ANNUAL MEETING AND CONFERENCE OF THE INTERNATIONAL NETWORK OF TIME-USE EPIDEMIOLOGISTS (INTUE)

8–10 JUNE 2019, OLOMOUC, CZECH REPUBLIC

Final Programme and Book of Abstracts
WELCOME NOTE

It is our great pleasure to welcome you to Olomouc for the 2019 Annual Meeting and Conference of the International Network of Time-Use Epidemiologists (INTUE). A year ago, when we started considering options for organising this event, the predictions were it will be a meeting of $10 \pm 2$ people (expressed as $\hat{y} \pm s_e$). Today, we are pleased to inform you that we have as many as 31 registered participants. Given the probability of a score that is 10.5 times standard error above the predicted value, let us just say that, from a statistical perspective, this is an incredible outcome.

The conference programme will include keynote addresses by Associate Professor Karel Hron and Professor Timothy Olds, leading experts in compositional data analysis and time-use epidemiology. Additionally, in four research presentation sessions we will hear about findings from a total of 16 studies that fit within the framework for Viable Integrative Research in Time-Use Epidemiology (VIRTUE). Their summaries can be found herein.

With the aim to achieve the optimal time-use balance during the conference, we also organised a number of social activities, including a welcome dinner in a traditional Czech Restaurant, a walking sightseeing tour through Olomouc, drinks at a traditional Czech microbrewery, sporting activities at the BALUO fitness centre, and a Monday getaway to two historic sites near Olomouc. This will allow us ample time for team building and networking.

We would like to express our gratitude to the New Zealand Ministry of Business, Innovation and Employment, Royal Society of New Zealand, Palacky University Olomouc, Victoria University, and Auckland University of Technology for generously supporting the organisation of this event and to all of you, participants and presenters, for your attendance and contributions to the scientific programme.

We wish you to thoroughly enjoy your stay in Olomouc and to have a fruitful conference!

The Organising Committee
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GENERAL INFORMATION
ORGANISER
International Network of Time-Use Epidemiologists (INTUE)

Co-funded by:
Catalyst: Seeding grant from the New Zealand Ministry of Business, Innovation and Employment, administered by the Royal Society Te Apārangi

Supported by:
Auckland University of Technology, Auckland, New Zealand
Institute for Health and Sport (iHeS), Victoria University, Melbourne, Australia

Hosted by:
Palacký University Olomouc, Olomouc, Czech Republic

ORGANISING COMMITTEE
Dr Dorothea Dumuid, University of South Australia, Adelaide, Australia
Associate Professor Scott Duncan, Auckland University of Technology, Auckland, New Zealand
Dr Louise Foley, University of Cambridge, Cambridge, United Kingdom
Associate Professor Aleš Gába, Palacký University Olomouc, Olomouc, Czech Republic (Vice Chair and Host)
Professor Timothy Olds, University of South Australia, Adelaide, Australia
Associate Professor Željko Pedišić, Victoria University, Melbourne, Australia (Chair)

SCIENTIFIC COMMITTEE
Associate Professor Scott Duncan, Auckland University of Technology, Auckland, New Zealand (Chair)
Associate Professor Aleš Gába, Palacký University Olomouc, Olomouc, Czech Republic
Assistant Professor Zrinka Greblo Jurakić, University of Zagreb, Croatia
Assistant Professor Danijel Jurakić, University of Zagreb, Zagreb, Croatia
Associate Professor Željko Pedišić, Victoria University, Melbourne, Australia (Vice Chair)
Associate Professor Jana Pelclová, Palacký University Olomouc, Olomouc, Czech Republic

TRANSPORTATION

Trains from Prague to Olomouc
Olomouc is located 250 km South-East of Prague. The fastest and cheapest way to get from Prague to Olomouc is by rail. Trains from Prague to Olomouc depart every 20–30 minutes (estimated travel duration: 2 hours and 10 minutes; one-way ticket price starts at €7). Buses depart every 1–3 hours (estimated travel duration: 4–5 hours; one-way ticket price starts at €8). If you are traveling by train, we would recommend you to book your train tickets with one of the following providers:

- Student Agency | Regio Jet https://www.regiojet.com/
- LeoExpress https://www.leoexpress.com/en
- Czech Railways https://www.cd.cz/en (Pendolino trains are recommended)
- IDOS Train Transport Planner https://jizdnirady.idnes.cz/vlaky/spojeni/
Bikesharing in Olomouc
The June weather in Olomouc is perfect for cycling. You can rent a bike using the following service:


Public transport in Olomouc
Tram and bus services operate regularly during the daytime. Trams on all lines run every 15 minutes, with the exception of the service on line 5 that runs every half an hour. At the night time, only a limited number of services is available. Single tickets (valid for 40 minutes) or 24-hour tickets (only for hardcore time-use epidemiologists) can be purchased at newsstands, in some stores, from ticket machines at bus/tram stops (yellow colour), from the driver on the coach, or by SMS ([https://www.dpmo.cz/en/information-for-passengers/sms-ticket](https://www.dpmo.cz/en/information-for-passengers/sms-ticket)). The standard price of a single ticket is 14 Czech Koruna (~€0.5) or 20 Czech Koruna (~€0.75) if purchased on the coach, while you will pay 46 Czech Koruna (~€1.8) for a 24-hour ticket. More information about ticket prices can be found [here](https://www.dpmo.cz/en/information-for-passengers/sms-ticket).

It is very easy to navigate through Olomouc by public transport. Most key points of interest are accessible by trams (e.g., main railway station, city centre, conference venue). Tram number 2 goes from the main railway station (Hlavní nádraží) through the city centre to the conference venue (final stop, Neředín, krematorium). Tram number 7 also operates between the main railway station and the conference venue, but it goes around the city centre. A detailed tram plan can be found [here](https://www.dpmo.cz/en/information-for-passengers/sms-ticket). You can plan your trip on Olomouc public transport [here](https://www.dpmo.cz/en/information-for-passengers/sms-ticket).

Taxi in Olomouc
Several registered taxi companies offer their services in Olomouc. For a ride in the city centre, the prices usually range between 90 and 100 Czech Koruna (€3.5–3.8).

More information can be found here:
- Atlant Taxi: phone +420 800 113 030

CONFERENCE VENUE

Address
Faculty of Physical Culture, Palacký University Olomouc
U Letiště 976/32, 779 00 Olomouc, Czech Republic
Google Maps: [https://goo.gl/maps/bxT2u9VckSje28NZ6](https://goo.gl/maps/bxT2u9VckSje28NZ6)

How to get to the conference venue
The conference venue is located 7 minutes by foot from the last stop of tram numbers 2 and 7 (Neředín, krematorium). Please find more information about the tram lines in the section “Public transport in Olomouc”.

How not to get lost in the conference venue
The Annual Meeting, Lunch, and Coffee Breaks will be held in CKV Meeting Room (and on its terrace) in Building B. The keynotes and research presentation sessions will be held in BALUO Meeting Room accessible from the main corridor of the BALUO building. The two buildings are connected by a corridor on the first floor.
FLOOR PLAN:

MAIN ENTRANCE AND BALUO BUILDING
Entrance from BALUO Building

Stairs: Burn calories, not electricity!
REGISTRATION DESK AND NAME TAGS

The conference registration desk is located in the main corridor of the BALUO building, at the ground floor, opposite to the main entrance. The registration desk will be open on Sunday, 9th of May, 8:30AM–9:00AM. All participants should register at the Registration Desk upon their arrival to the conference venue. In case of a late arrival to the conference, please register with Željko Pedišić at your earliest convenience. For security purposes, name tags that will be provided upon registration must be worn at all times during the conference events on Sunday 9th of May.

INFORMATION DESK

Information to participants will be provided at the registration desk during the designated registration time. Outside this time, for any information related to the conference programme please speak directly to one of the following organisers: Scott Duncan, Aleš Gába, Željko Pedišić, or Jana Pelclová. If you require information outside the conference hours, please send your email inquiry to zeljko.pedisic@vu.edu.au.

CONFERENCE FEE AND OTHER COSTS

No conference participation fee will be charged. The following parts of the conference and social programme will also be free of charge:

- guided walking tour on the 8th of June;
- food and drinks served during the coffee and lunch breaks at the conference venue on the 9th of June;
- bus tour to Bouzov Castle and Svatý Kopeček.

Participants are expected to cover the costs of their own:

- travel and accommodation;
- dinner and drinks on the 8th of June (estimated price of dinner in Moravská Restaurace: €32; estimated price of a drink in Svatováclavský Pivovar: €1.5);
- food and drinks consumed during the bus tour on 10th of June (estimated price of lunch in Archa Restaurant at Svatý Kopeček: €8).

COFFEE BREAKS AND LUNCH

During the coffee and lunch breaks on the 9th of June, complimentary food and drinks from a traditional Spanish restaurant “El Romero” will be served in the CKV Meeting Room (and on its terrace) in Building B.

Morning coffee break menu

DRINKS:
- fruit juices, coffee, tea, milk, cream, mineral water

BUFFET:
- Muffins
- Cheesecake
- Muesli with yogurt
- Chocolate
- Extra virgin olive oil, butter, assorted breads
Lunch break menu

**DRINKS:**
- mineral water, fruit juices, beers, sangria

**BUFFET:**
- Spring mix salad
- Gazpacho
- Vegetarian paella
- Chicken paella

Afternoon coffee break menu

**DRINKS:**
- fruit juices, coffee, tea, milk, mineral water

**BUFFET:**
- Assorted cheese board, homemade jams and nuts
- Assorted ham and salami board, cherry tomatoes, cucumber
- Olive tapenade spread
- Vegetable sticks
- Extra virgin olive oil, butter, assorted breads
- Seasonal fruit skewers
- Assorted cookies

**INTERNET ACCESS**

Free wireless internet will be available at the conference venue (network name: “upol” or “upol-guest”; password: genius19loci).

**CONFERENCE NEWS AND NOTIFICATIONS**

Conference news and notification will be available at [http://www.intue.org/conference](http://www.intue.org/conference) and on INTUE Twitter account @INTUE_.

**SOCIAL MEDIA**

The conference participants are encouraged to include the hashtag #INTUE2019 when posting about the conference on social media and to tag @INTUE_ when tweeting about it.

**CURRENCY**

The currency of Czech Republic is Czech Koruna (1 EUR = 28 CZK).

**CONFERENCE LANGUAGE**

The official conference language is English.
Tourist Information

Olomouc has always been among the most important cities in the “Kingdom of Bohemia”. With its convenient location, ancient university, and spiritual, cultural and craft traditions, for centuries Olomouc has been a natural centre of Moravia, alluring to artists, academics, entrepreneurs, and tourists. With the population of around 100 thousand, Olomouc is the 6th largest city in the Czech Republic and a centre of the fertile Haná region. Its well preserved Old Town belongs to the most beautiful historical urban areas in Czechia and boasts a UNESCO World Heritage Site. Do not miss the opportunity to explore its numerous churches and Baroque fountains and try the most celebrated product of local cuisine, Olomouc “tvarůžky” cheese. We wish you a pleasant stay and many memorable moments in Olomouc!

More tourist information about Olomouc can be found [here](#).
SOCIAL PROGRAMME
Welcome dinner will take place on the 8th of June, 6PM–8PM, in Moravská Restaurace, a traditional Czech restaurant in the heart of Olomouc. We will meet inside the restaurant. Dress code: smart casual or casual.

Address: Horní nám. 23, 779 00 Olomouc, Czech Republic
Google Maps: [https://goo.gl/maps/e2FVgr241HQYSmHE6](https://goo.gl/maps/e2FVgr241HQYSmHE6)
Website: [http://www.moravskarestaurace.cz/](http://www.moravskarestaurace.cz/)
**GUIDED WALKING TOUR**

The guided walking tour through the beautiful city of Olomouc will take place on the 8th of June, 8PM–9PM (ie, after the welcome dinner). We will meet in front of Mora- vská Restaurace (see the address above).

**INTUE NIGHT OUT**

The INTUE night out will commence at 9PM on the 8th of June. We will meet in Svatováclavský Pivovar, a traditional Czech microbrewery. Dress code: smart casual or casual.

- **Address:** Mariánská 845/4, 779 00 Olomouc, Czech Republic
- **Google Maps:** [https://goo.gl/maps/h6qpy7xTWd61JYk8A](https://goo.gl/maps/h6qpy7xTWd61JYk8A)
- **Website:** [http://www.svatovaclavsky-pivovar.cz/](http://www.svatovaclavsky-pivovar.cz/)

Non-alcoholic beverages will be available.
MONDAY GETAWAY

An organised bus tour for the conference participants will take place on the 10th of June, 8:30AM–4PM. We will meet in front of the main entrance to BALUO building (or in case of rain, at the reception desk located in the BALUO building corridor) at 8:15AM. Please make it on time, because “lost time is never found again”.

First, we will visit the spectacular Bouzov Castle, located around 35 km from Olomouc.

After that, we will visit Svatý Kopeček (“Holy Hill”), located around 11 km from Olomouc. At Svatý Kopeček, we will have a late lunch (at 2PM) in Archa restaurant (https://archarestaurant.cz/). The planned return to Olomouc is at 4PM, with the drop-off at the conference venue.
PRESENTATION GUIDELINES

The research presentation sessions will include 10-minute presentations with 5 extra minutes for Q&A (a total of 15 minutes per presenter). The conference room will be equipped with a media projector, a PC, and a laser pointer. PowerPoint presentations will be supported on the computer. If you wish to use some other file format, please bring your own laptop with HDMI output port and a respective presentation software installed. The PowerPoint presentation should be sent to zeljko.pedisic@vu.edu.au no later than Saturday 8th of June. In case this will not have been done, please bring your presentation on a USB stick and submit it while registering for the conference (on Sunday, 9th of May, 8:30AM–9:00AM).

The audience is strongly encouraged to engage and interact with the presenter during the Q&A time. To further facilitate discussions during the Q&A time, the presenter will be encouraged to ask the members of the audience for their feedback on the presentation topic.
PROGRAMME AT A GLANCE

PLACE: Palacký University Olomouc, Faculty of Physical Culture, BALUO Meeting Room in BALUO building (all sessions) and CKV Meeting Room and its terrace in Building B (lunch and coffee breaks).

EMCEE: Associate Professor Željko Pedišić

AGENDA

9:00 Opening ceremony
9:15 INTUE Annual Meeting, Part 1
9:30 Keynote 1

10:15 Coffee break
10:45 Invited presentations, Session 1
11:45 Stretch break
12:00 Invited presentations, Session 2

13:00 Lunch served by El Romero
14:00 Keynote 2
14:45 Stretch break
15:00 Invited presentations, Session 3

16:00 Coffee break
16:30 Invited presentations, Session 4
17:30 INTUE Annual Meeting, Part 2
17:55 Closing ceremony
Welcome addresses by:
Associate Professor Željko Pedišić, Chair of the Organising Committee
Associate Professor Scott Duncan, Chair of the Scientific Committee
Associate Professor Aleš Gába, Conference Host
Professor Timothy Olds, INTUE President

Chair: Professor Timothy Olds, INTUE President
An overview of INTUE constitution and activities (Presenter: Associate Professor Željko Pedišić, INTUE Secretary)
Presentation and adoption of the INTUE annual report for 2018 (Presenter: Associate Professor Željko Pedišić, INTUE Secretary)
Presentation and adoption of the INTUE annual financial statement for 2018 (Presenter: Dr Dorothea Dumuid, INTUE Treasurer)

Session Chair: Dr Dorothea Dumuid
Speaker: Associate Professor Karel Hron
Speaker’s bio: Karel Hron is Associate Professor at Department of Mathematical Analysis and Applications of Mathematics, Palacký University in Olomouc, Czech Republic. He holds a PhD in applied mathematics from the same university. His research activities are focused on statistical analysis of compositional data, robust statistics, and multivariate statistical analysis in general. He addresses also applications of compositional data methodology; in addition to time-use epidemiology he realised a number of projects from geochemistry, analytical chemistry, metabolomics and other fields. Karel Hron has authored more than 100 research articles and is a co-author of a book on applied compositional data analysis (Springer, 2018). Furthermore, the methods and algorithms he developed are implemented in the R software (packages robCompositions and mvoutlier).
Abstract ID: 1

COFFEE BREAK
### INVITED PRESENTATIONS, SESSION 1

**Methodological research in time-use epidemiology**

<table>
<thead>
<tr>
<th>Time</th>
<th>Abstract ID</th>
<th>Abstract title and authors (*presenting author)</th>
</tr>
</thead>
</table>
| 10:45 | 2           | Standardised criteria for classifying the International Classification of Activities for Time-Use Statistics (ICATUS) activity groups into sleep, sedentary behaviour, and physical activity  
Nucharapon Liangruenrom, Melinda Craike, Dorothea Dumuid, Stuart Biddle, Catrine Tudor-Locke, Barbara Ainsworth, Chutima Jalayondeja, Theun Pieter van Tienoven, Ugo Lachapelle, Djiwo Weenas, David Berrigan, Timothy Olds, Željko Pedišić* |
| 11:00 | 3           | HABITUS - Human Activity Behavior Identification Tool and data Unification System  
Jasper Schipperijn*, Emiliano Molinaro, Jesper van der Zwan, Jens Hjort Schwee, Mikkel Baun Kjærgaard |
| 11:15 | 4           | Time spent awake after sleep onset: a component of the 24-hour day  
Jillian Haszard*, Kim Meredith-Jones*, Claire Smith, Rachael Taylor, Barbara Galland |
| 11:30 | 5           | Robust compositional analysis of physical activity and sedentary behaviour data  
Nikola Štefelová*, Jan Dygrýn, Karel Hron, Aleš Gába, Lukáš Rubín, Javier Palarea-Albadejo |

**Session Chair:** Dr Tom Stewart

### INVITED PRESENTATIONS, SESSION 2

**Outcomes of health-related time-use compositions**

<table>
<thead>
<tr>
<th>Time</th>
<th>Abstract ID</th>
<th>Abstract title and authors (*presenting author)</th>
</tr>
</thead>
</table>
| 12:00 | 6           | Does reallocation of time from sedentary bouts to physical activity reduce adiposity in children?  
Aleš Gába*, Jan Dygrýn, Nikola Štefelová, Karel Hron, Željko Pedišić, Dorothea Dumuid |
| 12:15 | 7           | Compositional associations between movement behaviours and social, emotional, and physical development in preschool children  
Nicholas Kuzik*, Valerie Carson |
| 12:30 | 8           | Spinal health and sitting: a link to the 24-hour movement continuum  
Kaja Kastelic*, Nejc Šarabon |
| 12:45 | 9           | Bidirectional investigation of movement profiles and adiposity in children  
Paul J Collings* |

**Session Chair:** Associate Professor Jana Pelclová

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**10:45AM – 11:45AM, BALUO Meeting Room**

**STRETCH BREAK**

**12:00PM – 1:00PM, BALUO Meeting Room**

**LUNCH**
Session Chair: Associate Professor Scott Duncan
Speaker: Professor Timothy Olds
Speaker's bio: Tim Olds is a Professor of Behavioural Epidemiology at the University of South Australia. After completing a PhD in French Studies at the University of Sydney, Tim went on to study exercise science, earning a second PhD in 1997. His research interests have been in mathematical modelling of cycling performance, anthropometry, and more recently secular trends in the sleep, fitness, fatness, physical activity and food intake of children, and the relationship between health and use of time. He was Project Director for the Australian National Nutrition and Physical Activity Survey, and for the ADAPT Project, which used 3D anthropometry to match body types with military aircraft. Tim has 343 peer-reviewed publications and $28 m in grants and consultancies.

Abstract ID: 10

3:00PM–4:00PM, BALUO Meeting Room
INVITED PRESENTATIONS, SESSION 3
Outcomes of health-related time-use compositions

<table>
<thead>
<tr>
<th>Time</th>
<th>Abstract ID</th>
<th>Abstract title and authors (*presenting author)</th>
</tr>
</thead>
</table>
| 3:00  | 11          | Cross-sectional associations between sleep duration, sedentary time, physical activity, and obesity among Czech school-aged children using compositional analyses: preliminary results  
Jan Dygrýn*, Aleš Gába, Lukáš Rubin, Lukáš Jakubec, Eliška Materová, Nikola Štefelová |
| 3:15  | 12          | Does physically demanding work hinder a physically active lifestyle in low socio-economic workers? A compositional data analysis based on accelerometer data  
Charlotte Lund Rasmussen*, Javier Palarea-Albaladejo, Adrian Bauman, Nidhi Gupta, Kirsten Nabe-Nielsen, Marie Birk Jørgensen, Andreas Holtermann |
| 3:30  | 13          | Are longitudinal reallocations of time between movement behaviours associated with adiposity among elderly women? A compositional isotemporal substitution analysis  
Jana Pelclová*, Nikolka Štefelová, Dorothea Dumuid, Željko Pedišić, Karel Hron, Aleš Gába, Timothy Olds, Jana Pechová, Izabela Zając-Gawlak, Lenka Tlučáková |
| 3:45  | 14          | Associations between children's activity composition and body composition: a novel analysis where both explanatory and outcome variables are compositions  
Dorothea Dumuid*, Melissa Wake, Susan Clifford, David Burgner, John B Carlin, Fiona K Mensah, François Fraysse, Kate Lycett, Louise Baur, Timothy Olds |

Session Chair: Associate Professor Jasper Schipperijn

4:00PM–4:30PM, CKV Meeting Room
COFFEE BREAK
### 4:30PM–5:30PM, BALUO Meeting Room
#### INVITED PRESENTATIONS, SESSION 4

**Health-related time-use patterns and their correlates**

<table>
<thead>
<tr>
<th>Time</th>
<th>Abstract ID</th>
<th>Abstract title and authors (<em>presenting author</em>)</th>
</tr>
</thead>
</table>
| 4:30   | 15          | Gender differences of accelerometer-determined activity patterns among older Japanese adults: a compositional data analysis approach  
Shiho Amagasa*, Noritoshi Fukushima, Hiroyuki Kikuchi, Shigeru Inoue |
| 4:45   | 16          | Clusters of time-use behaviours in New Zealand children  
Tom Stewart*, Jonathon Neville, Scott Duncan |
| 5:00   | 17          | Meeting movement behaviors guidelines: correlates and the effects on body weight among Chinese children and adolescents—findings from the 2017 physical activity and fitness in China—the youth study  
Si-Tong Chen*, Yang Liu, Jing-Tao Hong |
| 5:15   | 18          | Exploring 24-h time-use patterns of non-standard workers  
Lisa M Mackay*, Anantha Narayanan, Tom Stewart, Scott Duncan |

**Session Chair:** Associate Professor Aleš Gába

### 5:30PM–5:55PM, BALUO Meeting Room
#### INTUE ANNUAL MEETING, PART 2

**Chair:** Professor Timothy Olds, INTUE President

INTUE Annual Award ceremony  
Discussion about future activities of INTUE  
Other general business

### 5:55PM – 6:00PM, BALUO Meeting Room
#### CLOSING CEREMONY

Closing remarks by Associate Professor Željko Pedišić, Chair of the Organising Committee
BOOK OF ABSTRACTS
1. Compositional Data Analysis: Fundamental Concepts and Recent Developments

**Karel Hron**

1. Faculty of Science, Palacký University Olomouc, Olomouc, Czech Republic

*Presenting author; Email: karel.hron@upol.cz

Compositional data are multivariate observations that carry relative information. They are measured in proportions, percentages or directly in the original time units in case of time-use data, i.e., as observations that might obey (or not) a constant sum of components. Due to their specific features, the statistical analysis of compositional data must obey the geometry of the simplex sample space. In order to enable processing of compositional data using standard statistical methods, compositions can be conveniently expressed by means of real vectors of logratio coordinates. Their meaningful interpretability is of primary importance in practice. Aim of the talk is to introduce the logratio methodology of compositional data and how methods which are popular in time-use epidemiology need to be adapted there. We will also discuss some recent challenges in the field like weighting of compositional parts/ratios, compositional tables and analyzing density functions using the Bayes spaces methodology which could enhance or even open new perspectives in time-use data processing.

2. Standardised criteria for classifying the International Classification of Activities for Time-Use Statistics (ICATUS) activity groups into sleep, sedentary behaviour, and physical activity


1. Institute for Health and Sport, Victoria University, Melbourne, Australia
2. Institute for Population and Social Research, Mahidol University, Thailand
3. Mitchell Institute, Victoria University, Melbourne, Australia
4. Alliance for Research in Exercise, Nutrition and Activity, School of Health Sciences, University of South Australia, Adelaide, Australia
5. Institute for Resilient Regions, University of Southern Queensland, Australia
6. Pennington Biomedical Research Center, Louisiana State University System, United States of America
7. Healthy Lifestyles Research Center, School of Nutrition and Health Promotion, Arizona State University, United States of America
8. Exercise and Wellness Program, School of Nutrition and Health Promotion, Arizona State University, United States of America
9. Faculty of Physical Therapy, Mahidol University, Bangkok, Thailand
10. Research Group TOR, Department of Sociology, Vrije Universiteit Brussel, Belgium
11. Social Policy Research Centre, University of New South Wales, Sydney, Australia
12. Department of Urban Studies and Tourism, Universite du Quebec a Montreal, Canada
13. Behavioral Research Research Program, Division of Cancer Control and Population Sciences, National Cancer Institute, Bethesda MD, United States of America

*Presenting author; Email: zeljko.pedisic@vu.edu.au

The International Classification of Activities for Time-Use Statistics (ICATUS) is one of the most widely used time-use classifications globally. Comprehensive 24-hour movement-related data that can be extracted from ICATUS are yet to be explored in relation to health outcomes, because activities are not classified in a way that makes such analysis feasible. This study, therefore, aimed to develop criteria for classifying Trial ICATUS 2005 and ICATUS 2016 activities into movement-related categories, including sleeping, sedentary behaviour (SB), light physical activity (LPA), and moderate-to-vigorous physical activity (MVPA), based on expert assessment. One author assigned METs and codes for movement-related factors, specifically wakefulness status and posture, to the most detailed level of
activities in the Trial ICATUS 2005. Once all subclass activities of the Trial ICATUS 2005 were coded, one author matched all subclass activities from the ICATUS 2016 with the corresponding activities in the Trial ICATUS 2005, where applicable. The assessment and harmonisation of each ICATUS activity were reviewed independently and anonymously by four experts in the field, as part of a Delphi process. Given a large number of ICATUS activities, four separate Delphi panels were formed for this purpose, where each panel reviewed approximately 130 activities. A total of 390 activities from the Trial ICATUS 2005 and 152 activities from the final ICATUS 2016 were classified into sleep, SB, LPA, and MVPA categories. We were able to harmonise the majority of ICATUS 2016 activities (n = 143) with the Trial ICATUS 2005 activity groups. Consensus about harmonisation and classification of ICATUS activities was reached by the third round of the Delphi survey in all four panels. Adoption and consistent use of this classification system will facilitate standardisation of time-use data processing for the purpose of sleep, sedentary behaviour, and physical activity research, and improve between-study comparability. Future studies should test the applicability of the classification system by applying it to empirical data.

3. HABITUS - Human Activity Behavior Identification Tool and data Unification System

Jasper Schipperijn*, Emiliano Molinaro, Jesper van der Zwan, Jens Hjort Schwee, Mikkel Baun Kjærgaard

1Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark
2Department of Mathematics and Computer Science, University of Southern Denmark, Odense, Denmark
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Collection of 24hr GPS and (raw) accelerometer data is now possible on a large scale, however data processing involves many different decisions and comparing or pooling data across multiple studies is difficult because of lacking harmonization. Processing raw accelerometer data is computationally intensive, especially if multiple algorithms are to be used on large pooled meta-analysis datasets with 24hr behavioral data. A new system developed at the University of Southern Denmark aims to assist researchers in processing their data, facilitate data harmonization, and make federated meta-analysis of accelerometer and GPS data possible. The system consists of three separate elements: 1) secure data storage, 2) user interface with processing algorithms, 3) data processing on the ABACUS 2.0 High Performance Computer (HPC). Researchers upload their data to a personal virtual hard disk which is fully compliant with all GDPR regulations for sensitive personal data. All data processing choices are made via a user interface and various different tool and algorithms can be used and the R package GGIR for accelerometer data processing is integrated in the system. Once the processing decisions are made, the system temporally loads the data onto the HPC where it is processed. The original data, as well as a processed dataset are returned to the secure data storage. Researchers can visualize their data using the R package Shiny. If a researcher allows their data to be used for meta-analysis, the system can run a federated analysis across multiple virtual hard disks without revealing the original data to the analyst. The first system tests showed that the data processing speed improved at least 1000 times compared to a workstation computer. This system offers high-speed data processing of raw 24hr accelerometer and GPS data and facilitates data-harmonization and confederated meta-analysis.
4. Time spent awake after sleep onset: a component of the 24-hour day

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Sleep is important for children’s health. While the evidence primarily focuses on sleep duration, other sleep characteristics, such as sleep quality, are potentially influential. Time spent awake after sleep onset (WASO) is a measure of sleep quality and is also a component of the 24-hour day. Current use of WASO in compositional time-use analyses is limited and is often counted as sleep time, despite the fact WASO is a measure of sleep disturbance that can adversely affect health. Alternative methods used to account for WASO include 1) incorporation into sedentary time; 2) exclusion before normalisation of components to 24 hours; or 3) inclusion as a separate component. Including WASO as a separate component is problematic, as zero values will first require a small reallocation of time from other components, such as sleep. We illustrate these different approaches using data from a large study of New Zealand children, aged 8 years of age, in relation to BMI. As accurate estimates of WASO cannot be assessed using questionnaires we will also demonstrate the challenges associated with measurement of WASO using accelerometers, particularly for compositional time-use analyses. We will show that discrepancies in estimates are dependent on device placement, device manufacturer and sleep algorithm in a small group of children aged 4-8 years. We will conclude with thoughts on the future direction of research into WASO as a component of the 24-hour day.

5. Robust compositional analysis of physical activity and sedentary behaviour data

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Although there is an increasing awareness of the suitability of using compositional data methodology in public health research, classical methods of statistical analysis have been primarily used so far. This aims to illustrate the potential of robust statistics to model movement behaviour using Czech adolescent data. We investigated: (1) the inter-relationship between various physical activity (PA) intensities, extended to model relationships by age; and (2) the associations between adolescents’ PA and sedentary behavior (SB) structure and obesity. These research questions were addressed using three different types of compositional regression analysis—compositional covariates, compositional response, and regression between compositional parts. Robust counterparts of classical regression methods were used to lessen the influence of possible outliers. We outlined the differences in both classical and robust methods of compositional data analysis. There was a pattern in Czech adolescents’ movement/non-movement behavior—extensive SB was related to higher amounts of light-intensity PA, and vigorous PA ratios formed the main source of potential aberrant observations; aging is associated with more SB and vigorous PA at the expense of light-intensity PA and moderate-intensity PA. The robust counterparts indicated that they might provide more stable estimates in the presence of outlying observations. The findings suggested that replacing time spent in SB with vigorous PA may be a powerful tool against adolescents’ obesity.
6. Does reallocation of time from sedentary bouts to physical activity reduce adiposity in children?

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Substituting sedentary time with physical activity (PA) has several health benefits. However, the effects of reallocating time from different sedentary bouts (SBs) to PA on health outcomes are not well-known. This study investigates the effects of reallocating time spent in different SBs to light-intensity (LIPA) and moderate-to-vigorous PA (MVPA) on adiposity in children. Participants were 425 school-aged children. Total sedentary time (TST) and time spent in different SBs (i.e., 1–9, 10–29 and ≥30 min) and PA were monitored using an ActiGraph accelerometer. Adiposity was expressed as fat mass percentage. To investigate the effects of reallocating TST and time spent in different SBs to PA, the compositional isotemporal substitution model was applied adjusted for sex and age of children. The composition of movement behaviors was significantly associated with adiposity ($R^2=0.07; p<0.001$). Further, the relative contributions of time spent in 10–29 min SB ($β_{ilr}=0.18; p=0.040$) and MVPA ($β_{ilr}=-0.18; p=0.003$) were associated with adiposity. A negligible decrease in adiposity while reallocating TST and time in SBs to PA, the compositional isotemporal substitution model was applied adjusted for sex and age of children. The composition of movement behaviors was significantly associated with adiposity ($R^2=0.07; p<0.001$). Further, the relative contributions of time spent in 10–29 min SB ($β_{ilr}=0.18; p=0.040$) and MVPA ($β_{ilr}=-0.18; p=0.003$) were associated with adiposity. A negligible decrease in adiposity while reallocating TST and time in SBs to MVPA was observed. In contrast, reallocating 1 h/week of TST to MVPA resulted in a decrease of about 0.3 percent points in body fat percentage. The maximum effect on adiposity was observed while time from 10–29 min sedentary bout was reallocated to MVPA. In this case, body fat percentage decreased of about 0.4 percent points with every hour reallocated from 10–29 min SB to MVPA. Replacing sedentary time with MVPA is associated with positive effects on adiposity in children.

7. Compositional associations between movement behaviours and social, emotional, and physical development in preschool children

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Our previous research findings suggest that movement behaviour (sleep, stationary time [ST], light physical activity [LPA], and moderate to vigorous physical activity [MVPA]) compositions are important for cognitive and motor development outcomes in preschool children (3-5 years). The purpose of this abstract was to examine the associations between movement behaviour compositions and social, emotional, and physical development in the same sample of preschool children. Children ($n=96$) were recruited from Edmonton, Canada. ActiGraph wGT3x-BT accelerometers, worn 24 hours/day, were used to measure movement behaviours. Social and emotional development (i.e., sociality, externalizing, internalizing, prosocial behaviour, self-regulation) were measured with the Child Self-Regulation and Social Behaviour Questionnaire. Height and weight were objectively measured to calculate physical development outcomes (i.e., percent of expected adult height [EH], body mass index z-scores based on World Health Organization Growth Standards). Compositional geometric means of movement behaviours, normalized to 24-hours, were calculated. Isometric log ratio transformations were applied to movement behaviour compositions and linear regression models were created for each movement behaviour and development outcome combination. All analyses were conducted in R. Children accumulated 11.6 hours of sleep, 6.1 hours of ST, 4.9 hours of LPA, and 1.5 hours of MVPA. Movement behaviour compositions were not significantly associated with children’s
social, emotional, and physical development outcomes. However, time spent in MVPA, relative to other movement behaviours, was significantly beneficially associated with sociability (B=0.87, p=0.03). Movement behaviours were not associated with physical development outcomes and most social and emotional development outcomes in this sample. This is in contrast with our previous research findings in this sample, for motor and cognitive development outcomes. Future research should confirm whether different development outcomes in this age group are more sensitive to movement behaviour compositions.

8. Spinal health and sitting: a link to the 24-hour movement continuum

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Prolonged sitting is widely recognized as a risk factor for low back disorders and low back pain. Several harmful mechanisms have been proposed, affecting intervertebral discs, posterior lumbo-pelvic ligaments and fasciae, and muscles of the lumbo-pelvic-hip complex. Sitting position is commonly accompanied with some degree of lumbar flexion while in the (semi)static conditions. If such posture is maintained for prolonged periods of time, the spinal tissues slowly deform, leading to a reduction of tissue resistance to loads and eventually (micro)trauma. The tissue strain when sitting is highly dependent on the sitting posture (slouched, upright, reclined etc.) and individual’s spinal tissue health. However, loading of the passive tissues (dynamic loading is favourable) and muscle activation during engaging in physical activity is essential for maintaining and strengthening the tissues’ health. Then a period of rest (i.e. unloading) must be followed, so that the adaptive tissue response could occur. Also, it was shown that insufficient sleep time, high levels of sedentary behaviour, physical inactivity and high levels of physical activity make the existing low back pain worse, while associations with first-time low back pain are not clear. The studies often investigated a single behaviour in isolation. Since there is a strong rationale based on biological plausibility and epidemiological studies, and because time is finite during the day, further studies should take into account all movement behaviours in a 24-hour period. To the best of our knowledge, little is known about the combined effect of time spent in sleep, sedentary behaviour and physical activity on low back pain and low back disorders.

9. Bidirectional investigation of movement profiles and adiposity in children

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The aim of this study was to investigate directions of association between combined-sensing estimates of movement behaviours with total and site-specific adiposity in children from a disadvantaged location, and to examine heterogeneity of associations by ethnicity. The Birmingham healthy Eating & Active lifestyle for children Study (BEACHeS) and its full-trial equivalent the West Midlands ActiVe lifestyle and healthy Eating in School children (WAVES) project are controlled trials of obesity prevention programmes conducted in a socioeconomically diverse and multi-ethnic (primarily white British and South Asian) population of children aged 6-8 years. The trials share common methods and together contain data for >1800 children who were followed for up to 2.5y. At baseline and follow-up habitual
movement behaviours were captured by combined heart-rate and movement sensing (Actiheart). The data will be used to estimate sleep duration (≤1.1 METs) sedentary time (>1.1-1.5 METs), light (>1.5–3 METs), moderate (>3–6 METs) and vigorous (>6 METs) intensity physical activity. Available adiposity indicators include weight, BMI, waist circumference, bioimpedance estimates, and biceps, triceps, subscapular, and suprailiac skinfolds. Compositional data analysis will be used to investigate associations between the entire composition, the relative time spent in each baseline movement behaviour, and the effect of exchanging baseline movement behaviours for one another with changes in adiposity parameters over follow-up. Exposures and outcomes will thereafter be reversed to investigate associations between baseline total and site-specific adiposity with movement compositions at follow-up. Multiple imputation will allow for covariate missing data and interaction effects by sex and ethnic group will be explored. The results will provide new knowledge regarding directions of association between movement behaviours and childhood adiposity. This information has the potential to aid understanding of health inequalities, particularly the higher prevalence of obesity and physical inactivity in impoverished and South Asian populations.

10. Goldilocks Day: optimising activity compositions for health

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The foundation principle of time-use epidemiology is that the way we use our time impacts our health. Until recently, the focus has been on time-use behaviours individually. However, there is emerging evidence that optimal health may be associated with patterns of behaviours rather than individual behaviours, in much the same way as diet as a whole rather than individual nutrients may explain health effects. Reframing the lifestyle-health link in terms of the 24-h day makes sense, because the day can be construed as a set of mutually exclusive and exhaustive behavioural domains: to increase time spent in one domain (such as exercise) we must necessarily decrease the time spent in at least one other domain (such as sleep). The new paradigm talks of the activity composition rather than individual behavioural domains. To deal with compositional data of this sort, time-use epidemiologists have recently adapted and developed new non-Euclidean statistical models. Compositional data analysis (CoDA) circumvents problems with multicollinearity and unbounded space which bedevil the application of traditional statistical models to compositional data. With CoDA and compositional isotemporal substitution, we can determine whether an activity composition is associated with any given health or social outcome. CoDA will generate a series of n-dimensional response surfaces representing the modeled relationships between activity compositions and health outcomes. Optimisation analysis will identify the “peaks” of these surfaces — the Goldilocks Day, the best possible mix of activities. However, there will likely be different response surfaces for different outcomes. We need to find the optimum of optima. To do this, we either need to choose a global outcome, such as health-related quality of life, or to weight the outcomes, using, for example, their relative contribution to burden of disease, population weightings from discrete choice experiments, or individual weightings using software applications.
11. Cross-sectional associations between sleep duration, sedentary time, physical activity, and obesity among Czech school-aged children using compositional analyses: preliminary results

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A holistic approach is required to assess the health effects of sleep, sedentary behaviour (SB) and physical activity (PA). The objective of this study was to examine differences in sleep duration, SB, moderate-to-vigorous PA, and obesity between: (1) boys and girls, (2) non-obese and obese children, and children from different grades of schools – elementary first stage (EFS), elementary second stage (ESS) and secondary schools (SS). The participants were 9–19-year-old girls and boys (n=575; 56% girls), whose sleep duration, SB and PA were measured during the school year over 7 days, by 24 hours. ActiGraph GT9X+ (ActiGraph LLC, FL) were worn on non-dominant wrist. The R package GGIR was used to calibrate accelerometer data, compute the metric ENMO, and estimate the number of minutes in MVPA. BMI z-scores were computed using age- and sex-specific WHO reference data. Differences between sleep, PA and obesity were analyzed by ANOVA using SPSS 23.0 (Inc, Chicago IL). Boys spent significantly more time in MVPA (76.0 min/day) than girls (69.5 min/day) and there were no significant differences in sleep and total PA. Similarly, there were no differences in all behaviours between obese and non-obese children. Children from EFS accumulated significantly more sleep time (6.6 hrs/day) than children from ESS (6.3 hrs/day) and those from SS (5.9 hrs/day). Similarly, the children from EFS accumulated more total PA (ENMO) (44.5±10.6 mg/day) than children from ESS (35.9±10.8 mg/day) and those from SS (31.6±8.6 mg/day), and children from EFS spent significantly more time in MVPA (81.8±28.6 min/day) than children from ESS (73.8±32.6 min/day) and those from SS (67.9±28.6 min/day). Preliminary findings suggest that total PA and MVPA are declining over school grades. There were no differences in movement/non-movement behaviour between non-obese and obese children.

12. Does physically demanding work hinder a physically active lifestyle in low socioeconomic workers? A compositional data analysis based on accelerometer data

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Leisure time physical activity (LTPA) is strongly associated with socioeconomic position (SEP). Few studies have investigated if demanding occupational physical activity (OPA) could impede a physically active lifestyle in low SEP groups. The aim of this study was to investigate the association between OPA and LTPA among low SEP men and women. This cross-sectional study was based on data from 895 low SEP workers who wore accelerometers for 1–5 consecutive workdays. The associations between the relative importance of activities performed during work and leisure time were assessed using
compositional regression models stratified on sex. Compositional isotemporal substitution models were used to assess the implication of increasing occupational walking, standing, or sitting on LTPA. Among both sexes, most waking leisure time was spent sedentary (men ~67%, women ~61%). In men, the associations between OPA and LTPA were weak. In women, the strongest association was observed between the relative importance of occupational walking and leisure time standing (r=−0.16; p=0.01), where reallocating 15 min work time to occupational walking showed an expected decrease in leisure time standing of 7 min. The women in this study spent most of the leisure time sedentary. Thus, the estimated decrease of leisure time standing could have substantial long-term health consequences if these minutes are spent on additional sedentary behavior.

13. Are longitudinal reallocations of time between movement behaviours associated with adiposity among elderly women? A compositional isotemporal substitution analysis

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This study used an integrated time-use approach to: 1) investigate the prospective associations between changes in daily movement behaviours and adiposity among elderly women; and 2) examine how the reallocation of time between movement behaviours is associated with longitudinal changes in adiposity. This was a 7-year longitudinal study in Central European older women (n=158, baseline age 63.9±4.4 years; baseline BMI 26.5±4.1 kg/m²). At baseline and follow-up, light-intensity physical activity (LIPA), moderate-to-vigorous physical activity (MVPA), and sedentary behaviour were measured by accelerometer and body adiposity (body mass index [BMI], %body fat [BF]) was assessed from measured height and weight and bioelectrical impedance analyser. Robust compositional regression and longitudinal isotemporal substitution were used to explore if, and how, changes in movement behaviours were associated with adiposity. The increase in sedentary behaviour at the expense of LIPA and MVPA during the seven-year period was associated with higher BMI and %BF at follow-up (both p<0.01). The increase in LIPA or MVPA at the expense of sedentary behaviour was associated with reduced BMI and %BF at follow-up. In our sample, longitudinal reallocation of 30 min from MVPA to sedentary behaviour was associated with larger change in BMI (0.75 units) and %BF (1.28 units) than 30 min reallocation from sedentary behaviour to MVPA (BMI –0.37 units; %BF –0.65 units). We found an association between longitudinal changes in daily movement behaviours and adiposity among elderly women in Central Europe. Our findings support public health programs to increase or maintain time spent in higher intensity physical activity among elderly women.
14. **Associations between children’s activity composition and body composition: a novel analysis where both explanatory and outcome variables are compositions**

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The aim of the study was to evaluate how the reallocation of time between components of the 24-h day (sleep, sedentary time, light, and moderate-vigorous activities) is associated with children’s body composition. We used data from the population-based cross-sectional Child Health CheckPoint within the Longitudinal Study of Australian Children (n = 938 11-12 year-olds, 50% boys). Both exposure and outcome variables were compositional data. The exposure was twenty-four hour activity composition assessed via accelerometry (minutes/day of sleep, sedentary time, light, and moderate-to-vigorous physical activity [MVPA]). The outcome was 3-part body composition (percentage truncal fat, percentage nontruncal fat, and percentage fat-free mass) via bioelectrical impedance analysis. We estimated differences in 3-part body composition associated with the incremental reallocation of time between activities, using dual-compositional regression models adjusted for sex, age, puberty, and socioeconomic position. Reallocation of time between MVPA and any other activity was strongly associated with differences in body composition. Adverse body composition differences were larger for a given MVPA decrease than were the beneficial differences for an equivalent MVPA increase. For example, 15 minutes less MVPA (relative to remaining activities) was associated with absolute percentage differences of +1.7% (95% CI 1.2; 2.4) for truncal fat, +0.8% (0.6; 1.2) for nontruncal fat, and −2.6% (−3.5; −1.9) for fat-free mass, and a 15-minute increase was associated with −0.7% (−0.9; −0.5) truncal fat, −0.4% (−0.5; −0.3) nontruncal fat, and +11% (0.9; 1.5) fat-free mass. Reallocations between sleep, sedentary time, and light physical activity were not associated with differences in body composition. Preventing declines in MVPA during inactive periods (eg, holidays) may be an important intervention goal. More MVPA, instead of other activities, may benefit body composition.

15. **Gender differences of accelerometer-determined activity patterns among older Japanese adults: a compositional data analysis approach**

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Less is known about gender differences in activity patterns while taking the co-dependence of time-use domains into account. This cross-sectional study investigated how accelerometer-determined activity patterns differ between genders, using compositional data analysis. Data were analyzed from 450 community-dwelling older Japanese adults (56.7% men, 74.3 ± 2.9 years) who provided valid accelerometer (HJA-350IT, Omron Healthcare) data. We evaluated time spent in sedentary behavior (SB), light-intensity physical activity (LPA), and moderate-to-vigorous physical activity (MVPA). Log-ratio EM algorithm was used to impute zeros. Gender differences in activity patterns were tested by multi-
variate analysis of covariance (MANCOVA). To support the interpretation of which behavior is differed between genders, we developed bootstrap percentile confidence intervals (CI) for log-ratio differences. Overall, participants had percent time spent in SB, LPA, MVPA during wearing time (mean 14.6 hours) correspond to 60.8, 35.1, and 4.1, respectively. There was a significant difference of activity patterns between genders. Compared to men, women spent 16.1% (CI 12.9 - 19.3%) less time in SB and 36.3% (CI 27.8 - 42.7) more time in LPA. No significant gender difference was found in time spent in MVPA. Compared to men, women had more favorable activity patterns. Considering health benefits of LPA, evaluating only MVPA may underestimate activity of older women.

16. Clusters of time-use behaviours in New Zealand children

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The New Zealand Ministry of Health recently adopted 24-hour movement guidelines for children and youth. However, little is known about how New Zealand children spend their time, or if children can be organised into distinct groups based on their lifestyle behaviour patterns. We aimed to identify clusters of children with similar patterns of lifestyle behaviours and describe the compositions of behaviour across these clusters. Time-use behaviours were assessed using a 7-day, 24-hour accelerometer protocol. Children (8 years of age) with 24 hours of wear time for multiple day were retained (n = 630). A 4-part composition was derived for each participant (sleep, sedentary behaviour, light intensity activity, moderate-vigorous activity) using published algorithms. Cluster analysis was used to identify four mutually exclusive groups. Behaviour compositions were compared among clusters using the compositional MANOVA technique. Overall, the highest proportion of the 24-hour day spent was spent in sleep (10.2 h), followed by sedentary (7.1 h), light intensity (5.1 h), and MVPA (1.5 h). The composition of time use was significantly different among the four clusters (all pairwise contrasts p < 0.05). One cluster – ‘inactive sleepers’ – had the highest sleep (geometric mean = 10.4 h), sedentary time (7.8 h), and lowest MVPA (1 h). Another cluster – ‘constant movers’ – had the lowest sleep (9.7 h), sedentary time (6.2 h), and the highest MVPA (2.3 h) and light intensity activity (5.6 h). These are among the first results to describe 24-hour movement patterns in New Zealand children. Most children were able to meet the NZ guidelines for sleep (9–11 hours per day) and MVPA (at least 1 hour per day) regardless of their cluster assignment. The next step will be to examine health and behavioural outcomes in relation to these time-use behaviours.

17. Meeting movement behaviors guidelines: correlates and the effects on body weight among Chinese children and adolescents—findings from the 2017 physical activity and fitness in China—the youth study

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Meeting the Canadian 24-Hour Movement Behavior (MBs) Guidelines (having sufficient moderate-to-vigorous physical activity, MVPA; limited screen time, ST; recommended sleep duration, SLP) has been identified having positive effects on healthy body weight (BW). However, little is known about the prevalence of meeting the MBs guidelines, and its correlates, and effects on BW among Chinese children and adolescents. Using feasible survey questionnaire, we collected information regarding MVPA,
ST and SLP from 131,859 (response rate = 99.89%) school-aged students (7-19 years old). Students’ height and weight were measured by portable electronic devices, for which calculate body mass index (BMI). Using the International Obesity Task Force (IOTF) norm reference, students were dichotomized as non-overweight/obesity (non-OW/OB) or OW/OB. Covariates including sex, grade, race, residence locations, parental education, family income and composition were collected by questionnaire. The prevalence of meeting the MBs guidelines was estimated by using complex sample option. The predictors of meeting the MBs guidelines and its effects on BW were explored by Generalized Linear Models (GLMs). Of 131,859 students, 114,072 participants (boys%: 49.18) were included into analysis. Only 5.12% (95% CI: 5.89-6.19) of students met the MBs guidelines, without sex difference. 22.44% (95% CI: 23.53-24.05) of participants were determined as OW/OB. Correlates of meeting the MBs guidelines were increasing age (negative), parental education and family income (both positive). Meeting the MBs guidelines seemed have little effects on predicting non-OW/OB. Surprisingly and interestingly, we found that meeting the MBs guidelines hardly prevented OW/OB among Chinese children and adolescents. This counter-intuitive finding implies that more potential factors should be considered when preventing OW/OB for Chinese populations, such as diet. Also, measurement error was another cause for the interesting finding. Older students and those with lower parental education and family income should be priority of interventions.

18. Exploring 24-h time-use patterns of non-standard workers

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Adults who routinely work non-standard hours (outside 7am to 7pm, Monday to Friday) have unique patterns of sleep and physical activity compared with traditional day workers. This research is being conducted to understand the patterns of sleep, physical activity, and sedentary behaviour in this population, so that workplaces can better support these employees through better job design and health programmes. Around 150 shift-working employees in the New Zealand aviation industry wore Axivity AX3 accelerometers on the thigh and lower back for seven days (168 hours) and completed a sleep log diary. Participants also completed a web-based survey about their job characteristics, health, wellbeing, and lifestyle behaviours. This presentation will (i) discuss the practicalities of conducting time-use research with non-standard workers, (ii) provide examples of unique 24-h data processing decisions, and (iii) discuss the value of providing participants with a detailed report of their 24-h time-use patterns.
WELCOME!