depression; published in English, Spanish, or Portuguese; including adults (age ≥18 and ≤65 years). Exclusion criteria: Grey literature, systematic reviews, narrative reviews, and meta-analyses; studies on adolescents, pregnant women, older adults; or non-human research.

Results: This review synthesized data from 17 studies (randomly selected from the full 75) carried out in Europe, Asia, North and South America, the Middle East and Oceania that estimated odds ratios, relative risk, or probability of developing depression and/or anxiety. There was a lower chance to develop depression and/or anxiety for those with healthy eating patterns, such as the Mediterranean diet or diets rich in fruit and vegetables (13 of 17: 8 cross-sectional studies, 3 longitudinal studies, and 2 case-control studies); greater chance with Western eating patterns or diets rich in ultra-processed foods (11 of 17: 5 cross-sectional studies, 5 longitudinal studies, and 1 case-control study). Four studies (2 cross-sectional, 1 longitudinal and 1 case-control) reported null findings.

Conclusion: Dietary pattern analysis accounted for the complexity of associations between diet and common mental disorders. Findings suggest that healthy dietary patterns may have a protective role against depression and anxiety, whereas Western diets appear to contribute to an increased risk of these disorders.

P2-J-74 EFFECTS OF VEGETABLE CONSUMPTION ON BLOOD PRESSURE IN HEALTHY ELDERLY INDIVIDUALS

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Introduction: Nitric oxide (NO) is a molecule with vasodilatory properties that affects blood pressure (BP). It can be produced endogenously by the oxidation of L-arginine in a reaction catalyzed by nitric oxide synthase (NOS) enzyme. NOS tends to become less effective in older age. In such cases, the ingestion of nitrate, an exogenous source of NO, may offer potential therapeutic benefits. This study aims to compare the effects of consumption of vegetables with high and low nitrate content on BP in healthy elderly individuals.
Methods: This is a randomized study with a crossover design. Participants aged 60 to 75 years were randomly assigned to consume 250g per day of high-nitrate (HN) and low-nitrate (LN) vegetables in free-living conditions. Each treatment period lasted 1-week, separated by a 1-week washout period. Systolic (SBP) and diastolic (DBP) blood pressure was measured, and blood samples were collected before and after each treatment. Dietary intake was assessed using 24-hour recalls and food diaries throughout the study. Differences between treatments were analyzed using paired t-tests or Wilcoxon tests. One-way repeated measures ANOVA was used to compare means between interventions at a significance level of 0.05.
Results: A total of 40 volunteers participated in the study (62.5% were women). A significant increase in nitrate consumption was observed after the high-nitrate treatment compared to the low-nitrate treatment (median difference: 382.2g vs. 5.8g, $p < 0.001$). The mean plasma nitrate difference was also significantly higher following the high-nitrate intervention [38.89 (SD: 14.50) µmol/L vs. 0.15 (SD:4.38) µmol/L, $p < 0.01$]. SBP showed a significant reduction of 7.75 mmHg (SD 11.94, $p < 0.001$) after the high-nitrate diet, while the low-nitrate diet resulted in a non-significant decrease of 3.05 mmHg (SD 12.08, $p = 0.711$). SBP mean difference between the two treatments was not statistically significant ($p = 0.090$). DBP remained unchanged after both interventions.
Conclusion: SBF decreased after high-nitrate vegetable consumption although its reduction was not significantly greater than that observed after low-nitrate vegetables. This suggests that factors beyond nitrate content may influence vasodilatory properties. Further research is needed to explore these additional components and their effects on blood pressure regulation.

P2-J-75 BRAZILIAN ADULTS' EATING PATTERNS AND DIETARY CHARACTERISTICS ASSOCIATED WITH THE RISK OF NON-COMMUNICABLE DISEASES

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Introduction: This study aims to identify eating patterns associated with dietary characteristics related to the increased risk of non-communicable diseases.
Methods: Data for Brazilian adults (between 20 and 59 years) in the 2017-2018 National Dietary Survey were analyzed (n=28,153). Food items cited in the first 24-hour diet recall were grouped into 24 food groups. Factor analysis with Principal Component Analysis extraction was applied, and food groups with factor loadings |≥0.25| were retained in the eating patterns. Energy density (kcal/g), fiber density (g/1.0 kcal), sodium density (mg/1,000kcal), sodium/potassium ratio, and added sugars density (g/1,000 kcal) were the dietary characteristics analyzed. Linear regression models, adjusted for age, income, and sex, were used to investigate the association between eating patterns and the selected dietary characteristics. The analyses considered the sampling design and weights.
Results: Three major dietary patterns were identified that together explain 20.7% of the variability in food consumption. The first dietary pattern was named "Brazilian breakfast" and was characterized by bread, solid fats (mainly butter and margarine), and coffee. The second, characterized by rice, beans, vegetables, and beef, was called "Traditional Brazilian pattern". The last was named "Fast-food pattern" and included sauces, pasta, sweeteners, added-sugar beverages, fast foods, cake and sweets, and milk and dairy. The Traditional Brazilian pattern was associated with an increase in fiber intake ($\beta=2.05$; $p<0.01$) and a reduction in added sugar intake ($\beta=-1.90$; $p<0.01$). The opposite was observed for the Fast-food pattern (fiber: $\beta=-1.21$, $p<0.01$; added sugar: $\beta=6.45$; $p<0.01$). The Brazilian breakfast pattern was associated with a reduction in both fiber ($\beta=-0.61$; $p<0.01$) and added sugar ($\beta=-0.53$; $p<0.01$).
Conclusion: The Traditional Brazilian eating pattern was associated with favorable dietary characteristics, such as increased fiber content and reduced added sugars content. The configuration of this pattern represents the typical lunch or dinner consumed by Brazilians, as it included rice and beans, the most important staple foods in the country, and vegetables and beef. The results reiterate the recommendations to prevent NCDs in Brazil that encompass the encouragement to consume in natura and minimally processed foods and the maintenance of traditional foods, like rice and beans.

P2-J-76 ASSOCIATION OF EATING WINDOW WITH ADIPOSITY MEASURES: THE HISPANIC COMMUNITY HEALTH STUDY/STUDY OF LATINOS

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Trainee Poster Presentation Award Nominee

Introduction: Time-restricted eating may help control weight through caloric restriction or other factors. Activity and sedentary behavior (SB) may also play a role, as people with a longer eating window (EW: time between first and last daily intake) may be more active. The association between meal timing, adiposity, and SB is of interest in Hispanic/Latino persons, who experience a high burden of cardiometabolic disease. We explored the relationship between EW, energy intake, and accelerometer-measured SB and assessed whether a longer EW is associated with adiposity in in Hispanic/Latino adults. We tested for modification of this association by income and educational attainment, as those with higher income/education may spend more time sedentary than those with lower income/education levels due to their type of employment and thus be less likely to have greater activity with longer EW.

Methods: Using data from the Hispanic Community Health Study/Study of Latinos (n=11,778 participants with valid 24-hour dietary recall and accelerometer data, no unplanned weight loss, and BMI ≥18.5), we explored the relationship between EW, SB, and energy intake. We used multivariable linear regression models to study the relationship between EW and adiposity, tested for EW by income/education interaction, and then performed income-stratified analyses. Covariates included clinical, behavioural, and demographic characteristics.

Results: People with longer EW had greater energy intake in all income and education groups ($r=0.19$, $p<0.001$ for the whole sample; similar for all income/education groups). Those with longer EW had less SB overall ($r=-0.12$, $p<0.001$ in lower income group; similar for the combined sample and both education categories) but with diminished association in the higher income group ($r=-0.05$, $p=0.16$). After adjustment for estimated energy balance, SB, and covariates in the whole group, each additional hour of EW was associated with 0.29% higher BMI (95% CI 0.07, 0.51), $p=0.011$. We observed a statistically significant interaction between EW and income ($p=0.02$), but not EW and education. In the higher income stratum, each hour longer EW was associated with 0.59% higher BMI (95% CI 0.16, 1.02), $p=0.01$. No significant association was observed in the lower income stratum.

Conclusion: Shorter EW may promote healthy weight, but some individuals with longer EW tend to have greater activity than those with shorter EW, which could balance their greater energy intake.

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