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DATE

12-14 October 2021



Proceedings of the 8th International Society for Physical Activity and Health Congress

KEYNOTES

**20 years of sedentary behaviour research:
Revolution, evolution, or repackaging?**
by Dr. Emmanuel Stamatakis

**All in the family: What works and what
does not when promoting parental support
of youth physical activity?**
by Dr. Ryan Rhodes

**Elements of Indigenous Motivation in
Physical Activity, Sport, and Life.**
by Waneek Horn-Miller

**Physical activity promotion in Latin
American populations: A Tale of Magic
Realism.**
by Dr. Olga Sarmiento

**Impacts of climate change on humanity: it
is worse than you think, but still fixable.**
by Dr. Camilo Mora

CONGRESS THEME

***"The Wholistic Approach
to Health and Wellness
through Physical Activity:
Body, Spirit, and Mind."***

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Dr. Darren Warburton, Professor, University of British Columbia

Keynote Presentations

20 years of sedentary behaviour research: Revolution, evolution, or repackaging?

by Dr. Emmanuel Stamatakis (University of Sydney)

Summary of Keynote Address: The idea that too much sedentary behaviour (sitting) poses distinct health risks, over and above the risks posed by the absence of sufficient physical activity, rapidly gained popularity in the first decade of this century, followed by a steady growth over the second decade. Hyperbolic messaging such as “sitting is the new smoking” were intensely promoted in popular media and scientific circles until recently. Starting from UK in 2011, many national public health guidelines have included sedentary behaviour-related recommendations of various degrees of specificity and depth. As a nascent field of research, both scientific evidence and opinion on the importance of sedentary behaviour has varied broadly over the last 20 years. Views have ranged from sedentary behaviour being simply the flipside of physical activity, to sedentary behaviour being a unique risk factor that is physiologically and behaviourally independent. This keynote provided a critical overview of sedentary behaviour as a research field over the 1999 – 2000 period, starting from the Non-Exercise Activity Thermogenesis hypothesis and followed by landmark publications on concepts such as “sedentary breaks” and “inactivity physiology”, all the way to the most recent WHO sedentary behaviour guidelines. The main conclusions were that sedentary behaviour played a critical catalytic role in the evolution of the broader physical activity field; but sedentary behaviour messages were often repackaged and re-marketed physical activity content. The keynote also provided a number of recommendations for future research and public health practice towards better integrating sedentary behaviour into the ever-expanding research paradigm of movement and health.

All in the family: What works and what does not when promoting parental support of youth physical activity?

by Dr. Ryan Rhodes (University of Victoria)

Summary of Keynote Address: Families who participate in regular physical activity reap considerable health, well-being, and family function benefits. Unfortunately, few children or their parents are participating in sufficient physical activity to reap these benefits, establishing the need for greater promotion efforts. This keynote will overview the evidence for parental support of child physical activity in the context of complex family systems. Educational vs. self-regulatory approaches to parental support promotion are compared using current observational and experimental evidence. The need for a multi-disciplinary approach to family physical activity promotion is emphasized with consideration of multiple family stakeholders (such as engaging fathers and grandparents), greater attention to modern family structures (such as shared parenting), and reflexive interventions (habit, identity, affective response) in complex systems.

Elements of Indigenous Motivation in Physical Activity, Sport, and Life.

by Waneek Horn-Miller (Kahnawake First Nation)

Summary of Keynote Address: Waneek, following in the footsteps of her ancestors used storytelling to share her journey as an Indigenous woman from trauma to the Olympics and

beyond. Her keynote address focused on the unique Indigenous perspectives on motivation, and the role that history, community, and culture play upon its formation and maintenance. She began her keynote address discussing what sport motivation is and how we think and react. She discussed how in her sporting career she was extremely athletic, but not necessarily the most skilled. However, she had an internal drive (motivation) that separated her from her peers. She highlighted how Indigenous peoples share something, a collective identity, with other Indigenous peoples that differs from the general population and traditional colonial approaches. She also highlighted the impacts of the Residential School system on Indigenous peoples in Canada including her immediate family. She discussed how energy, love, and even anger can be harnessed for motivation. She also emphasized how anger can take away from success, eating away from your emotions and thought processes. She stressed that her journey to discovery was seventeen years in the making involving a lot of self-reflection. This included recognizing the importance of considering how the decisions made by seven generations of ancestors had provided her current opportunities. Waneek discussed the importance of taking a key role in one's family and community. She also discussed the roles political structures, social awareness, activism, and systemic racism play on the health and wellbeing of Indigenous peoples. She emphasized the importance of others valuing the impacts of colonization on Indigenous athletes and peoples. She talked about finding the ways of managing stress in life and sports. She also described how the experiences, opportunities, activism, and challenges experienced by her mother shaped Waneek's life and that of her sisters. She discussed the stigma, biases, and racism that she and her mother experienced emphasizing how her mother's ability to show the strength and resiliency over these barriers was instrumental to Waneek and her sisters' successes later in life. By watching and learning from her mom, Waneek learned at a very young age what she had control over and what she did not. Ultimately, Waneek's mother was setting the goal for the next generation of disease free, high achieving Warriors. Waneek also discussed the importance of Indigenous athletes (like Alwyn Morris, Billy Mills, and Angela Chalmers) as role models for her as a young athlete. She continued her discussion about how trauma is a big part of what has shaped Indigenous peoples in Canada. She discussed the Oka crisis when she was 14 years old and the impact on her life. She highlighted how she was able to move past this trauma through strength, resiliency, and motivation to become an elite Olympic athlete. She talked about having to figure out what type of warrior she was and how she could best honour her ancestors. She concluded her presentation by discussing how the collective motivation within her family created a fire for success.

Physical activity promotion in Latin American populations: A Tale of Magic Realism.

by Dr. Olga Sarmiento (Universidad de Los Andes)

Summary of Keynote Address: Dr. Sarmiento presented the evaluation of community programs that emerged from the land of Magic Realism, Latin America. She emphasized how magic realism paints a realistic view of the modern world while also adding magical elements. She highlighted how the programs presented all had a part of magic realism from a region full of colour, innovation, contrasts, inequality, and resilience. Dr. Sarmiento discussed how Latin America is a region under rapid urbanization (with 80% living in cities) with great contrasts and challenges with respect to social equality/inequality gaps. Latin America is dense, diverse, and fragmented with a high prevalence of insufficient physical activity. She demonstrated how the IPEN study

conducted in Bogota, Cuernavaca, and Uritiba showed that Latin Americans are more active in the streets and parks. In this land of magic realism, Dr. Sarmiento highlighted how there are novel programs that can promote physical activity within parks and on the streets. These programs go beyond traditional systems including the the Ciclovias, Recreativas, or open street programs, cycling infrastructure, community programs in parks to promote PA through dancing, and cable cars integrated to mass transit for transport. All of these programs are aligned with the Global action plan on physical activity 2018–2030 of more active people for a healthier world from WHO. She revealed that these out of the health sector programs have the potential to promote physical activity and impact the well-being of people (women, children, and older adults) and their urban settings. She also discussed how practice-based evidence accelerates more quickly than evidence-based practice. She also argued how evaluation requires mixed methods, and an interdisciplinary research approach, with engagement of citizens (citizen science by the people) and policy actors throughout the design and evaluation process. She highlighted how policy makers have recognized the potential impact of recreation and transport and urban interventions on livability and health. Dr. Sarmiento emphasized how these studies required national and international networks and multidisciplinary groups with true partnerships between researchers, end users, and community.

Impacts of climate change on humanity: it is worse than you think, but still fixable.

by Dr. Camilo Mora (University of Hawaii Manoa)

Summary of Keynote Address: Dr. Camilo Mora's keynote address was designed to address the impacts of climate change on humanity and the solutions that his team has created. Dr. Mora emphasized how through approximately 20 years of research on these different topics he has discovered the enormous and alarming impact(s) of climate change on nature and humanity. He also articulated his concerns about our ability to deal with climate change. He highlighted the diverse (at least 27) ways that you can die from during a heatwave. He equated how this was like a horror movie with 27 endings to choose from. Dr. Mora discussed how the evaluation of 12,000 papers revealed that there are more than 400 ways that climate change can harm humanity. He argued how there will be no place to hide from climate change and it is likely to get worse. Dr. Mora's daughter, Asryelle, then discussed potential solutions that they have explored to address the impacts of climate change, such as the Carbon Neutrality Challenge (www.GoCarbonNeutral.org). The premise is to calculate how much carbon dioxide each person generates, estimate the number of trees necessary to sequester those emissions, plant the trees, and then climate change solve. At any moment, a person will know how many trees to plant and/or how much they would have to reduce consumption to reach neutrality. Asryelle discussed the various community-based approaches to addressing climate change including an initiative wherein 20 teams were able to plant 1,100 trees in two hours. Asryelle also highlighted how they created a webpage called "The Planting World Records" to incentivize this project, which allowed teams of no more than 20 people to compete in planting the most trees in six hours. Asryelle emphasized the various opportunities and challenges associated with addressing climate change. She stressed how the average person would need to plant 130 trees to be carbon neutral across the lifespan, which equates to one trillion trees across the world. Asryelle concluded by emphasizing that we know the problem and the solution and therefore there is no excuse for not addressing climate change.

Congress Day One

Symposia

Symposium A1: Lancet Physical Activity Series 2020: Bridging the gaps in research, policy and practice

8:35 am - 10:05 am (Sydney, Australia, Tuesday, October 12, 2021)

Melody Ding¹, Esther van Sluijs², Kathleen A. Martin Ginis³, Adrian Bauman¹, Deborah Salvo⁴

¹University of Sydney, Australia, ²Cambridge University, United Kingdom, ³University of British Columbia, Canada, ⁴Washington University in St. Louis, USA

Purpose: The Lancet Physical Activity Series (LPAS) launched in 2012 and 2016 have been major publications in the field. These series have provided much-needed summaries of the progress in research and policy, elevated the case of physical activity (PA) in global health, and informed a large volume of research (>17,000 citations) and policy dialogues. In July 2020, ahead of the Tokyo Summer Olympics, we launched the 2020 LPAS. In this symposium, we will bring together lead authors of LPAS 2020 to discuss the progress, gaps, and future direction of the field of PA and health.

Description: Chair: Dr. Melody Ding, the University of Sydney, Australia. In the opening statement, the Chair will share a brief history of the LPAS, followed by the introduction of the 2020 Series. The Chair will focus on an overall discussion of the field, the research and policy gaps identified before the 2020 series, and how the 2020 Series aimed to address these gaps.

Presenter 1: Dr. Esther van Sluijs, Cambridge University, United Kingdom. Title: Physical activity behaviours in adolescence: Current evidence and opportunities for intervention.

Presenter 2: Dr. Kathleen A Martin Ginis, University of British Columbia, Canada. Title: Physical activity among people with disabilities: A global perspective. Description: The presenter will provide an overview of PA for people with disabilities (PWD) living in low, middle, and high-income countries, by 1) summarizing the epidemiology of PA prevalence and health benefits; 2) reviewing correlates/determinants of PA and PA interventions in PWD; and 3) discussing international PA policy for PWD.

Presenter 3: Dr. Adrian Bauman, University of Sydney, Australia. Title: Do the Olympic Games promote population physical activity: Demythologizing the “trickle down” hypothesis. Description: This presentation will examine the promises of the “Olympic legacy” to increase population PA through novel reviews and analyses related to recent Olympic games, including: 1) an audit and review of pre-Olympic policy documents, 2) trends in PA in hosting countries around the Olympics, and 3) policy recommendations on how to capitalize mass sporting events to promote population-level PA.

Presenter 4: Dr. Deborah Salvo, Washington University in St. Louis, USA. Title: Physical activity promotion and the United Nations Sustainable Development Goals: Building synergies to maximize impact. Description: This presentation will discuss how to align the PA promotion agenda with sustainable development to maximize multi-sectoral engagement. The presentation will comprise multiple components to synthesis diverse evidence from conceptual development, literature review, and agent-based modeling. Finally, the presenter will provide an integrative framework for action with concrete recommendations.

Results: The presenters will summarize key findings from their LPAS papers and encourage discussion with the audience on specific presented topics and generally on the progress, gaps and directions of PA research, policy and practice globally.

Conclusions: This symposium highlights a collection of highly visible new publications spanning over multiple key topics of interest for ISPAH. Featuring international experts, including Early-Mid Career Researchers, and supported by the LPAS Executive Committee, this symposium aims to provide timely, updated and important, but neglected areas in the field and stimulate broader discussion on how to encourage active living worldwide.

Keywords: Global Health, Adolescent, Disability, Policy, Interdisciplinary Research

Symposium A2: Global physical activity promotion through youth-engaged citizen science

8:35 am - 10:05 am (Sydney, Australia, Tuesday, October 12, 2021)

Erica Hinckson¹, Abby C. King², Moushumi Chaudhury¹, Sebastien Chastin^{3,4}, Paul Gardiner⁵, Ann Banchoff², Lisa Goldman Rosas², Olga Sarmiento Dueñas⁶, Felipe Montes-Uniandes⁶, Feyisayo A. Odunitan-Wayas⁶

¹Auckland University of Technology, New Zealand, ²Stanford University School of Medicine, ³Glasgow Caledonian University, UK, ⁴Ghent University, Belgium, ⁵University of Queensland, Australia, ⁶Universidad de los Andes, Bogotá, Colombia

Purpose: To showcase the application of a systematic, community-engaged research that seeks to influence community-driven changes in local environments for engagement in physical activity. The research was conducted by the Our Voice (OV) Global Citizen Science Research Network, which currently involves 20 countries from six continents.

Description: Youth from low-income, underserved communities represent a potentially powerful; yet underutilized resource for community-engaged citizen science that can catalyze civic, scientific, and social engagement while improving health at a community level. In this symposium, we share results from Our Voice (OV) Global Citizen Science Youth Initiative.

Chair: Professor Erica Hinckson, Auckland University of Technology. Introduction of Symposium. The Chair will briefly introduce the context and introduce the speakers.

Presenter 1: Dr. Ann Banchoff, Stanford University School of Medicine. Title: Our voice: Engaging youth as Citizen Scientists to advance health equity. Description: This presentation will provide a brief overview of the OV Global Citizen Science Youth Initiative. The OV citizen science model is an evidence-based and scalable “bottom-up” research-to-action model that engages and empowers residents as change agents in their own communities. In this presentation, we will present results from projects that have engaged youth from diverse socioeconomic backgrounds focused on safe routes to schools (U.S.), healthy and active school environments (Colombia, South Africa), and intergenerational projects in which youth and older adults have worked together to improve walkability and safety in low-income neighborhoods (Mexico, U.S.).

Presenter 2: Dr. Moushumi Chaudhury, Auckland University of Technology. Title: Empowering children to influence changes in their school environment for learning, physical activity, health, & well-being. Description: This presentation will focus on results from the New Zealand project where children identified the environmental barriers and facilitators to being physically active and healthy at school. Using the OV protocol, youth collected meaningful information about their ‘local’ school environment, prioritised their concerns, interpreted data and engaged in conversations with the school’s principal, and Board of Trustees to generate practical solutions that impacted their school environment.

Presenter 3: Professor Sebastien Chastin, Glasgow Caledonian University, Ghent University. Title: Our voice: Co-benefits of environmental conservation and health. Description: Exposure to blue space in urban environment is associated with better health outcomes, but with increase urbanisation and usage, blue spaces are also under environmental pressure. Our study explored how co-benefit between environmental conservation and health can be derived from youth group. A campaign of citizen science using the OV protocol was developed in youth clubs and primary school in North Glasgow within the canal corridor.

Results: Outcomes to date from the projects have included increased rates of walking and biking to school among ethnically diverse elementary school children (U.S.); activation of the school community to reduce traffic and improve safety and infrastructure in and around schools for physical activity promotion (Colombia, South Africa); development of strategies to contain roaming dogs to promote neighborhood walkability (Mexico); promotion of active and healthy environments among students from low socio-economic schools by finding solutions to lack of play spaces, unusable open spaces and lack of fitness facilities (New Zealand); and the production of a short film that was presented to local town planners, councillors and the public around the enjoyment young people derive from being around green and blue spaces, littering, vandalism and the lack of investment of local authorities in maintaining these places (Scotland).

Conclusions: Dr. Paul Gardiner, The University of Queensland. Activating youth across the socioeconomic spectrum as citizen scientists can complement “top-down” policy methods and create pathways that address the community drivers of physical activity in diverse regions globally contributing to the ultimate global goal of a 10% increase in physical activity by 2025. Funding: The Robert Wood Johnson Foundation Grant ID#7334, USA. South Sci of COMET, Curious Minds-He Whenua Hirihiri te Mahara and Ministry of Business Innovation and Employment, New Zealand. FAO is funded by NIHR (16/137/34) for Global Health Research Group and Network on Diet and Activity, NIH FIC D43TW010540 and OBSSR, UK. This symposium presents independent research funded by the above organisations. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care, UK; Robert Wood Johnson Foundation, USA; or MBIE, New Zealand.

Keywords: Environment, Physical Activity, Youth, Citizen Science, Intervention

Symposium A3: Poor implementation? Process evaluations to explain implementation and effectiveness of school physical activity programmes using mixed-methods

8:35 am - 10:05 am (Sydney, Australia, Tuesday, October 12, 2021)

Matthew McLaughlin^{1,2,3,4}, Cassandra Lane^{1,2,3,4}, Gabriella M. McLoughlin^{5,6}, Patti-Jean Naylor⁷

¹School of Medicine and Public Health, University of Newcastle, Newcastle, Australia, ²Hunter New England Population Health, Wallsend, NSW, Australia, ³Hunter Medical Research Institute, Newcastle, NSW, Australia, ⁴Priority Research Centre in Health Behaviour, University of Newcastle, Newcastle, NSW, Australia, ⁵Implementation Science Center for Cancer Control and Prevention Research Center, Brown School, Washington University in St. Louis, St. Louis, MO, USA, ⁶Department of Surgery (Division of Public Health Sciences), Washington University School of Medicine, Washington University in St. Louis, St. Louis, MO, USA, ⁷School of Exercise Science, Physical and Health Education, University of Victoria, Victoria, British Columbia, Canada

Purpose: Schools are considered a key setting for physical activity promotion. However, meta-analyses suggest that many school-based physical activity interventions are not effective, with poor implementation given as a primary reason for the lack of effectiveness. This symposium provides an in-depth exploration of implementation outcomes via three school-based mixed-methods process evaluations to explain implementation effectiveness.

Description: We present three mixed-methods process evaluations of efficacious school-based physical activity interventions in two countries, across primary and secondary schools. In order to realise their public health benefits, these interventions have been scaled-up. To explain implementation effectiveness, we will explore where and if they are implemented (adoption), how much support was offered and obtained for this implementation (fidelity and reach) and if they are liked (acceptable), practically deliverable by schools (feasible) and perceived to work (appropriateness).

Chair: Dr. Patti-Jean Naylor, University of Victoria

Presenter 1: Cassandra Lane, University of Newcastle. Title: Mixed-methods process evaluation of Physically Active Children in Education (PACE): an effective school-based physical activity policy implementation strategy. Description: PACE is an effective, multi-strategy intervention that was found to significantly increase schools' implementation of a mandatory physical activity policy. In order to optimise such implementation interventions, the underlying mechanisms surrounding the intervention effect and relative contribution of each strategy are needed. This presentation will report on the findings of a mixed methods process evaluation undertaken to explore the various implementation measures of PACE and the relative importance of each implementation strategy.

Presenter 2: Dr. Gabriella M. McLoughlin, Tempe University. Title: Mixed-methods process evaluation of the School Wellness Integration Targeting Child Health (SWITCH®) Dissemination Trial. Description: The SWITCH® program has been shown as an effective program at enhancing children's physical activity and nutrition behaviours, and is now in the dissemination phase across the state of Iowa. This presentation will report on the mixed-methods process evaluation findings, grounded in the Consolidated Framework for Implementation Research (CFIR). In particular, we will report on the implementation strategies adopted by schools according to socioeconomic status of population, baseline organizational readiness/capacity, and composite implementation score, as a means to identify adaptation techniques which can further promote and enhance implementation.

Presenter 3: Matthew McLaughlin, University of Newcastle. Title: Mixed-methods process evaluation of the scale-up of 'Physical Activity 4 Everyone' (PA4E1): A Hybrid Type III Randomised Controlled Trial. Description: The PA4E1 program is an efficacious secondary school physical activity program targeting students in low-socioeconomic areas, which increased students' moderate-to-vigorous physical activity by 49 minutes per week. The program has now been scaled-up. This presentation will report the process evaluation findings of the scaled-up trial. The process outcomes are fidelity and reach of the implementation strategies, and the acceptability, appropriateness and reach of the program, inclusive of both the physical activity practices (the intervention) and the implementation support strategies. Specific sub-groups will be explored, including high Indigenous enrolment schools. Findings will help explain the scaled-up trial implementation outcomes.

Results: Quantitative and qualitative data collected from school end-users and implementers will be mixed and discussed in relation to the implementation effectiveness of each school-based program.

Conclusions: Detailed process evaluations may be used to optimise the effectiveness, cost-effectiveness and potential for scale of the current and future interventions in schools.

Keywords: Implementation, Mixed-Methods, Process Evaluation, Schools, Physical Activity

Symposium A4: The Physical Activity Cohort Repository (PACE): A new resource for ISPAH members

8:35 am - 10:05 pm (Sydney, Australia, Tuesday, October 12, 2021)

Andrea Ramirez Varela¹, Terry Boyle², Leonessa Boing³, Brigid Lynch⁴

¹School of Medicine, Universidad de los Andes, Bogotá, Colombia, ²University of South Australia, Adelaide, Australia, ³Santa Catarina State University, Florianópolis, Brazil, ⁴Cancer Council Victoria, Melbourne, Australia

Purpose: The Epidemiology Council of ISPAH will present results from the flagship project of the Council's first term (the PACE), and give an overview of its functionality and applications.

Description: Critical assessment and knowledge of the epidemiological methods to measure physical activity-PA and sedentary behaviour-SB variables in longitudinal studies are required to continue building PA and SB research capacity worldwide. An online repository with free and available data from cohort studies worldwide, is a valuable resource and will encourage researchers to return to existing studies and apply contemporary causal inference methods. This will not only build a stronger evidence base, but it will facilitate international collaborations that will contribute with capacity building in PA research worldwide. This symposium will provide an overview of the development of the PACE, and provide examples of how this resource can be used by ISPAH members. The symposium Chair and presenters formed the core working group for the project; they will each give a ten-minute presentation. We will then hold a panel discussion with other members of the project team, where they will talk about how the PACE will help their own programs of research. There will be a focus on how this resource will build capacity in low- and middle-income countries.

Chair: Dr. Andrea Ramirez Varela, School of Medicine, Universidad de los Andes. Title: The Physical Activity Cohort Repository (PACE): Introduction and overview of the PACE Project

Presenter 1: Dr. Brigid Lynch, Cancer Council Victoria. Title: Background and rationale for the Physical Activity Cohort Repository

Presenter 2: Leonessa Boing, Santa Catarina State University. Title: Methods, results to date and the Physical Activity Cohort Repository

Presenter 3: Dr. Andrea Ramirez Varela, School of Medicine, Universidad de los Andes. Title: Utility of the Physical Activity Cohort Repository for LMIC.

Presenter 4: Dr. Terry Boyle, University of South Australia. Title: Current and potential use of multiple waves of physical activity data.

Panel discussion: Volunteer contributors to the PACE project, who are attending the ISPAH Congress, will give a brief overview of how they plan to utilize the PACE. Questions will be taken from the audience at this time.

Results: Sixteen volunteer ISPAH members from nine countries contributed to the project. A comprehensive systematic review strategy was used to identify publications describing cohort studies that include measures of physical activity and/or sedentary behavior (both self-report and device-based measures). The systematic review was registered at PROSPERO. The team screened nearly 9,000 titles and abstracts that were identified by the literature search. Full text screening and data extraction is expected to be completed by July 2020.

Conclusions: The PACE will provide a clear picture of the scale and methods by which physical activity has been assessed in cohort studies around the world. The PACE will help to maximize the investments made into cohort studies, by encouraging researchers to return to existing studies and apply contemporary analytic methods, and by facilitating international consortia. This will not only build a stronger evidence base, but it will facilitate international collaborations that will help build capacity in low- and middle-income countries.

Keywords: Epidemiology, Cohort Studies, Physical Activity, Sedentary Behavior

Symposium A5: Revisiting the “Physical Activity Paradox”: An in-depth look from around the globe

6:00 pm - 7:30 pm (Sydney, Australia, Tuesday, October 12, 2021)

Nidhi Gupta¹, Melody Ding², Tracy Kolbe-Alexander^{3,4,5}, Pieter Coenen⁶

¹National Research Centre for the Working Environment, Copenhagen, ²School of Public Health, Faculty of Medicine and Health, University of Sydney, Camperdown, NSW, Australia, ³School of Health & Wellbeing, Faculty of Health, Engineering & Sciences, Ipswich, Queensland, Australia, ⁴University of Southern Queensland, Toowoomba, Australia, ⁵School of Human Movement and Nutrition Sciences, University of Queensland, Australia, ⁶Division of Exercise and Sports Medicine, University of Cape Town, Cape Town, South Africa, ⁶Department of Public and Occupational Health, Amsterdam UMC, Amsterdam, the Netherlands

Purpose: It is well-established that physical activity reduces the risk of various health outcomes, including cardiovascular diseases, musculoskeletal pain, and mortality. However, a growing body of evidence on domain-specific physical activity indicates that the health effects of physical activity might not be the same when the physical activity is carried out at work versus during non-work time. This observation has been referred to as the ‘Physical Activity (PA)-Health Paradox’. For example, a meta-analysis on almost 200,000 individuals indicated that occupational physical activity (OPA) increases 18% risk of all-cause mortality independent of leisure time physical activity especially among males.

However, some critique that observational study design, self-reported physical activity measures, and incomplete statistical procedures have led to the biased observation of the “paradox”. Also, current research on OPA is limited by its geographic scale and the lack of consideration of various aspects of OPA, such as seasonal variation, shift work, and a wide range of occupational groups. In our proposed symposium, we aim to present novel research findings from around the world on OPA and health related outcomes, taking into account various limitations of the current research evidence.

Description: Chair. Nidhi Gupta and Dr. Pieter Coenen. This covers an introduction on the origin of the PA paradox, how it has been understood till now, and for what the paradox has been criticized.

Presenter 1: Nidhi Gupta, National Research Centre for the Working Environment, Copenhagen. Title: Do we observe the PA Paradox among workers from manufacturing and cleaning sector? A study on 4-year follow up on long-term sickness absence. Description: This presentation will be about if we observe the Physical Activity Paradox among workers from two job sectors, using accelerometry-based physical activity measures and adjustment for important confounders.

Presenter 2: Dr. Melody Ding, University of Sydney. Title: Patterns of occupational physical activity and mortality outcomes: A prospective analysis of a large population-based Chinese cohort. Description: The presenter will show novel analysis of the patterns of occupational, transport and leisure-time physical activity and the associations between activity patterns and mortality outcomes in China. The presenter will then lead a discussion regarding occupational physical activity in low- and middle-income countries.

Presenter 3: Dr. Tracy Kolbe-Alexander, University of Southern Queensland. Title: Time use in shift workers and the relationship with vascular function. Description: Differences in shift workers’ physical activity (PA), sedentary behaviour and sleep while at work and in leisure time, on days when they are working at night, during the day, or on non-workdays, are largely unexplored. This talk will address the variation in these behaviours among shift workers from different sectors according to the type of shift (day, night, day off) in addition to comparisons with those who only work during the day. The relationship between shift workers’ physical activity and vascular function will also be discussed.

Presenter 4: Pieter Coenen, Vrije University Medical Centre, Amsterdam. Title: Towards a better understanding of the ‘physical activity paradox’: a research agenda. Description: In this presentation, the presenter will discuss the points of critique of ‘the physical activity paradox’ and provide a research agenda to guide the audience into a better understanding of occupational physical activity.

Results: This symposium will extend the current discussion regarding the ‘Physical Activity Paradox’ by providing in-depth analysis and discussion on some important gaps in research, such as shift work, seasonal variation and a large range of occupational groups around the world.

Conclusions: This symposium is linked to ISPAH theme of “Physical Activity Domains and Health”. Our collaborative work shows the importance of developing a research agenda for understanding the PA paradox. With more in-depth and more comprehensive analysis, our collaborative work aims to provide evidence and elicit discussion towards developing effective guidelines and strategies regarding domains of physical activity to reduce risk of non-communicable diseases globally.

Keywords: Domain-Specific, Measurements, Seasonal Variation, Shift Work, Job Groups

Symposium A6: Translating whole system approaches into practice to increase population physical activity

6:00 pm - 7:30 pm (Sydney, Australia, Tuesday, October 12, 2021)

Lindsey Reece^{1,2}, Adrian Bauman^{1,2,3,4,5}, Tracy Nau^{2,3,4}, Karen Lee^{3,4}, Ben J. Smith^{3,4}, William Bellew^{1,2,3,4,5}, Peter McCue⁶, Phil Hamdorf⁶, Katie Shearn^{7,8}, Anna Lowe^{7,8}, Rob Copeland^{7,8}

¹SPRINTER, Prevention Research Collaboration, School of Public Health, University of Sydney, NSW, Australia, ²Charles Perkins Centre, University of Sydney, NSW, Australia, ³School of Public Health, University of Sydney, Sydney, NSW, Australia, ⁴The Australian Prevention Partnership Centre, University of Sydney, Sydney, NSW, Australia, ⁵WHO Collaborating Centre for Physical Activity Nutrition and Obesity (CCPANO), ⁶Office of Sport, NSW Government, NSW, Australia, ⁷National Centre for Sport and Exercise Medicine (NCSEM), Sheffield, South Yorkshire, UK, ⁸Sheffield Hallam University, Sheffield, South Yorkshire, UK

Purpose: There has been a recent resurgence in applying system thinking to complex public health problems, yet few have discussed their application in real-world settings, with little consideration given to the interaction of research, practice and policy.

Description: Hear transparent and reflective experiences from three diverse whole systems projects, that will collectively inform a discussion on how to translate evidence into practice with a proactive discussion for future research, policy and practice.

Chair: Dr. Lindsey Reece, University of Sydney. Introduce symposia by providing a global update on evidence and international policy drivers for the development and implementations of whole systems approaches to increase population physical activity

Presenter 1: Dr. Tracy Nau (University of Sydney, The Australian Prevention Partnership Centre) and Professor Bill Bellew (University of Sydney, The Australian Prevention Partnership Centre and WHO Collaborating Centre for Physical Activity, Nutrition and Obesity). Title: ASAPa – the Australian systems approach to physical activity Description: The Australian Systems Approaches to Physical Activity (ASAPa) project is a national initiative to addressing population physical activity (PA) with the aim to advance whole systems approaches from theoretical to practical applications. National meetings were convened with policy makers across sectors and jurisdictions. A conceptual systems map was developed incorporating governance, translation and advocacy. The review of policies, programs and prevalence identified potential gaps and opportunities that could be targeted to strengthen the PA system, including system supports around financing, evaluation, governance, and standardisation of state-based surveillance systems. An evidence-based guide for policy action and investment was developed.

Presenter 2: Dr. Lindsey Reece; (SPRINTER, University of Sydney). Title: A systems approach to NSW physical activity strategy. Description: A whole-of-Government Physical Activity Strategy is a priority for the NSW Office of Sport. An evidence review highlighted the need for a multifaceted, multisectoral approach. The eight investments that work for physical activity were the central organising framework for the strategic development process which enabled state agencies to unite around a shared goal. Eight sector specific workshops were convened to highlight gaps in current provision and identify sector specific priorities. Common cross cutting themes were then addressed at a multiagency forum which informed the drafting of key strategic documents. Quantitative and qualitative evaluations were completed throughout.

Presenter 3: Dr. Katie Shearn (Sheffield Hallam University, UK); Anna Lowe (Program Manager, Move More, NCSEM, UK); Professor Rob Copeland (NCSEM, UK; Sheffield Hallam University). Title: Translating whole system approaches into practice to increase population physical activity. Description: Move More is a whole systems approach (WSA) to physical activity in Sheffield. The approach has established principles and values by which we want to stimulate change. We have operationalised this through a cyclical approach of testing and learning across six interlinked areas of work: active communities, active healthcare, active environments, active workforces, active schools and active through sport. We will explain how changes have come about and ongoing tensions across three themes. Our efforts to build and sustain active participation from key institutions across the city; our approaches to support community organisations build capacity in our neighbourhoods, and; our work to join up across sectors through the development of our Move More Ambassador Network.

Results: System interactions across these projects will provide practical examples of mapping systems; stakeholder engagement and management; willingness to take risks and challenge existing practice, whilst describing the daily tensions as systems leaders. The collation of experience and processes applied throughout the evolution of these innovative projects will provide a key forum for knowledge sharing. A facilitated discussion on how to reorient future practice towards equitable and sustainable environments that enable physical activity to be embedded within everyday life will also occur.

Conclusions: This symposium will be useful in supporting other communities to translate systems evidence into practice.

Conflict of Interest and Funding: The SPRINTER research group is a partnership between the University of Sydney and the Office of Sport NSW government. SPRINTER receives funding for a three-research program. ASAPa: Funding for this research has been provided from the Australian Government's Medical Research Future Fund. The MRFF provides funding to support health and medical research and innovation, with the objective of improving the health and wellbeing of Australians. MRFF funding has been provided to The Australian Prevention Partnership Centre under the MRFF Boosting Preventive Health Research Program. Further information on the MRFF is available at www.health.gov.au/mrff

Keywords: Whole Systems, Physical Activity, Knowledge Translation

Oral Presentations Session A1

Oral Presentation A1.1 Switching from active to passive travel: What is the potential among adolescents?

10:15 am - 10:25 am (Sydney, Australia, Tuesday, October 12, 2021)

Venurs Loh¹, Shannon Sahlqvist¹, Jenny Veitch¹, Alison Carver², Ana Maria Contardo Ayala¹, Rachel Cole³, Anna Timperio¹

¹Institute for Physical Activity and Nutrition (IPAN), School of Exercise and Nutrition Sciences, Deakin University, Geelong, Australia, ²Mary MacKillop Institute for Health Research, Australian Catholic University, Melbourne, VIC, Australia, ³School of Health and Sport Sciences, University of Sunshine Coast, Sippy Downs, QLD, Australia

Background: Few Australian adolescents are sufficiently active. Replacing short 'passive' travel (i.e. car, public transport) with active travel (i.e. walking or cycling) could be an important potential strategy to increase physical activity. **Purpose:** To characterise adolescents' travel patterns to various destinations, identify short passive trips that could be feasibly replaced by active travel, and identify the characteristics associated with those trips. **Methods:** Data were from 2,192 Victorian secondary school students (12-17 years; 51%males) with 24-h travel diary data in the Victorian Integrated Survey of Travel Activity 2012–2016. Feasible distance thresholds for walking and cycling were determined at the 80th percentile of distance of reported walking and cycling trips, respectively, in the sample. Comparison tests were conducted to assess whether travel patterns differed by sociodemographic characteristics. Multilevel logistic regression identified characteristics of passive trips that could be replaced by active travel. **Results:** A total of 6,428 trips comprising 8,986 trip legs (segments) were recorded. About 11% of adolescents could feasibly replace ≥ 1 short passive trip with walking and 48% could feasibly replace ≥ 1 short passive trip with cycling. Of the passive trips recorded, 7% could be replaced with walking and 40% could be replaced with cycling. Trips that commenced within daylight hours, and trips made for shopping and social reasons had higher odds of being replaceable by active travel. **Conclusion:** Increasing cycling for transport, especially for discretionary trips made during daylight hours, could potentially have a significant impact on overall physical activity levels. **Funding:** VL is supported by an Executive Dean's Postdoctoral Research Fellowship. JV is supported by an Australian National Heart Foundation Future Leader Fellowship (ID101928). AMCA was previously supported by, and AT was a recipient of, a National Health and Medical Research Council Centre for Research Excellence (APP1057608) during the conduct of this study.

Keywords: Active Travel, Motorised Transport, Modal Shift, Travel Pattern

Oral Presentation A1.2 Association between walking and perception of green space among community-dwelling older people with low self-efficacy

10:25 am - 10:35 am (Sydney, Australia, Tuesday, October 12, 2021)

Haruhi Encho¹, Kazuaki Uchida¹, Kana Horibe¹, Kiyomasa Nakatsuka¹, Ryo Goto¹, Kenta Saeki¹, Kazuya Tamura¹, Masato Tezuka¹, Mao Mukaijo¹, Naaki Yamada¹, Rei Ono¹

¹Department of Public Health, Graduate School of Health Sciences, Kobe University, Kobe, Hyogo, Japan

Background: Low self-efficacy can cause physical inactivity among older people. Increasing perception of green space is one of the effective approaches to physical activity, but it is not clear among older people with low self-efficacy. **Purpose:** This study aims to investigate the association between walking and perception of green space among older people with low self-efficacy. **Methods:** We conducted a cross-sectional study among 104 community-dwelling older people with low self-efficacy (mean age = 79.7 years, 69.2 % females). Low self-efficacy was defined as below the median score on the self-efficacy for exercise scale. Walking was measured using International Physical Activity Questionnaire and "more walking" was defined as ≥ 150 minutes of walking per week. Perception of green space was measured by an 8-item questionnaire and "high perception of green space" was defined as above the median score. To investigate the association, unadjusted and adjusted logistic regression analysis was used and adjusted the following confounding variables: age, gender, and years of education. **Results:** Fifty-one participants (49.0%) were "more walking" and 48 participants (46.2%) had "high perception of green space". Even after adjusted, people with "high perception of green space" were "more walking" (Odds ratio = 3.02, 95% Confidence interval = 1.34-7.08). **Conclusion:** Our findings suggest that increasing perception of green space may be important to encourage walking among older people with low self-efficacy. **Funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Keywords: Walking, Green Space, Self-Efficacy, Older People

Oral Presentation A1.3 The impact of the ENJOY Seniors Exercise Park on physical activity, physical function and health in older people

10:35 am -10:45 am (Sydney, Australia, Tuesday, October 12, 2021)

Pazit Levinger^{1,2,3}, Jeremy Dunn¹, Maya Panisset¹, Terry Haines⁴, Briony Dow¹, Frances Batchelor¹, Stuart Biddle⁵, Gustavo Duque⁶, Keith Hill³

¹National Ageing Research Institute, Melbourne, Australia, ²Institute for Health and Sport, Victoria University, ³Rehabilitation, Ageing and Independent Living (RAIL) Research Centre, Monash University, Melbourne, Australia, ⁴Monash University, Melbourne, Australia, ⁵University of Southern Queensland, Springfield, Queensland, ⁶Melbourne University, Melbourne, Australia

Background: The ENJOY project (Exercise interveNtion outdoor project in the cOMmunitY for older people) is a community research project actively promoting physical activity engagement and well-being through the delivery of an exercise program using outdoor multimodal exercise equipment (the Seniors Exercise Park <https://youtu.be/PaYuCMtlyk>). **Purpose:** This study investigated the impact of the physical activity program, on health, physical function, and falls in older people. **Method:** Inactive older people (with

increased falls risk) were recruited and underwent a 3-month supervised outdoors exercise program followed by 6-month maintenance phase (unstructured physical activity program). Participants' physical activity, physical function, falls and health related quality of life were assessed at baseline, 3-months and 9-months, with an overall 12-months falls record follow up. **Results:** Eighty people completed the 3-month intervention, 58 completed the 9-month assessment (due to COVID-19 restrictions), with 54 available for the 12-months falls analysis. A significant improvement in physical activity, physical function ($p < 0.01$), self-rated quality of life ($p < 0.05$), wellbeing ($p < 0.01$), fear of falls ($p < 0.01$), falls risk ($p < 0.01$), depressive symptoms ($p = 0.01$) and loneliness ($p = 0.03$) were reported at 3-months. The improvement in physical activity and physical function was maintained at 9 months. Number of fallers (from 51.8% to 31.4%, $p = 0.03$) and falls incidence (from 42 to 29 falls, $p < 0.01$) were significantly reduced at the 12-months follow up. Conclusion: The Seniors Exercise Park program offers various health and physical benefits and can be an important public health infrastructure investment in promoting physical activity for older people. **Funding:** Gandel Philanthropy.

Keywords: Built-Environment, Older People, Physical Activity

Oral Presentation A1.4 Daily Park use, physical activity and stress: A Mobile-Ecological Momentary Assessment study amongst Asian adults

10:45 am - 10:55 am (Sydney, Australia, Tuesday, October 12, 2021)

Nicholas A. Petrunoff¹, Park Su Hyun¹, Wang Nan Xin², Rob M. van Dam^{1,3}, Angelia Sia^{4,5}, Tan Chuen Seng¹, Falk Müller-Riemenschneider^{1,6}

¹Saw Swee Hock School of Public Health, National University of Singapore and National University Health System, ²Department of Human Nutrition, University of Otago, ³Department of Nutrition, Harvard T.H. Chan School of Public Health, Harvard University, ⁴Centre for Urban Greenery & Ecology, National Parks Board of Singapore, ⁵Department of Psychological Medicine, Yong Loo Lin School of Medicine, National University of Singapore and National University Hospital System | ⁶Digital Health Center, Berlin Institute of Health, Charite University Medical Centre Berlin

Purpose: To investigate the variability of daily patterns of park use (PU), leisure-time physical activity (LTPA) and psychological stress; relationships of PU and LTPA with stress; and, whether these relationships are independent. **Methods:** Singapore citizens/permanent residents 21-75 years-of-age from the Multi-Ethnic Cohort were enrolled into this study. Participants received mobile-Ecological Momentary Assessment (m-EMA) mini-surveys for up to nine days via their smartphone, including questions on PU and LTPA that day, plus perceived stress level that evening. Descriptive statistics summarized participant demographics, day-to-day variation in PU, LTPA and stress. Logistic regression models using generalized estimating equations assessed relationships of PU and LTPA with stress. Interaction effects between PU and LTPA were assessed. **Results:** From 709 participants, 85.2% ($n = 605$, 4,678 m-EMA responses) were included in analyses - mean age 45.1 years; 53.9% female; 71.9% Chinese. Proportions reporting any stress were highest (39.5%) on Mondays and lowest on Sundays (29.2%), whilst PU and LTPA participation respectively were lowest (22.8%, 30.4%) on Mondays and highest on Saturdays/Sundays (26.5%, 39.2%). PU and LTPA participation (vs. no PU and no LTPA) were both associated with lower evening stress (respectively, Adjusted Odds Ratio (AOR)=0.67; 95% CI=0.58–0.77; AOR=0.73; 95% CI=0.64–0.82). Associations were independent (interaction term between PU and LTPA: $p = 0.99$). **Conclusions:** Daily PU and LTPA were both associated with reduced evening stress. These associations were independent from each other, suggesting both contribute to reducing psychological stress amongst adults. **Funding:** Ministry of National Development Research Fund (Singapore), National Parks Board and National University of Singapore.

Keywords: Adults, Park Use, Physical Activity, Mobile-Ecological Momentary Assessment, Psychological Stress

Oral Presentation A1.5 Socio-ecological influences of leisure-time physical activity among Nepalese adults: a qualitative study

10:55 am - 11:05 am (Sydney, Australia, Tuesday, October 12, 2021)

Susan Paudel¹, Alice J. Owen¹, Ben J. Smith^{1,2}

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia, ²Sydney School of Public Health, University of Sydney, Sydney, Australia

Background: With the economic and social change, participation in occupational and transport-related physical activity is declining among Nepalese adults, highlighting the growing importance of leisure-time physical activity (LTPA). Purpose: To qualitatively explore the socioecological influences upon participation in LTPA among Nepalese adults aged 40 years and above. **Methods:** A total of 51 adults (30 females and 21 males) participated in one of nine focus groups conducted in Kathmandu, Nepal. Data collection was guided by the social-ecological model of physical activity and analysis was done using the reflexive thematic analysis approach in NVivo 12. **Results:** Leisure time was mostly spent resting, socialising, or engaging in sedentary activities such as watching television. Individual-level barriers to LTPA participation included lack of knowledge, perceived lack of skill, lack of motivation, considering oneself as sufficiently active and engagement in sedentary screen activities. Family and household responsibilities, lack of support and fear of being judged by community members constituted the interpersonal barriers, while environmental barriers to LTPA included an absence of a supportive social norm, lack of open spaces, weather conditions and perceived lack of safety. Health benefits, prioritising physical activity, social support, provision of group-based activities and age-appropriate public exercise facilities were identified as major facilitators. **Conclusion:** Critical issues that need to be addressed to increase LTPA among Nepalese adults include traditional gender roles, family and social support, and social norms. Modifications of the built environment, such as public exercise facilities, offer further opportunities and will require coordination beyond the health sector.

Keywords: Leisure, Physical Activity, Focus Groups, Thematic Analysis, Socio-Ecological Model

Oral Presentations Session A2

Oral Presentation A2.1 Relationship between peer group size and active outdoor play in children aged 9-12 years

10:15 am - 10:25 am (Sydney, Australia, Tuesday, October 12, 2021)

Kazuya Tamura¹, Ryo Goto¹, Naoki Yamada¹, Kiyomasa Nakatsuka¹, Kazuaki Uchida¹, Kana Horibe¹, Kenta Saeki¹, Haruhi Encho¹, Masato Tezuka¹, Mao Mukaijo¹, Rei Ono¹

¹Department of Public Health, Graduate School of Health Sciences, Kobe University, Kobe, Japan

Background: Outdoor play in childhood is important for physical, cognitive, and social development. Outdoor play is thought to be influenced by friends, but the relationship is not clear. **Purpose:** To investigate the association between peer group size and outdoor play among children aged 9-12 years. **Methods:** We recruited fourth- to sixth-grade children from two public elementary schools in Kobe, Japan. Children who participated in outdoor play on 3 or more of the 5 weekdays were categorized into "high". We asked children to nominate up to 10 of their closest friends. And we calculated peer group size as the total number of reciprocal closest friends in each child. Multivariate logistic regression analysis was conducted to investigate the association between peer group size and outdoor play frequency, adjusted for sex, grade, school, body mass index, sports club participation, screen time of using cell phones and screen time of playing video games. **Results:** The analysis sample comprises 291 children (137 girls, mean age: 10.59 ± 1.02 years). For outdoor play frequency, 114 children (39%) were classified in the "high". The mean peer group size was 3.90 ± 2.07. Children with larger peer group size had a significantly higher probability of being categorized as "high" (odds ratio: 1.23, 95% confidence interval: 1.09-1.39). **Conclusion:** This study suggested that encouraging children to interact with each other may promote them to participate in outdoor play. **Funding:** This research received no specific grant.

Keywords: Outdoor Play, Peer Group, Child, Development

Oral Presentation A2.2 Relationship between perceived physical competence and outdoor play among children aged 9-12 years

10:25 am - 10:35 am (Sydney, Australia, Tuesday, October 12, 2021)

Ryo Goto¹, Kazufumi Kitagaki^{1,2}, Kana Horibe¹, Kazuya Tamura¹, Naoki Yamada¹, Rei Ono¹

¹Department of Public Health, Graduate School of Health Sciences, Kobe University, Kobe, Japan, ²Faculty of Rehabilitation, Shionawate Gakuen University, Daito, Japan

Background: Perceived physical competence (PPC) promotes physical activity (PA), but the relationship between PPC and the type of PA was not clear. **Purpose:** To investigate the relationship between PPC and outdoor play (OP) among school-aged children and to identify any sex-specific differences. **Methods:** Total 288 children (134 girls; mean age 10.6 years) from two elementary schools in Japan were included. OP and PPC were assessed using self-report questionnaires. The children described the time of OP on each weekday and were categorized as "High" if they performed OP for ≥ 1 h at least three times a week. The questionnaire of PPC comprised 12 questions scored on a five-point scale. Higher scores indicated better PPC, and the summed score was used. Logistic regression analyses were performed after adjusting for age, sex, body mass index, screen time, sports club participation, and the number of friends. **Results:** Children with higher scores of PPC had a significantly higher probability of being categorized as "High" [crude OR: 1.04; 95% CI: 1.00–1.08, adjusted OR: 1.04; 95% CI: 1.00–1.08]. In stratified analysis by sex, girls with higher scores of PPC had a significantly higher probability of being categorized as "High" [crude OR: 1.08; 95% CI: 1.01–1.15, adjusted OR 1.09; 95% CI: 1.02–1.17]. There was no association between PPC and OP among boys. **Conclusion:** Especially for girls, improving PPC may promote OP as a voluntary PA. **Funding:** This research did not receive any specific grant.

Keywords: School Children, Outdoor Play, Physical Self-Concept, Sex Characteristics

Oral Presentation A2.3 Effects of the Active Kids voucher program on children and adolescents' physical activity

10:35 am - 10:45 am (Sydney, Australia, Tuesday, October 12, 2021)

Bridget C. Foley¹, Katherine B. Owen¹, Adrian E. Bauman¹, William Bellew¹, Lindsey J. Reece¹

¹Faculty of Medicine and Health, Sydney School of Public Health, Prevention Research Collaboration, SPRINTER, Charles Perkins Centre, University of Sydney, Sydney, NSW, Australia

Background: There is an urgent need to implement effective population-wide interventions which overcome barriers to health-enhancing physical activity for children and adolescents. **Policy components:** The universal Active Kids voucher program led by the New South Wales (NSW) Government, Australia aims to reduce the cost of registration in structured physical activity programs for all school-enrolled children and adolescents. **Evaluation:** We used a prospective cohort study, to monitor physical activity and relevant outcomes in 4.5-18-year-olds who used an Active Kids voucher. Generalized linear mixed models were used to examine changes from registration to after voucher use at ≤ 8 weeks, 9-26 weeks and ≥ 6 months. Fifty-three percent (n=671,375) of school-enrolled children in NSW registered in the program during 2018. Cohort participants (n=37,626) were followed up by-proxy using online surveys. After using a voucher, the number of days per week achieving physical activity guidelines increased significantly from 4.0 days/week (95%CI 3.8, 4.2) at registration to 4.9 days/week (95%CI 4.7, 5.1) after 6-months. Increased physical activity was observed across sociodemographic population sub-groups. The voucher-specific activity contributed 42.4% (95%CI 39.3, 45.5) to the total time children participated in structured physical activities outside of school. Children and adolescents who increased to, or maintained, high levels of activity were had social supports for being active, had active parent/caregivers and were happier than their low-active counterparts. **Results:** In girls, none of the variables included in the model were significantly related to zMR (p>0.05); however, in boys a negative and significant effect of MVPA was observed

($b = -0.026$; $p = 0.011$), where those who spent more time in MVPA had a better zMR profile, but no significant effect was observed for LPA or sedentariness. **Conclusions:** The Active Kids program shows promise as a scaled-up intervention to increase children and adolescents' physical activity participation. **Funding:** NSW Government, Office of Sport.

Keywords: Children, Adolescents, Sport, Physical Activity, Policy

Oral Presentation A2.4 A scalable school-based intervention to improve children's cardiorespiratory fitness: The internet-based Professional Learning to help teachers promote Activity in Youth (iPLAY) cluster randomised controlled trial

10:45 am - 10:55 am (Sydney, Australia, Tuesday, October 12, 2021)

Christopher Lonsdale¹, Taren Sanders¹, Michael Noetel¹, Philip Parker¹, Jane Lee¹, Devan Antczak¹, Diego Vasconcellos¹, David Lubans²

¹Australian Catholic University, ²University of Newcastle

Background: Children's health is at risk because of declines in cardiorespiratory fitness. Meta-analyses of efficacy studies show that school-based physical activity interventions can improve children's cardiorespiratory fitness. These interventions, however, are rarely disseminated at scale, meaning they typically have little public health impact. iPLAY is a primary school intervention designed to build schools' capacity to promote physical activity without relying on external providers delivering programs to students. To enhance scalability and sustainability, iPLAY is delivered to teachers via an online learning platform, with mentoring support from experienced physical education teachers. **Purpose:** To determine whether iPLAY, when deployed across a large number of schools, could improve children's cardiorespiratory fitness. **Methods:** We did a cluster randomized controlled trial (RCT) with allocation at the school level (1:1 allocation). We completed assessments at baseline, post-intervention (12 months after baseline), and maintenance (24 months after baseline). The primary outcome was students' cardiorespiratory fitness, as measured by a 20m shuttle run test. We tested for between-arm differences in changes in student outcomes using linear mixed models. **Results:** We recruited 132 primary schools in New South Wales, Australia. We assigned a representative sample of 22 schools to the cluster RCT. The remaining 110 schools entered an implementation study in which teachers received iPLAY but students did not complete primary outcome assessments. In the 22 schools involved in the cluster RCT, we recruited 1,217 students from Grades 3 and 4 who completed baseline assessments of their cardiorespiratory fitness. At 12-months (post-intervention), there was a significant between-arm difference in students' change in fitness favouring the iPLAY intervention condition (1.2 laps [95%CI=0.1, 2.0]). This effect continued to grow, as at 24 months the between arm difference was 2.2 laps [95%CI=0.9, 3.6]. **Conclusions:** iPLAY is a scalable model to deliver a school-based physical activity intervention that improves children's cardiorespiratory fitness. iPLAY also builds capacity in schools such that benefits are sustained or continue to grow after the intervention ends. **Funding:** Study funded by the National Health and Medical Research Council (GNT1114281) and the New South Wales Department of Education. **Trial registration:** ACTRN12616000731493.

Keywords: Children, Physical Activity, Cardiorespiratory Fitness, Intervention

Oral Presentations Session A3

Oral Presentation A3.1 Psychology of physical activity – A 30-year reflection on physical activity behaviour change research

10:15 am - 10:25 am (Sydney, Australia, Tuesday, October 12, 2021)

Stuart J. H. Biddle¹, Guy Faulkner², Nanette Mutrie³, Trish Gorely⁴

¹University of Southern Queensland, Australia ²University of British Columbia, Canada ³University of Edinburgh, Scotland, ⁴University of the Highlands and Islands, Scotland

Background: The first English language authored textbook on exercise psychology was published 30 years ago (Biddle & Mutrie, 1991, *Psychology of Physical Activity & Exercise*). The publication of the 4th edition of the follow-up to this book in 2021 (Biddle, Mutrie, Gorely & Faulkner, 2021, *Psychology of Physical Activity*), allows for a 30-year retrospective view of changes in this field concerning physical activity behaviour change. **Purpose:** To review progress concerning research about physical activity behaviour change since the 1st edition and speculate on future developments. **Results:** Significant progress has been made concerning methodology and measurement for physical activity behaviour change, including standardised guidelines for intervention development. Research syntheses have enabled large volumes of intervention research to be summarised but global effect sizes remain modest and often unexplained. Progress has been 'weak-to-moderate' for understanding behavioural maintenance or for use of long-term data; there is 'weak' progress on moving from efficacy to effectiveness trials; 'good' progress has been made involving research participants in intervention planning and design; and 'moderate-to-good' progress is evident in the use of explanatory process evaluations. **Conclusions:** These trends reflect changes in our understanding across the 30 years of the textbook publication process and suggest future research directions for those interested in the field of physical activity for health, especially from a behavioural perspective.

Keywords: Exercise Psychology, Trends, Behaviour Change

Oral Presentation A3.2 A review of physical activity surveillance in Japanese adults over the last 50 years

10:25 am - 10:35 am (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Considering the uniqueness of Japan among the world in its long history of physical activity (PA) surveillance, including participation in sports since 1957 and objective measurement of step-determined PA using research-graded pedometers since 1989, it is important to understand how survey methods have changed over the years for data interpretation. **Purpose:** To review the methodology of national PA surveys. **Methods:** We reviewed the methodology (sampling, measurement, etc.) of the National Health and Nutrition Examination Survey Japan (NHNSJ) and Public Opinion Survey on Participating in Sports (POSPS) available in government websites and published documents. **Results:** We observed major changes in the survey methodology of the POSPS (e.g., redefinition of sports and change from visit surveys to internet surveys), but no major change in that of the NHNSJ. The NHNSJ, conducted every November using stratified random sampling, measures daily steps using pedometers (AS-200, Yamasa Co. Ltd., Japan) and exercise habit prevalence (defined as exercise of ≥ 30 minutes/day ≥ 2 days/week over a year) with face-to-face interviews. Since 1995, the mean age-adjusted steps decreased by approximately 700 steps/day, whereas exercise habit prevalence has remained constant in men and decreased in women. The response rate of these national surveys has declined since the conception of the surveys. **Conclusions:** The NHNSJ allows evaluation of long-term trends in population-level PA from different aspects, whereas the POSPS requires caution in data interpretation due to significant changes in survey methodology. **Funding:** The JSPS KAKENHI (Grant Number 19H03996).

Keywords: Epidemiology, National Database, Time-Series Survey, Long-Term Trend

Oral Presentation A3.3 Physical activity surveillance in Australia: Standardisation is overdue

10:35 am - 10:45 am (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Physical inactivity remains a substantial contributor to chronic disease and ill-health in Australia. A stable surveillance system is necessary to understand the magnitude of the problem, assess its contribution to the burden of disease and monitor the impact of policies and programs to address it. **Purpose:** To determine and compare how Australian States and Territories measure the proportion of their adult populations who meet the recommended levels for being 'sufficiently active' over time. **Methods:** A detailed audit was conducted of the questions and definitions used by State and Territory health-sector surveys to determine adult population levels of sufficient physical activity over time. The State and Territory survey trends were compared with the state-level trends derived using the consistent Australian Bureau of Statistics' (ABS) National Health Survey. **Results:** Survey questions and definitions were sustained and comparable in New South Wales and Queensland, with minor modifications in Western Australia. In South Australia, the comparability of trend data was disrupted in 2018 with a change in reporting of age groups. Victoria and Tasmania have used different definitions and questions over time. The state and territory health survey systems have produced much greater variability in physical activity than is suggested by the ABS' state-level analysis. **Conclusions:** The lack of uniformity has

reduced comparability of prevalence within and between jurisdictions. Standardisation is required if physical activity trends are to be reliably interpreted to inform policy and practice. **Funding:** Australian Government's Medical Research Future Fund (MRFF) as provided to The Australian Prevention Partnership Centre.

Keywords: Physical Activity, Surveillance, Measurement

Oral Presentations Session A4

Oral Presentation A4.1 Physical activity level during the Covid-19 pandemic: Evidence from Thailand's Surveillance on Physical Activity 2019-2020

11:15 am - 11:25 am (Sydney, Australia, Tuesday, October 12, 2021)

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Background: The stringent measures to contain COVID-19 pandemic has imposed a strain on the entire society including the opportunities for regular physical activity (PA). **Purpose:** This study examined the effects of the national curfew policy and health promotion campaigns in influencing PA during the pandemic. **Methods:** Thailand's Surveillance on Physical Activity (SPA) 2019 and 2020 data were employed to compare PA level of Thai adults aged 18–64 years in three periods: pre-pandemic, during the maximum curfew and after maximum curfew was lifted. A total of 4460 respondents from SPA 2019 (face-to-face interview) and 4482 respondents from SPA 2020 (online survey) were included in the analysis. Global Physical Activity Questionnaires (GPAQ) Version 2.0 was used to assess PA. **Results:** The prevalence of sufficient MVPA among Thai adults decreased from 74.6% in SPA2019 to 54.7% in SPA2020. The decrease was accompanied by reduction in the average daily MVPA from 580 to 420 minutes. The prevalence of sufficient MVPA was at its lowest during the maximum curfew, and slightly increase during the relaxed curfew period. Those who were exposed to the Fit from Home (FFH) campaign were 1.4 times more likely to have sufficient MVPA. **Conclusion:** The pandemic measures imposed by the government have reduced the PA opportunities of Thai adults. The slight increase on the PA level after the maximum curfew was lifted suggested that continuous health promotion program is necessary to revert PA of Thai adults. **Funding:** SPA is funded by Thai Health Promotion Foundation grant number 63-0030.

Keywords: Physical Activity, Surveillance, Covid-19 Pandemic, Adults

Oral Presentation A4.2 Parent stress and children's movement behaviours during the COVID-19 pandemic

11:25 am - 11:35 am (Sydney, Australia, Tuesday, October 12, 2021)

Ellie K. Taylor¹, Anthony D. Okely¹, Prasad Chathurangana², Himangi Lubree³, Yashodha Hettiarachchi², Syed Muhammad Ali Turab⁴, Aqsa Baig⁴

¹University of Wollongong, Australia, ²University of Colombo, Sri Lanka, ³KEM Hospital, India, ⁴PHC Global, Pakistan

Background: COVID-19 restrictions have had an unfavourable impact on children's physical activity and screen time. The link between children's movement behaviour and parental mental health is not well understood in low- and middle-income countries (LMICs) where the pandemic has had a profound impact. **Purpose:** To explore the relationship between parent stress and child movement behaviours in Sri Lanka, Pakistan and India during the pandemic. **Methods:** The sample comprises 30 parents with children aged 3 - 4 years. Parents were invited to participate in semi-structured interviews and a pandemic impact questionnaire, via phone, exploring their stress levels and their child's movement behaviours, during the pandemic. **Results:** Parents reflected on concerns regarding their child's lack of physical activity, and the amount of time their child was spending in screen time. Parents reported taking on different roles, and juggling complex responsibilities, influencing their motivation and ability to promote movement and play. This is further compounded by limited safe play spaces. **Conclusions:** Parents and caregivers have an important role to play in encouraging children's healthy movement behaviours, particularly in circumstances where additional family supports (e.g. childcare, grandparents) are not available. Parents require readily-accessible information regarding promotion of healthy movement behaviours in the home environment, particularly in LMICs. We need to think beyond the impact of restrictions on the physical activity and screen time of children, to the impact this may have on parental stress and mental health. **Funding:** NHMRC Investigator Grant to ADO (APP1175658).

Keywords: Children, Physical Activity, Mental Health

Oral Presentation A4.3 Impact of COVID pandemic situation on the children with Cerebral Palsy?

11:35 am - 11:45 am (Sydney, Australia, Tuesday, October 12, 2021)

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¹St. Xavier's Gait Lab, ²Department of Orthopaedics, Children Orthopaedic Clinic, ³Department of Orthopaedics, SRCC Children's Hospital

Background: Children with cerebral palsy and their families have been impacted by the Covid pandemic situation. Children with CP and their parents are affected by the covid pandemic, due to lack of formal schooling and lack of rehabilitation, all this has impacted their daily routine. **Objective:** The survey aimed to study the impact of the covid pandemic on the accessibility of physical therapy, orthotic aids, and also individual behavior changes in children with cerebral palsy. **Methods:** Online survey was conducted with the parent using 9-part survey consisting of 26 questions that explored the experiences of children and their families during the

lockdown. Demographics data, ambulatory status, lack of access to physiotherapy, orthotic adjustment, surgery, deterioration, and behavior from a parent as collected. Results: 101 children with cerebral palsy with mean age 10.32 (5.20) out of which 36 (34.3%) were male and 69 (65.7%) were females. During lockdown 39 (38.6%) of children were taking regular physiotherapy, 36 (35.6%) children had irregular therapy sessions and 26 (25.7%) children didn't take therapy. Due to lack of rehabilitation and lack of inability of the parent to perform exercises, there was deterioration in ambulatory status 57 (56.4%) of children. 34 (33.7%) children had worsened in the function of the upper limb. 42 (41.6%) children had increased joint contracture and deformity. 64 (63.4%) children had an increase in muscle stiffness. 45 (44.6%) children had changed in behavior due to prolonged sitting at home, increased anger, aggression (n=4, (45.5%), and change in (n=29, 28.7%) eating pattern. 30 (29.7%) children gain weight more than 5kg due to increased sitting time and sedentary behavior. **Conclusion:** The survey revealed major consequences, such therapy services were massively interpreted, the parent had difficulties in managing the child therapy at home. There is always a possibility that the pandemic will repeat itself, so our approach toward physical therapy assessment and rehabilitation of children with disabilities needs to be re-evaluated and revamped by shifting our focus toward home-based and family-centered care. These approaches can help bridge the gap in the delivery of physical therapy services for children with disabilities in times of COVID-19.

Keywords: Cerebral Palsy, Covid Pandemic, Ambulation, Orthosis, Physiotherapy

Oral Presentation A4.4 The effect of containment measures during the COVID-19 pandemic to sedentary behaviour of Thai Adults: Evidence from Thailand's surveillance on physical activity 2019-2020

11:45 am - 11:55 am (Sydney, Australia, Tuesday, October 12, 2021)

Piyawat Katewongsa¹, Danusorn Potharin², Narumol Haemathulin², Dyah Anantalia Widyastari¹

¹Institute for Population and Social Research, Mahidol University, ²Thailand Physical Activity Knowledge Development Centre (TPAK)

Background: Measures to contain the spread of Covid-19 imposed by governments have undoubtedly impacted on preventing its spread but may have also produced longer periods of sedentary living across all segments of society. **Purpose:** This study examined the sedentary behavior (SB) of Thai adults before and during the Covid-19 pandemic. **Methods:** The 2019 and 2020 datasets of Thailand's Surveillance on Physical Activity (SPA) were employed. Face-to-face interviews were employed in SPA2019, whereas online self-administered LimeSurvey was used in SPA2020. A total of 5379 (SPA2019) and 6531 (SPA2020) persons aged 18–64 years who had access to the Internet were included in the analysis. The Global Physical Activity Questionnaires (GPAQ) v.2 Thai version was used to measure SB in both face-to-face and online survey. **Results:** Cumulative SB increased from 824 (before the pandemic) to 875 min/day during the pandemic. The odds of accumulating >13 h/day of SB was highest among females, young adults, those who completed post-secondary education, unemployed or working in the non-agriculture sector, having a chronic disease/condition, residing in an urban area, and living in a 'higher-risk' pandemic zone. Physical activity (PA) level and the Fit from Home (FFH) intervention was not associated with SB. **Conclusion:** Measures imposed to contain the spread of Covid-19 infection were significantly associated with lower opportunity of Thai adults for work-related physical movement, and that increased their SB, particularly with the shift from onsite to online working platforms. **Funding:** SPA is funded by Thai Health Promotion Foundation.

Keywords: Sedentary Behavior, Covid-19 Pandemic, Adults

Oral Presentations Session A5

Oral Presentation A5.1 Organised sport and physical activity participation characteristics of Indigenous children (n=36,129) registered in Active Kids

11:15 am - 11:25 am (Sydney, Australia, Tuesday, October 12, 2021)

Lindsey J. Reece¹ | Rona Macniven² | Bridget C. Foley¹ | Katherine B. Owen¹ | John R. Evans³ | David Cushway⁴ | Nivi Srinivasan⁴ | Phil Hamdorf⁴ | Adrian Bauman²

¹SPRINTER research partnership, School of Public Health, University of Sydney, Sydney, Australia, ²University of Sydney, Sydney, Australia, ³University Technology Sydney, Australia, ⁴NSW Government Office of Sport

Background: The benefits of organised sport and physical activity are important for priority population groups including Indigenous children. To overcome the cost barrier, the New South Wales (NSW) government state-wide Active Kids program, supports the costs associated with registration and membership. Program Delivery: All school-enrolled children (1.2 million) aged 5-18 years in NSW are eligible for a \$100 voucher. At registration, parent/carers report the child's socio-demographic characteristics, physical activity and sport participation. **Evaluation:** Mixed-methods, pragmatic evaluation integrated within the design of Active Kids provides a unique opportunity to understand patterns of participation behaviors and correlates associated with participation, voucher uptake and program reach. This study aimed to investigate socio-demographic factors associated with organised sport and physical activity participation among Indigenous children. In 2018, 671,375 children registered, with 36,129 (5.4%) identifying as Indigenous. More Indigenous children than non-Indigenous children met the physical activity guidelines. Indigenous children had greater odds of meeting physical activity guidelines across all socio-economic quartiles, whilst non-Indigenous children odds reduced with social disadvantage. Indigenous children were less likely to participate in sport at least twice a week and Indigenous children living in major cities had higher sport participation levels compared with those living in outer regional and remote areas. **Conclusions:** Active Kids achieved population representative reach among Indigenous children, whose physical activity levels were higher than non-Indigenous children across all socioeconomic quartiles. Active Kids has potential to supplement Indigenous children's physical activity levels using organised sessions and reduce sport drop-out among older children. **Funding:** The SPRINTER

research group is a strategic research partnership between the University of Sydney and the Office of Sport NSW government. SPRINTER receives funding to conduct a breadth of research and evaluation work which includes Active Kids.

Keywords: Active Kids, Equity, Vouchers, Pragmatic Evaluation

Oral Presentation A5.2 Dietary habits, physical activity and sedentary behaviour of children of urban employed mothers in Bangladesh

11:25 am - 11:35 am (Sydney, Australia, Tuesday, October 12, 2021)

Sabiha Afrin¹ | Amy Mullens² | Stuart J. H. Biddle³

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Backgrounds: There is an absence of information about the associations between maternal employment and children's dietary patterns (DP), physical activity (PA), and sedentary behaviour (SB) in the context of low-to-middle-income countries (LMIC). **Purpose:** To explore the DP, PA, and SB of children and adolescents (6-18 years) of mothers differing in employment status within Bangladeshi urban families. **Methods:** A qualitative design and purposive snowball sampling were used. Semi-structured telephone interviews were conducted with 22 employed and not employed mothers. Data were analyzed using Braun and Clark's thematic analysis. A combination of inductive and deductive techniques was used to generate codes. **Results:** The interviews identified 5 major themes. Breakfast skipping, eating instant and non-homemade food is common for the children of employed mothers. Mothers, regardless of employment status, reported challenges in encouraging children to eat vegetables. The scope of PA is limited due to environmental facilities. Employed mothers discourage adolescent girls to play outside due to insecurity as well as socio-cultural reasons. Children use screen-based devices mainly for online classes, watching movies/cartoons, and playing games. Children use devices more often when the mother is at work and sometimes employed mothers allow extra time on smartphones/tablets on weekends to keep their children occupied. **Conclusion:** Differences in DP, PA and SB are found between children of employed and not employed mothers. Gender differences are evident in the participation of PA. These results may guide future quantitative research to address the problems experienced by working mothers in urban areas of LMICs. **Funding:** This research did not receive any financial support from any organization.

Keywords: Children and Adolescent, Dietary Patterns, Maternal Employment, Physical Activity, Sedentary Behaviour

Oral Presentation A5.3 Proportion of kindergarten children meeting the WHO guidelines on physical activity, sedentary behaviour and sleep and associations with adiposity in urban Beijing

11:35 am - 11:45 am (Sydney, Australia, Tuesday, October 12, 2021)

Hongyan Guan^{1,2}, Zhiguang Zhang³, Bo Wang^{1,2}, Anthony D. Okely^{3,4}, Meiling Tong⁵, Jianxin Wu^{1,2}, Ting Zhang^{1,2}

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Background: World Health Organisation (WHO) Guidelines on Physical Activity, Sedentary Behaviour and Sleep for Children under 5 Years of Age were released in 2019. The aim of this study was to examine the proportion of Chinese kindergarten children who met each individual guideline and each combination of the guidelines and the associations with adiposity. **Methods:** Participants were 254 kindergarten children aged 4.1-6.3 years recruited from three kindergartens in urban area of Beijing. Physical activity, sedentary behaviour and sleep duration were assessed using 24-hour accelerometry over three consecutive days. Screen time was reported by parents. Weight and height were measured; and children were categorised into normal weight and overweight/obese groups according to the WHO age- and sex- specific criteria. Frequency analyses were performed to examine the proportion of children meeting individual and combination of these guidelines. Logistic regression analyses were conducted to examine the associations between guideline compliance and adiposity. **Results:** The proportion of children who met the physical activity (3 hours daily physical activity, including 1 hour daily moderate- to vigorous-intensity physical activity (MVPA)), sedentary screen time (<1 hour/day), and sleep guidelines (10-13hours/day) were 65.4%, 88.2% and 29.5%, respectively; only 15.0% met all three guidelines and 2.7% did not meet any of the guidelines. Not meeting the physical activity guideline, sleep guideline, or combination of any two guidelines, or all three guidelines was not associated with overweight or obesity; however, children who did not meet the sedentary screen time guidelines were at higher risk for overweight and obesity (odds ratio=3.76, 95% CI: 1.50-9.45). **Conclusions:** In our study, only a small proportion of children met all three guidelines. Most Chinese kindergarten children met physical activity guidelines or screen time guidelines, whereas fewer children met sleep guideline. Not meeting sedentary screen time guidelines was associated with adiposity, which warrant further interventions for limiting screen time in young children.

Keywords: Physical Activity, Sedentary Behaviour, Screen Time, Kindergarten

Oral Presentations Session A6

Oral Presentation A6.1 Validating My E-Diary for Activities and Lifestyle (MEDAL) to assess children's movement behaviours

11:15 am - 11:25 am (Sydney, Australia, Tuesday, October 12, 2021)

Sarah Yi Xuan Tan¹, Airu Chia¹, Padmapriya Natarajan^{1,2}, Claire Marie Jie Lin Goh¹, Bee Choo Tai^{1,3}, Lynette Pei-Chi Shek^{4,5}, Seang Mei Saw^{1,6,7}, Foong-Fong Mary Chong^{1,8}, Falk Müller-Riemenschneider^{1,3}

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Background: My E-Diary for Activities and Lifestyle (MEDAL) is an interactive web-based diary developed to collect time-use information from children aged 10 years and older. **Purpose:** To compare time spent in movement behaviours (moderate-to-vigorous physical activity, light physical activity, inactivity and sleep) between children's self-report on MEDAL and by wrist-worn accelerometers. **Methods:** Children aged 10-11 years recorded their daily activities over four days, and wore an Actigraph accelerometer on their non-dominant wrist throughout the study. Accelerometer data were processed using GGIR 2.0. Spearman correlation coefficient and intraclass correlation coefficient were used to compare self-reported and accelerometer-measured time spent in each movement behaviour. **Results:** Among the participants (n=49), moderate-to-strong correlations were found between self-reported and accelerometer-measured MVPA (r=0.37, p<0.001), inactivity (r=0.36, p<0.001) and night sleep (r=0.58, p<0.001), while the correlation for LPA was poor (r=0.19, p=0.031). Agreement for all behaviours was poor (MVPA ICC=0.24, p=0.004; LPA ICC=0.19, p=0.019; inactivity ICC=0.29, p=0.001; night sleep ICC=0.45, p<0.001). Stronger correlation and agreement were found on weekdays for inactivity and night sleep, and on weekend days for MVPA and LPA. **Conclusions:** Children can be ranked by their self-reported MVPA, inactivity and night sleep on MEDAL, although actual time spent in these behaviours may differ from accelerometer-derived estimates; self-reported LPA warrant cautious interpretation. Observable differences in reporting accuracy exist between weekdays and weekend days. **Funding:** NUHS Summit Research Program Partnership, and co-funded by NUS ODPRT, NUS SSH School of Public Health and NUS YLL School of Medicine.

Keywords: Children, MEDAL, Web-Based Application, Criterion Validity, Movement Behaviour

Oral Presentation A6.2 Validation of smartphones and different activity trackers for step counting under free living conditions

11:25 am - 11:35 am (Sydney Australia, Tuesday, October 12, 2021)

Claire Marie Jie Lin Goh¹, Wang Nan Xin¹, Andre Matthias Müller¹, Rowena Yap¹, Sarah Edney¹, Falk Müller-Riemenschneider^{1,2}

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Background: Smartphones and wrist-worn devices have been becoming more popular for step counting purposes and physical activity promotion. However, the validity of these devices under free-living conditions has not been adequately determined. **Purpose:** To investigate the criterion validity of smartphones and activity trackers used in a nation-wide physical activity program under free living conditions. **Methods:** Participants (N=34), aged 21-31 years wore a waist-worn pedometer and seven different wrist-worn activity trackers continuously over three days. The number of step counts reflected on the participants smartphone for each of the three days was recorded at the end of the study. To establish criterion validity, smartphones and activity trackers were compared to the pedometer using Pearson's correlation coefficient, mean absolute percentage error (MAPE) and Intraclass Correlation Coefficient (ICC). **Results:** The mean reported wear time for the 34 participants across three days was 12.9 hours. All 34 participants had provided tracker data and 23 of them had provided valid smartphone data. On average, five out of the seven activity trackers underestimated step counts while the remaining two and the smartphone overestimated step counts. Criterion validity was consistently higher for the activity trackers (r=0.78-0.92; MAPE 14.5-36.1%; ICC: 0.51-0.91) than the smartphone (r=0.37; MAPE 55.7%; ICC: 0.36). **Conclusions:** The accuracy of using a smartphone for measuring step counts was substantially lower than that of using wrist-worn activity trackers. Other factors will need to be considered when using a smartphone to track step counts. **Funding:** Study funded by the Singapore Health Promotion Board.

Keywords: Validation, Smartphone, Activity Tracker, Step Counts

Oral Presentation A6.3 Using wearable cameras to categorise type and context of screen-based behaviours among Adolescents

11:35 am - 11:45 am (Sydney, Australia, Tuesday, October 12, 2021)

George Thomas¹, Jason A. Bennie¹, Katrien De Cocker¹, Fitria Dwi Andriyani^{1,2}, Taren Sanders³, Bridget Booke³, Chris Lonsdale³, Stuart J. H. Biddle¹

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Background: Automated wearable cameras present a new opportunity to accurately assess human behaviour. However, this technology is seldom used in the study of adolescent's screen exposure and the field is reliant on poor quality, self-report data. **Purpose:** To examine adolescents' screen exposure by categorising the type and context of behaviours using automated wearable cameras. **Methods:** Adolescents (15.4 ± 1.6 years; n=10) wore a camera for three school evenings and one weekend day. The camera captured an image every 10 seconds. Fieldwork was completed between February and March 2020, and data analysed in August 2020. Images were date and time-stamped and coded for screen type, content, and context. **Results:** Data representing 71,396 images were analysed. Overall, 74% of images contained screens and 16.8% of those images contained multiple screens. Most screen exposure involved television sets (36.3% of screen-based images), smartphones (29.2%), and laptop computers (21.4%). The context of screen use differed by device type, although most screen exposure occurred at home (96.3%) and with solitary engagement (83.9%). The immediate after-school period saw high laptop computer use (30%), while smartphone use (38.7%) peaked in the middle evening and pre-bedtime hours, respectively. Weekend screen exposure was high, with

smartphone use (55.5%) peaking in the early morning period and fluctuating throughout the day. **Conclusions:** There was evidence for high screen use during the after-school and weekend period, mostly through solitary engagement, and within the home environment. Findings may inform the basis of larger studies aimed at examining screen exposure in free-living conditions. Funding: This research was supported by the Research Training Program – International Stipend and Tuition Fees Scholarship.

Keywords: Adolescent, Screen Time, Smartphone, Television, Wearable Cameras

Oral Presentations Session A7

Oral Presentation A7.1 Effects of integrating physical and cognitive tasks on preschool children's executive function, numeracy, and physical activity

4:10 pm - 4:20 pm (Sydney, Australia, Tuesday, October 12, 2021)

Myrto Mavilidi¹, Caterina Pesce², Anthony D. Okely³, Fred Paas^{4,1}, Sue Bennett¹, Steven Howard¹

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Background: Due to lack of time, opportunities for children to be physically active during their time in preschool are becoming increasingly compromised. Initiatives to change usual practices in preschools, using an integrative approach to physical and cognitive tasks, are needed. **Purpose:** A 6-week intervention program combining reading sessions and cognitively engaging physical activity aimed to improve preschool children's executive function, numeracy, and physical activity. **Methods:** 145 children (3-5 years; 65 female) from 7 childcare centres were randomly allocated to one of three conditions, conducted twice per week, as a group activity: 1) a cognitively engaging physical activity condition, in which a story was told, stimulating children to perform physical activities and cognitive tasks, 2) a cognitive condition, in which a story was told, stimulating children to perform cognitive tasks, and 3) a control condition (i.e., storytelling only with no activities). Counting was embedded in all reading sessions for the 3 groups. Children were individually assessed at baseline and after 6 weeks. **Results:** Mixed ANOVA showed a significant Condition x Time interaction ($F(2, 117) = 8.18, p < .001, \eta^2 = .12$) for numeracy. Data on physical activity, executive function, and self-regulation are currently being analysed (finished by August 2021). **Conclusions:** Preliminary findings support the potential for the meaningful integration of physical and cognitive and skills to generate positive effects in children's developmental progress. **Funding:** This study is supported by the UOW Vice Chancellor Postdoctoral Fellowship Award (individual grant).

Keywords: Physical Activity, Executive Function, Self-Regulation, Numeracy, Early Years

Oral Presentation A7.2 Distinct effects of different frequency active interruptions to sitting on glycemic control in Type 2 Diabetes

4:20 pm - 4:30 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Active interruptions to sitting time are beneficial for glycemic control in adults with type 2 diabetes. With recent movements towards less prescriptive physical activity and sedentary behaviour guidelines, it is relevant to determine whether the frequency of interruptions to sitting time is important for health. The optimal frequency of active interruptions to sitting time is yet to be examined when total activity time is standardized. **Purpose:** To examine whether the frequency of interruptions to sitting time involving simple resistance activities (SRAs), compared to uninterrupted sitting, differentially affected 22 h glycemic control in adults with medication-controlled type 2 diabetes (T2D). **Methods:** Twenty-four participants (13 men; mean±SD age 62±8 years) completed three 8 h laboratory conditions: SIT: uninterrupted sitting; SRA3: sitting interrupted with 3 min of SRAs every 30 min; and, SRA6: sitting interrupted with 6 min of SRAs every 60 min. Flash glucose monitors assessed glycemic control over a 22 h period. **Results:** No differences were observed between conditions for overall 22 h glycemic control as measured by AUC_{total}, mean glucose and time in hyperglycemia. During the 3.5 h post-lunch period, mean glucose was significantly lower during SRA6 (10.1 mmol·L⁻¹, 95%CI 9.2, 11.0) compared to SIT (11.1 mmol·L⁻¹, 95%CI 10.2, 12.0; $P = 0.006$). Post-lunch iAUC_{net} was significantly lower during SRA6 (6.2 mmol·h·L⁻¹, 95%CI 3.3, 9.1) compared to SIT (9.9 mmol·h·L⁻¹, 95%CI 7.0, 12.9; $P = 0.003$). Time in hyperglycemia was significantly lower post-lunch during SRA6 (1.5 h, 95%CI 1.0, 1.9, $P = 0.001$) compared to SIT (2.2 h, 95%CI 1.7, 2.6). Nocturnal mean glucose was significantly lower following the SRA3 condition (7.6 mmol·L⁻¹, 95%CI 7.1, 8.1) compared to SIT (8.1 mmol·L⁻¹, 95%CI 7.6, 8.7, $P = 0.024$). **Conclusions:** With standardized total activity time, less-frequent active interruptions to sitting may acutely improve glycemic control; while more-frequent interruptions may be beneficial for nocturnal glucose in those with medication-controlled T2D. **Funding:** This research was supported by a Heart Foundation Vanguard Grant (Award no.

101449), a NHMRC Centre of Research Excellence grant #1057608, and the Victorian Government OIS scheme.

Keywords: Sedentary Behaviour, Physical Activity, Glucose Metabolism, Type 2 Diabetes, Continuous Glucose Monitoring

Oral Presentation A7.3 Contrasting compositions of sitting, standing, stepping, and sleeping time: Associations with Glycaemic outcome by diabetes risk

4:30 pm - 4:40 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Recent evidence suggests that prolonged sitting and its adverse impact on glycaemic indicators appear to be proportional to the degree of insulin resistance. To investigate this finding in a free-living context, we aimed to examine associations of device-measured 24-hour time-use compositions of sitting, standing, stepping, and sleeping with fasting glucose (FPG) and 2h post-load glucose (2hPLG) levels, and to examine separately the associations with time-use compositions among those at lower and at higher risk of developing type 2 diabetes. **Methods:** Cross-sectional analyses examined thigh-worn inclinometer data (activPAL, 7 day, 24h/day protocol) from 648 participants (aged 36-80 years) at either lower (<39mmol/mol; <5.7% HbA1c) or higher (≥39mmol/mol; ≥5.7% HbA1c) diabetes risk from the 2011-2012 Australian Diabetes, Obesity and Lifestyle study. Multiple linear regression models were used to examine associations of varying compositions with FPG and 2hPLG, with time spent in each behaviour allowed to vary up to 60 minutes. **Results:** In general, the associations with the FPG within the time-use compositions were small, with statistically significant associations observed for sitting and sleeping (in the lower diabetes risk group) and standing (higher diabetes risk group) only. For 2hPLG, statistically significant associations were observed for stepping only, with findings similar between lower ($\beta = -0.12$ 95%CI: -0.22, -0.02) and higher ($\beta = -0.13$ 95%CI: -0.26, -0.01) risk groups. Varying the composition had minimal impact on FPG; however, one hour less sitting time and equivalent increase in standing time was associated with attenuated FPG levels in higher risk only (Δ FPG% = -1.4% 95%CI: -1.7, -1.2). Large differences in 2hPLG were observed for both groups when varying the composition. One hour less sitting with equivalent increase in stepping was associated with attenuated 2hPLG, with estimations similar in lower (Δ 2hPLG% = -4.0% 95%CI: -4.7, -3.2) and higher (Δ 2hPLG% = -4.9% 95%CI: -5.9, -3.9) risk for diabetes. **Conclusions:** In middle-aged and older adults, glycaemic control could be improved by reducing daily sitting time and replacing it with stepping. Standing could also be beneficial for those at higher risk of developing type 2 diabetes.

Keywords: Time-Use, Diabetes Risk, Glycaemic Control, Sedentary Behaviour

Oral Presentation A7.4 The combined effects of physical activity and sedentary behavior on dementia onset among older adults

4:40 pm - 4:50 pm (Sydney, Australia, Tuesday, October 12, 2021)

Yuta Nemoto¹, Shinichiro Sato², Yoshinori Kitabatake³, Noriko Takeda⁴, Kazushi Maruo⁵, Takashi Arao⁶

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Background: Combined effects of physical activity (PA) and passive/mentally active sedentary behavior (SB) on dementia are unclear. **Purpose:** Identifying the effects of these behaviors on dementia onset among older adults. **Methods:** All residents aged ≥65 in Tsuru, Yamanashi, Japan, were enrolled. A mail survey was conducted in 2016. Respondents were followed up for five years, and 5323 participants were included in the analyses (79.7%). Dementia onset was examined using long-term care insurance data. PA was evaluated with the International Physical Activity Questionnaire and categorized into <2.5 MET-h/week as “low,” <16.0 MET-h/week as “moderate,” and ≥16.0 MET-h/week as “high.” We assessed sitting time for watching TV as passive SB (<1 h/day, <3 h/day, ≥3 h/day) and reading time (RT) as mentally active SB (<10 min/day, <30 min/day, ≥30 min/day). To examine the associations of PA and SB with dementia, we performed Fine-Gray models and calculated sub-distribution hazard ratios [95% confidence intervals]. **Results:** During the 5-year follow-up, 606 (11.4%) individuals developed dementia. Analyses showed that PA (moderate: 0.75[0.59, 0.95], high: 0.54[0.36, 0.80]) and RT (high: 0.76[0.60, 0.97]) were associated with reduced the risk of dementia. Compared with low PA and low RT group, moderate PA and moderate RT, high PA and moderate RT, high PA and high RT were associated with a lower dementia risk. **Conclusions:** PA and RT reduce the risk of dementia. Interventions promoting both PA and RT would be effective for preventing dementia. **Funding:** Japan Society for the Promotion of Science (15H03089).

Keywords: Older Adults, Physical Activity, Reading, Dementia

Oral Presentation A7.5 The influence of disempowerment on the sedentary behaviour and physical activity of hospitalised older adults

4:50 pm - 5:00 pm (Sydney, Australia, Tuesday, October 12, 2021)

Unyime S. Jasper^{1,2}, Renuka Visvanathan^{1,2,3}, Agathe Daria Jadczyk^{1,2}, Solomon Yu^{1,2,3}, Joanne Dollard^{1,2}

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Background: Older adults spend the majority of their time in hospital sedentary. This contributes to functional decline, a longer hospital stay and possible worsening of frailty. Little is known about the perspectives of hospitalised older patients regarding sedentary behaviour (SB) and physical activity (PA). **Purpose:** To explore older patients' perspectives on SB and PA, identify influencing factors and their relationship. **Methods:** This study used the constructivist grounded theory methodology. Semi-structured interviews were conducted with patients aged ≥ 65 years on an orthopaedic and geriatric medicine ward. Results: 23 patients [80 ± 14.1 years; 65.5% (n=15) female] were interviewed. Patients described SB as physical and mental inactivity and PA as activities of daily living and other activities common to older people. Patients were aware that SB is detrimental to their physical and/or mental health, and expressed willingness to get physically active where they feel safe and supported. Older patients opined the hospital processes disempower them from getting physically active. Factors beyond their control, lack of physical support from staff, not communicating their desire to get physically active and lack of activities in hospital were major reasons for SB. The factors influencing SB and PA in hospital were cultural (hospital processes), behavioural (past PA levels), social (activities that offer opportunities for socialisation), cognitive (understanding of SB and PA), interpersonal (communication and support from clinical staff), personal (personal motivators to getting physically active in hospital) and environmental (lack of activities and ward environment). The interplay between these factors encourage SB and discourage PA in hospital. **Conclusion:** Older patients are willing to be physically active if empowered through better communication, education and support. There is a need to improve patient understanding of SB and PA. Understanding and tackling the factors that result in SB and reduce PA is critical if SB is to be reduced and PA increased.

Keywords: Older Adults, Hospital, Sedentary Behaviour, Physical Activity, Qualitative

Oral Presentations Session A8

Oral Presentation A8.1 What contributes to physical literacy in Early Childhood settings? Perspectives from Queensland Early Childhood Educators

4:10 pm - 4:20 pm (Sydney, Australia, Tuesday, October 12, 2021)

Jaime Barratt¹, John Cairney¹

¹University of Queensland

Background: Physical activity (PA) for preschool children promotes several health outcomes. Considering a vast number spend their weekdays in childcare settings, the Early Childhood Educator (ECE) becomes a key facilitator of PA. From a pragmatic perspective, physical literacy (PL) is a vehicle for promoting lifelong engagement in PA. However, little research exists exploring ECEs perceived PL in order to further explore the relationship between their PL and preschool children's PA. **Purpose:** To explore Queensland ECEs' perceived PL according to the Australian Physical Literacy Framework (APLF) domains (physical, psychological, social, cognitive), and factors that contribute to their own PL and preschoolers' PA. **Methods:** Two ECEs were recruited from separate childcare centres across Queensland, Australia, and participated in one-hour audio-recorded interviews via Zoom. ECEs were asked 24 questions surrounding their perceived PL, and 9 exploring factors that impact their PL and children's PA. Interviews were transcribed verbatim and analyzed thematically. **Results:** The analysis resulted in 3 overarching themes: PL domains, and facilitators and barriers to PA. Both ECEs described high levels of knowledge of PA, engagement in PA, and confidence and motivation to be physically active in and outside of childcare settings. The most important factors that were found to contribute to their PL and children's PA included playing sports, maintaining a positive attitude, and organizational collaboration. **Conclusions:** Despite being employed in different centres, both ECEs perceived similar PL and factors that contribute to preschoolers' PA. This suggests the organization they are employed within, and its' policies play an important role in promoting PL and PA. **Funding:** No funding was received for this study.

Keywords: Early Childhood Educator, Preschool Children, Physical Literacy, Physical Activity

Oral Presentation A8.2 Physical activity policy for Australian early childhood education and care: Results from a Delphi study

4:20 pm - 4:30 pm (Sydney, Australia, Tuesday, October 12, 2021)

Hayley Christian^{1,2}, Michael Rosenberg³, Donna Cross¹, Jasper Schipperijn⁴, Trevor Shilton^{2,5}, Stewart Trost⁶, Elizabeth Wenden^{1,2}, Phoebe George¹

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Background: There is a lack of evidence-based physical activity (PA) policy for early childhood education and care (ECEC). **Purpose:** To develop a PA policy in consultation with ECEC providers and stakeholders. The policy included ECEC specific PA recommendations clarifying the Australian National Quality Standards for ECEC. **Methods:** The Delphi process was used to refine content and coverage of the policy, identify and overcome challenges with the proposed implementation procedures and confirm best-practice dissemination and evaluation. A national expert panel from ECEC, pre-school education, PA-related research and PA-related policy review and development were invited to participate. Items were retained if they had >70% consensus from participants. **Results:** Key statements and recommendations for physical activity and sedentary time at ECEC were reported as

acceptable as were implementation strategies targeting management/supervisors/educators, the physical environment and families. Ten strategies were identified as easy to implement and likely to have a strong level of influence (e.g., foster awareness and understanding of the policy; program a range of learning experiences encouraging active play; embed the importance of active play in everyday experiences; break up prolonged periods of sedentary behaviours; provide many daily opportunities for outdoor play time; make the policy available to all staff, families and visitors). Best practice policy dissemination and evaluation were also confirmed. **Conclusions:** These findings along with results from educator focus groups will be used to support the successful dissemination, implementation and evaluation of this PA policy in ECEC's across Australia. Funding: Australian Health and Medical Research Council Partnership Project.

Keywords: Physical Activity, Policy, Pre-Schoolers, Early Childhood, Childcare

Oral Presentation A8.3 Physical activities in Hong Kong Kindergarten: Strengths and weaknesses

4:30 pm - 4:40 pm (Sydney, Australia, Tuesday, October 12, 2021)

Thomas C. M. Fan¹, Alfredo Bautista¹

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Background: "Physical Fitness and Health" is one of the key learning areas in Hong Kong kindergarten education. However, little research has examined how kindergarten teachers enact the curriculum principles in class. The Quality Review (QR) scheme was launched to assess the quality of kindergarten education. Officers from Education Bureau regularly conduct classroom observations and complete assessment reports focusing on various domains. **Purpose:** We analyze the strengths and weaknesses articulated in the QR reports pertaining to Physical Activities (PA) in Hong Kong kindergartens. **Method:** A total of 164 QR reports published between 2017 and 2020 were analyzed by identifying the most common types of (1) positive feedback and (2) negative feedback focusing on the area of PA. Content analysis was used. Analytic codes were non-mutually exclusive. **Results:** The most common codes in positive feedback were sufficient time allotted to PA and adequate implementation of PA. Regarding negative feedback, the most common codes were inadequate PA opportunities offered to children and poor pedagogical practice. **Conclusion:** While Hong Kong's Education Bureau is making significant efforts to increase the quantity and quality of children's exposure to PA in kindergartens, there are still many aspects that must be enhanced. We argue that feedback given to kindergartens should be more specific to contribute to improving the quality of pedagogical practices. Hong Kong kindergarten teachers need further support to be able to enact the principles of Hong Kong's curriculum Guide in practice.

Keywords: Physical Activities, Kindergarten, Quality Review, Curriculum, Hong Kong

Oral Presentation A8.4 How to make physical activity promotion work in Thai schools: Perspectives of multiple stakeholders

4:40 pm - 4:50 pm (Sydney, Australia, Tuesday, October 12, 2021)

Areekul Amornsriwatanakul^{1,2}, Narongsak Noosorn³, Kittipong Poonchob¹, Rung Wongwat³, Phataraphon Markmee³, Michael Rosenberg², Karen Milton⁴

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Background: Previous literature suggested that a majority of Thai schools had many policies in place to promote physical activity (PA) amongst their students. However, school-age Thai children reported low levels of PA and there was no association found between the policies and children's PA levels. **Purpose:** This study aimed to: 1) determine current practice in PA promotion in Thai schools; 2) explore barriers and facilitators to PA promotion within the school setting; and 3) identify strategies to support schools' future practice. **Methods:** A qualitative study design was applied comprising: 1) document analysis; 2) focus groups; 3) in-depth interviews; and 4) onsite observations. The focus groups and in-depth interviews were conducted with 144 informants purposively recruited through 24 schools in 4 regions across Thailand. Inductive content analysis was used. **Results:** Most schools were promoting PA in the absence of written policies, and without an accurate understanding of PA. Non-alignment of school performance indicators and policies, concerns about children's academic performance, and lack of budget were raised as barriers to PA promotion, whereas strong partnership with multiple local stakeholders potentially facilitated school-based PA promotion. Mandated PA policies, and more information support were suggested as strategies to support schools' future practices. **Funding:** This study was financially supported by Thai Health Promotion Foundation through Office of Children and Youth Physical Activity Studies.

Keywords: School Policy, Physical Activity, Policy Implementation, Active School, Health Promotion, Thailand

Oral Presentation A8.5 Parental awareness and engagement in the Active Kids program across socioeconomic groups in New South Wales, Australia

4:50 pm - 5:00 pm (Sydney, Australia, Tuesday, October 12, 2021)

Katherine B. Owen¹, Bridget C. Foley¹, Adrian Bauman¹, William Bellew¹, Lindsey J. Reece¹

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Background: In 2018, the New South Wales (NSW) Government implemented a State-wide voucher program entitled Active Kids, to reduce the cost barrier to children's (5-18 years old) participation in organised sport and physical activity. **Purpose:** To explore parent/carer's awareness and children's engagement in the Active Kids program across socioeconomic groups using the independent NSW Population Health Survey (PHS) to validate engagement in the program. **Methods:** This was a cross-sectional study design. Data were obtained from the 2018 NSW PHS and the Active Kids program registration database. Multinomial

regression models were used to determine whether socioeconomic status was associated with parent/carer awareness and children's engagement in the program. **Results:** In 2018, 671,375 (53%) of all children in NSW registered for the Active Kids program. Parent/carer's in the most disadvantaged quartile were twice as likely to have never heard of the Active Kids program (OR: 2.04, 95% CIs 1.31, 3.16) or to have heard or the program but not registered (OR:1.94, 95% CIs 1.26, 3.00), and more than twice as likely to have registered for a voucher, but not followed through and redeemed the voucher (OR: 2.68, 95% CIs 1.27, 5.63) compared with the least disadvantaged quartile. **Conclusions:** The Active Kids program has provided financial support for organised sport and physical activity to a large number of children. However, there are still a substantial proportion of socially disadvantaged populations who are unaware and unengaged in the program. Further targeted work is required to increase engagement in the program for socially disadvantaged populations.

Keywords: Children, Physical Activity, Sport, Equity, Active Kids

Oral Presentation A8.6 Parent wellbeing and socioeconomic status during early childhood predicts 8 – 13 year old Indigenous children achieving Australian physical activity recommendations

5:00 pm - 5:10 pm (Sydney, Australia, Tuesday, October 12, 2021)

Rona Macniven¹, Rebecca Stanley², Brett Biles¹, Dorothea Dumuid³, Paul Chandler⁴, Tim Olds³, Anthony Okely², John Evans⁵

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Background: Physical activity is wholistically linked to culture and wellbeing among Aboriginal and Torres Strait Islander people (Indigenous peoples in Australia). Correlates of high physical activity among Indigenous children include living in a remote area and low screen time but little is known about determinants of physical activity. **Purpose:** To examine sociodemographic, parental social and emotional wellbeing (SEWB) and sedentary behavior determinants of physical activity among Indigenous children. **Methods:** The Longitudinal Study of Indigenous Children (LSIC) is the largest First Nations child cohort study in the world and collects data primarily through parental report. Multiple logistic regression analyses examined whether sociodemographic characteristics and parent SEWB, measured using the culturally relevant and validated Strong Souls Index (Strengths/resilience and Distress/anxiety/depression) at Wave 1 (age 0-5 years), predicted achieving physical activity guidelines of ≥ 1 hour/day moderate-vigorous physical activity (MVPA) at Wave 9 (aged 8 – 13 years). **Results:** Achieving MVPA guidelines at Wave 9 was associated with the following Wave 1 determinants: high parent SEWB (Resilience; Odds Ratio (OR) 1.87 (1.32-2.65) but not Distress), living in remote (OR 3.66 (2.42-5.54)), low socioeconomic areas (OR 1.85 (1.08-3.17)), main source of family income not wages/salaries (OR 0.66 (0.46-0.97)), and if families played electronic games (OR 0.72 (0.55-0.94)), after adjusting for covariates. **Conclusions:** Strategies to promote high parental wellbeing and resilience, and low levels of family screen time during the critical early years of life (0-5 years), even in families living in remote, low-SES areas with low employment, are important for Indigenous children's future physical activity levels. **Funding:** The Longitudinal Study of Indigenous Children is funded and managed by the Australian Government.

Keywords: First Nations, Sport, Resilience, Sedentary, Culture, Country

Oral Presentation A8.7 Family dog ownership, dog walking and dog play associated with increased pre-schooler physical activity

5:10 pm - 5:20 pm (Sydney, Australia, Tuesday, October 12, 2021)

Hayley Christian^{1,2}, Elizabeth Wenden^{1,2}, Leanne Lester³, Michelle Ng¹

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Background: Childhood obesity and physical inactivity are major public health issues. Almost every second household in Australia has a dog. Dog ownership leads to greater physical activity (PA) in adults and school-aged children. **Purpose:** To examine if dog ownership and dog-facilitated PA was associated with higher PA in pre-schoolers. **Methods:** A secondary data analysis of the 'Play Spaces & Environments for Children's Physical Activity' study cohort (2015-2018) was undertaken. Data was collected for 1490 children 2-5 years from 122 long day-care centres in Perth, Western Australia. Parent-report surveys measured socio-demographic factors, dog ownership, child-dog play, dog walking, structured/unstructured PA and sedentary screen time. **Results/Findings:** Compared with non-dog owners, dog-owning pre-schoolers did 6 minutes/day more home yard play, 5 minutes/day less park play and 8 times/week more unstructured PA (all $p < 0.05$). Dog-owning pre-schoolers who played with their dog ≥ 3 times/week did 25 minutes/week more structured PA, 12 times/week more unstructured PA, 31 minutes/day more home yard play and 8 minutes/day more park play (all $p < 0.05$). Dog-owning pre-schoolers who walked their dog ≥ 1 time/week did 8 times/week more unstructured PA, 12 minutes/day more home yard play, 17 minutes/day more park play and 126 mins/week less sedentary screen time (all $p < 0.05$). **Conclusions:** Family dog ownership is associated with outdoor play, structured and unstructured PA and screen time. This suggests that dog play and dog walking may be viable strategies for increasing pre-schoolers' PA levels. **Funding:** US Human-Animal Bond Research Institute (HAB17-017), W. Australian Health Promotion Foundation (Healthway#24219), Australian Heart Foundation Future Leader Fellowship (HC#100794).

Keywords: Dog Ownership, Pre-Schooler, Physical Activity, Dog Walking

Oral Presentation A8.8 Levels and correlates of objectively measured sedentary time in young children: SUNRISE pilot study results from 19 countries

5:20 pm - 5:30 pm (Sydney, Australia, Tuesday, October 12, 2021)

Katharina E. Kariippanon¹, Kar Hau Chong¹, Xanne Janssen², Simone Tomaz³, Evelyn Ribeiro⁴, Nyaradzai Munambah⁵, Anthony Okely¹

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Background: There is a paucity of data from low- and middle-income countries on sedentary behaviour (SB) patterns during early childhood. **Purpose:** The purpose of this study was to examine how device-measured SB in young children differed across geographically, economically, and socio-demographically diverse populations, in an international sample. **Methods:** This multinational, cross-sectional pilot study included data from 1071 children from 19 countries, collected between 2018 and 2020. SB was measured for three consecutive days using activPAL accelerometers. Sedentary time, sedentary fragmentation, and seated transport duration were calculated using PAL Analysis Algorithms and a custom-made analysis program. Linear mixed models were used to examine the differences in SB variables between sex, country-level income groups, caregiver education levels, urban/rural location, and population density. **Results:** Children spent 56% (7.4 hrs) of their waking time sedentary, and 42% accrued at least one sedentary bout/day lasting ≥ 60 min. The longest average bout duration was 81.1 ± 45.4 min, and an average of 61.1 ± 50.1 min/day was spent in seated transport. Children from upper-middle-income and high-income countries spent a greater proportion of the day sedentary, accrued more sedentary bouts, had shorter breaks between sedentary bouts, and spent significantly more time in seated transport, than children from low- and lower-middle-income countries. Few differences were found in SB patterns when comparing between urban/rural settings and caregiver education levels within each country-level income group, while multiple significant differences were found when comparing between country-level income groups. Higher population density was correlated with several higher SB measures. **Conclusions:** These data provide greater understanding of young children's SB patterns globally and the influences of country income urban/rural setting, caregiver education levels, and population density. Country income levels and population density appear to be stronger drivers of the observed differences than sex, rural or urban residential setting, or caregiver educational attainment. **Funding:** The SUNRISE pilot studies were supported by Early Start, University of Wollongong.

Keywords: Sedentary Behaviour, Early Years, Socio-Demographic Characteristics, Accelerometry

Oral Presentations Session A9

Oral Presentation A9.1 mHealth interventions targeting movement behaviours in Asia: A scoping review

4:10 pm - 4:20 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Mobile health (mHealth) interventions can be used to promote movement behaviours (i.e., physical activity, sedentary behaviour, sleep). However, current systematic reviews include few studies from Asia, despite it being home to over 60% of the global population. **Purpose:** To identify and describe mHealth interventions promoting movement behaviours in Asia. **Methods:** Six databases (EMBASE, MEDLINE, ProQuest, Scopus, Web of Science, China Knowledge Resource Integrated Database) were searched up until August 2021. Studies describing an intervention with an mHealth component targeting one or more movement behaviours in a healthy or general population, of any age, in Asia were included. Searches returned 3986 unique records that were screened for eligibility in duplicate. Data from included studies was synthesised descriptively. **Results:** Eighty studies with a total of 1,413,652 participants were identified. Most were randomised trials (38.8%) or quasi-experimental (27.5%). Over 85% were published within the last eight years. Studies were from 17 countries (out of 55), the majority of these are classified as high (65.0%) or upper-middle income (28.7%). Most interventions targeted physical activity (93.8%), few targeted sleep (8.8%) or sedentary behaviours (7.5%). mHealth components included apps (n=23), pedometers (n=19), text messages (n=14), wearables (n=7), or combinations thereof (n=17). The average intervention length was 121.8 (SD 127.6) days. **Conclusions:** mHealth interventions in healthy populations in Asia have primarily targeted physical activity in high and upper-middle income countries. Currently, there are few interventions targeting sedentary behaviour or sleep, and very few conducted in low-income countries within Asia.

Keywords: mHealth, Physical Activity, Sedentary Behaviour, Sleep, Asia

Oral Presentation A9.2 The influence of air pollution exposure on the association between active mobility and short-term health indicators: A systematic review

4:20 pm - 4:30 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Walking and cycling for transportation, namely active mobility (AM), can improve health through increasing individuals' daily physical activity levels. People using AM increase their breathing rate, however, inhaling harmful air pollutants (AP) along with necessary oxygen. The interaction of these combined effects is complex physiologically, manifesting as acute changes in health indicators. **Purpose:** Our study aimed to synthesise the current knowledge on effect modification of AP exposure with AM on short-term health indicators to guide decision-making. **Methods:** A systematic review was conducted using Medline, Embase, Web of Science and Scopus databases. Searches included a wide range of keywords related to AP and AM to identify original articles published in English or Spanish in peer-reviewed journals until May 2021. Effect modification by AP was examined in studies on healthy adults where an interaction term between AM and AP was included in modelling or that presented stratified

analyses by AP levels. **Results:** 4561 studies were found and 21 were finally included AP main indicators studied include particulate matter, ultrafine particles, and nitrogen oxides. Health indicators studied include a wide range of acute effects grouped into inflammatory, cardiovascular, and respiratory responses. Only four studies tested an interaction term within models. The associations of AM with blood pressure, heart rate variability, neutrophils, and lung function indicators were significantly modified by AP either in- or post-exposure. However, most associations between AM and health indicators were not modified by AP measures at any timepoint. **Conclusions:** Little evidence of interaction between AP and AM on acute responses was found. Further consideration on study design, interaction testing, and results reporting is needed to advance understanding of this complex relationship to guide future work and decision-making.

Keywords: Air Pollution, Physical Activity, Short-Term Exposure, Traffic-Related, Active Mobility

Oral Presentation A9.3 Musculoskeletal pain conditions and sedentary behaviour in occupational and non-occupational settings: A systematic review with meta-analysis

4:30 pm - 4:40 pm (Sydney, Australia, Tuesday, October 12, 2021)

Francis Q. S. Dzakpasu^{1,2,3}, Alison Carver¹, Christian J. Brakenridge^{1,2,3}, Flavia Cicuttini⁵, Donna M. Urquhart⁵, Neville Owen^{3,4}, David W. Dunstan^{1,2}

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Background: Sedentary behaviour (SB; time spent sitting) is associated with musculoskeletal pain (MSP) conditions; however, no prior systematic review has examined these associations according to SB domains. **Purpose:** We synthesised evidence on occupational and non-occupational SB and MSP conditions. **Methods:** Guided by a PRISMA protocol, eight databases (MEDLINE, CINAHL, PsycINFO, Web of Science, Scopus, Cochrane Library, SPORTDiscus, and AMED) and three grey literature sources (Google Scholar, WorldChat, and Trove) were searched (January 1, 2000, to March 17, 2021) for original quantitative studies of adults ≥ 18 years. Clinical-condition studies were excluded. For meta-analyses, random effect inverse-variance pooled effect size was estimated; otherwise, best-evidence synthesis was used for narrative review. **Results:** Of 178 potentially-eligible studies, 79 were included [24 general population; 55 occupational (including 15 experimental/intervention)]; 56 studies were of high quality, with scores >0.75 . Data for 26 were meta-synthesised. For cross-sectional studies of non-occupational SB, meta-analysis showed full-day SB to be associated with low back pain [OR = 1.19 (1.03 – 1.38)]. Narrative synthesis found full-day SB associations with knee pain, arthritis, and general MSP, but the evidence was inconsistent on associations with neck/shoulder pain, hip pain, and upper extremities pain. Evidence of prospective associations of full-day SB with MSP was insufficient and was inconsistent on cross-sectional and prospective associations with leisure-time SB. For occupational SB, cross-sectional studies meta-analysed indicated associations of self-reported workplace sitting with low back pain (OR = 1.47(1.12 – 1.92) and neck/shoulder pain (OR = 1.73(1.46 – 2.03)). Best-evidence synthesis identified inconsistent findings on cross-sectional association and a negative prospective association of device-measured workplace sitting with low back pain intensity in tradespeople. Evidence on computer time and neck/shoulder pain was moderate but insufficient for low back pain and general MSP. Experimental/intervention evidence indicated reduced low back pain, neck/shoulder pain, and general MSP with reducing workplace sitting. **Conclusions:** We found cross-sectional associations of occupational and non-occupational SB with MSP conditions, with occupational SB associations being occupation dependent. While prospective evidence was inconclusive, reducing workplace sitting was associated with reduced MSP. Future studies should emphasise prospective analyses and examining potential interactions with chronic diseases.

Keywords: Sedentary Behaviour (SB), Occupational and Non-Occupational, Workplace Sitting, Computer Time, Musculoskeletal Pain (MSP) Conditions

Oral Presentation A9.4 Control group improvements in objectively-measured physical activity in primary care: a systematic review and meta-analysis

4:40 pm - 4:50 pm (Sydney, Australia, Tuesday, October 12, 2021)

Nicole Freene^{1,2}, Rachel Davey², Rahanan Sathiyakumar², Steven M. McPhail^{3,4}

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Background: There is some evidence that simply measuring physical activity alone can increase self-reported physical activity behaviour. **Purpose:** To describe changes in objectively-measured physical activity within control groups in primary care physical activity intervention studies. **Methods:** PubMed, MEDLINE, SPORTDiscus, PsychINFO, and CINAHL were searched from inception to February 2019. Physical activity controlled intervention studies measuring objectively-measured physical activity in primary care with adults were included. **Results:** Thirty studies were eligible and 22 studies were included in the meta-analysis. Noteworthy increases ($\geq 10\%$) in objectively-measured physical activity within control groups were found in 17% of studies at the end of the intervention period. Noteworthy increases were reported in studies with younger participants, one-third of the pedometer studies, one-third of studies with participants at risk of chronic disease and in studies with a shorter duration between measurements. No control group improvements were found in participants with chronic disease. Meta-analyses found that steps.day^{-1} , counts.day^{-1} and $\text{counts.minute}^{-1}$ did not significantly change within control groups. Moderate-to-vigorous physical activity minutes.day^{-1} significantly decreased (-3.97; 95% CI -6.31 to -1.64; $P = 0.0009$). Sub-analyses revealed that steps.day^{-1} increased in participants < 50 years old (504; 95% CI -20 to 1029; $P = 0.06$) and in studies that used pedometers (196; 95% CI -335 to 726; $P = 0.47$). **Conclusions:** No significant improvements in objectively-measured physical activity were found within control groups in

primary care. However, in younger participants without chronic disease, objectively-measured physical activity measurement alone may lead to an increase in physical activity levels, particularly in interventions using pedometers.

Keywords: Control, Accelerometry, Pedometer, Measurement, Measurement Reactivity

Oral Presentation A9.5 Aboriginal and Torres Strait Islander adult physical activity and sport participation: facilitators and barriers

4:50 pm - 5:00 pm (Sydney, Australia, Tuesday, October 12, 2021)

Rona Macniven^{1,9}, Bridget Allen², Karla Canuto^{3,4}, Ebony Lewis^{1,2,9}, Josephine Gwynn⁵, Kylie Radford^{1,2,9}, Kim Delbaere^{1,2,9}, Justin Richards⁶, Nigel Lovell^{7,9}, Michelle Dickson⁵, John Evans⁸

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Background: Physical activity has cultural significance as well as population health and other benefits. A range of factors may influence Aboriginal and Torres Strait Islander adult participation. **Purpose:** This mixed methods systematic review synthesised existing evidence on facilitators and barriers for physical activity participation experienced by Aboriginal and Torres Strait Islander adults. **Methods:** Joanna Briggs Institute methodology was used. A systematic search was undertaken of 11 databases and 14 grey literature websites during 2020. Included studies reported physical activity facilitators and barriers experienced by Aboriginal or Torres Strait Islander participants aged 18+ years, living in their usual community. We also examined Indigenous capacity building characteristics of studies and appraised studies using the Mixed Method Appraisal Tool (MMAT) and the Aboriginal and Torres Strait Islander Quality Appraisal Tool (QAT). **Results:** Twenty-seven studies met inclusion criteria, 22 studies involved local Indigenous communities, of which nine collaborated with local Indigenous organisations. Study methodological quality was generally high according to the MMAT but much poorer or unclear from an Indigenous appraisal perspective. Sixty-two different facilitators and 63 different barriers were identified across individual, interpersonal, community/environmental and policy/program themes. Prominent facilitators included support from family, friends, and program staff, and opportunities to connect with community or culture. Prominent barriers included a lack of transport, financial constraints, lack of time, and over riding work, family or cultural commitments. **Conclusions:** Strategies to increase physical activity participation should seek to enhance facilitators and address barriers, collaboratively with communities and with Aboriginal and Torres Strait Islander leadership. **Funding:** This research was supported by funding from the UNSW Ageing Futures Institute.

Keywords: Indigenous, First Nations, Exercise, Population Health, Australia

Oral Presentation A9.6 The acute effects of prolonged uninterrupted sitting on vascular function: A systematic review and meta-analysis

5:00 pm - 5:10 pm (Sydney, Australia, Tuesday, October 12, 2021)

Frances C. Taylor^{1,2}, Ana J. Pinto³, Nirav Maniar⁴, David W. Dunstan^{1,2}, Daniel J. Green⁵

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Background: The time-course of vascular impairment in response to prolonged sitting is presently unknown. Whether there is a minimum amount of uninterrupted sitting which results in clinically relevant changes in vascular function is also unknown. **Purpose:** To determine the dose-response relationship between prolonged sitting and vascular function in healthy individuals and those with metabolic disturbances. **Methods:** Systematic review with meta-analysis. Ovid Embase, Ovid Medline, PubMed, and CINAHL were searched from inception to 4 December 2020. **Results:** Prolonged sitting resulted in a significant decrease in the standardised mean change (SMC) for lower-limb FMD at the 120-min (SMC = -0.85, 95%CI -1.32 to -0.38) and 180-min (SMC = -1.18, 95%CI -1.69 to -0.66) time points. Subgroup analysis indicated that prolonged sitting decreased lower-limb FMD in healthy adults (SMC = -1.16, 95%CI -1.75 to -0.58) who had higher a priori vascular endothelial function, but not in those with metabolic and vascular dysfunction (SMC = -0.51, 95%CI -1.18 to 0.15). **Conclusions:** Lower-limb vascular function is progressively impaired because of prolonged sitting. Subgroup analysis indicated prolonged sitting negatively impacts healthy populations, a finding not observed in those with metabolic disturbances. **PROSPERO trial registration number:** CRD42020171394.

Keywords: Arteries, Blood Flow, Sedentary Behavior

Oral Presentations Session A10

Oral Presentation A10.1 Accelerometry outcomes from a four-year community-based systems approach to childhood obesity prevention

4:10 pm - 4:20 pm (Sydney, Australia, Tuesday, October 12, 2021)

Claudia Strugnell¹, Nicholas Crooks¹, Cadeyrn Gaskin¹, Denise Becker², Liliana Orellana², Kristy Bolton¹, Penny Fraser¹, Andrew Brown¹, Ha Le³, Colin Bell¹, Steven Allender¹

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Background: Whole of Systems Trial of Prevention Strategies for Childhood Obesity (WHOSTOPS) was one of the first whole-of-community systems-based interventions designed to prevent childhood obesity. **Purpose:** We present objectively measured physical activity and sedentary time results from this four-year cluster-randomised controlled trial among children in grades four (approximately 9-10 years old) and six (approximately 11-12 years old). **Methods:** Ten communities were randomly allocated (1:1) to the WHOSTOPS intervention. A repeat cross-sectional design was used to collect data from children in 2015 (baseline), 2017, and 2019. Children wore hip-mounted ActiGraph (wGT3x-BT) accelerometer for 7 days. Freedson-Trost age-specific activity counts per minute (Axis 1) were converted into minutes.day⁻¹ spent engaged in moderate-to-vigorous physical activity (MVPA), light physical activity (LPA), and sedentary time (ST). Linear mixed models were fitted to estimate the effects of the intervention on the three activity outcomes. **Results:** Data from 1,406 children (intervention n=745; control n=661) were included in the analyses. No significant intervention effects were observed for MVPA, LPA, or ST. There were positive, but non-significant, changes in mean MVPA between 2015-2017 favouring intervention boys (3.7mins/day; 95% confidence interval [CI]: -5.7, 13.1) and girls (5.5mins/day; 95% CI: -1.5, 12.6) which had decreased by 2019. **Conclusions:** WHOSTOPS did not significantly alter activity levels. Community initiatives – such as active transport drop-off zones and bike buses – may have contributed to the potentially meaningful increases MVPA, highlighting the necessity for further research. **Funding:** Australian National Health and Medical Research Council, Western Alliance, Australian National Heart Foundation.

Keywords: Systems Approaches, Physical Activity, Children

Oral Presentation A10.2 Changes in physical activity and adiposity with mortality and incidence of cardiovascular disease: Longitudinal findings from the UK Biobank

4:20 pm - 4:30 pm (Sydney, Australia, Tuesday, October 12, 2021)

Matthew N. Ahmadi¹, Susan Paudel¹, Jason M. R. Gill², Emmanuel Stamatakis¹

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Background: Physical activity (PA) and adiposity are both major causal risk factors for cardiovascular disease (CVD) and all-cause mortality (ACM). **Purpose:** To examine the associations of concurrent changes in physical activity and adiposity with incident CVD and ACM. **Methods:** Baseline PA was categorized into inactive, insufficient, and sufficient based on current guidelines. Body mass index (BMI) and waist-to-hip ratio (WHR) were categorised into baseline tertiles. Both exposures were further grouped as decreased, stable, or increased based on changes in category over time. We examined hazard ratios (HR's) for all-cause mortality using cox regression and cox regression with competing risk for CVD. **Results:** A total of 2,573 incident CVD events and 471 deaths occurred among 29,494 participants with an average CVD and mortality follow-up of 4.7 (2.2) and 5.1 (2.1) years. Relative to stable PA and BMI or WHR (reference), most groups showed higher CVD risk with adiposity fluctuations. For example, when PA decreased, CVD risk was 1.82 (95%CI = 1.53 to 2.18) if BMI decreased and 2.00 (1.72 to 2.33) if BMI increased. Decreasing PA was associated with higher ACM regardless of adiposity change (i.e. HR = 1.89 [1.25 to 2.87] if WHR increased). **Conclusions:** PA stability or increase was not associated with increased ACM risk, across adiposity change levels. Stable adiposity was not associated with increased CVD risk, if PA was stable or increased. **Funding:** National Health Medical Research Council Ideas Grant (APP 1180812).

Keywords: Physical Activity, Body Mass Index, Waist Circumference, Cardiovascular Disease, Mortality

Oral Presentation A10.3 Associations of changes in physical activity and diet with incident obesity and changes in adiposity: Longitudinal findings from the UK Biobank

4:30 pm - 4:40 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Although diet and physical activity (PA) determine energy balance, little evidence exists on their relative long-term contributions to obesity development. **Purpose:** To examine the joint effects of PA and diet on obesity incidence and indicators of adiposity. **Methods:** Baseline PA was categorized into three groups based on WHO guidelines (inactive, insufficient, sufficient) and grouped as decreased, stable, or increased at follow-up. Dietary scores included consumption of fruits, vegetables, fish, processed meats, and red meats. Diet scores (0-4) were categorized as worsened, stable, or improved. Odds ratio (OR) for obesity incidence by joint PA and diet variables were examined with logistic regression, and changes in adiposity markers were examined with generalized linear models. **Results:** A total of 31,344 participants without obesity at baseline were followed up for 6.8 (2.3) years. We found the lowest obesity development risk estimates in the groups that increased PA, regardless of changes in diet score (OR = 0.65 to 0.89), relative to the stable PA and diet score. The protective associations of increasing PA were accentuated among participants with no history of smoking, cardiovascular disease or cancer. Among PA increasers, obesity risk decreased (OR = 0.54 to 0.68), whilst a decrease in body mass index (-0.25 to -0.42 kg/m²) and waist circumference (-77 to -1.41 cm) was observed with

concurrent stable/improved diet score. **Conclusions:** Increasing PA with concurrent diet stability/improvement was associated with the lowest obesity risks over time. PA improvements conferred more pronounced protection against obesity development risk than diet. **Funding:** National Health and Medical Research Council Ideas Grant (APP 1180812).

Keywords: Physical Activity, Diet, Body Mass Index, Waist Circumference, Obesity

Oral Presentation A10.4 Associations of changes in physical activity and discretionary screen time with incident obesity: findings from the UK Biobank

4:40 pm - 4:50 pm (Sydney, Australia, Tuesday, October 12, 2021)

Susan Paudel¹, Borja del Pozo Cruz², Elif Inan-Eroglu¹, Matthew Ahmadi¹, Emmanuel Stamatakis¹

¹Charles Perkins Centre, School of Health Sciences, Faculty of Medicine and Health, University of Sydney, ²Centre for Active and Healthy Ageing, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark

Background: Physical activity (PA) and discretionary screen time (DST; television and computer use during leisure) are both associated with obesity risk, but little evidence exists on their combined influence over time. **Purpose:** To examine the joint associations of concurrent changes in PA and DST with incident obesity. **Methods:** Changes in PA and DST over time were defined using departure from sex-specific baseline tertiles and categorised as worsened (PA decreased/DST increased), maintained, and improved (PA increased/DST decreased). Changes in each exposure were then used to define joint PA-DST change variable with nine mutually exclusive groups. We examined the joint associations of concurrent changes in PA and DST with incident obesity using mixed multivariable-adjusted Poisson models. **Results:** Of the 30,735 participants, 1,628 (5.3%) developed incident obesity over a mean follow up of 6.9 (\pm 2.2) years. In the direct effect analyses, improving PA (Incident Rate Ratio (IRR) 0.46 (0.38-0.56)) was associated with a lower risk of incident obesity than maintaining PA, maintaining DST, or improving DST. Compared to the referent group (both PA and DST worsened), all other combinations of PA and DST changes were associated with lower incident obesity risk in the joint association analyses. We observed the largest beneficial associations for improved PA across DST change categories [DST worsened (IRR 0.31 (0.21-0.44)), maintained (IRR 0.34 (0.25-0.46)), or improved (IRR 0.35 (0.22-0.55))]. **Conclusion:** Improving PA had the most pronounced beneficial associations irrespective of DST changes. Future studies with objective assessments of exposure variables will be helpful to understand the relationship better.

Keywords: Television Viewing, Discretionary Computer Use, Adiposity, Obesity, Longitudinal

Oral Presentation A10.5 TV-viewing in Australian adults: Sedentary or active?

4:50 pm - 5:00 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: It is widely assumed that TV-viewing is sedentary with little consideration of multitasking. **Purpose:** To examine the correlates of sedentary and active TV-viewing in Australian adults. **Methods:** We analysed data from the Australian Time Use Survey from 2006. Persons aged ≥ 15 years old who reported at least one 5-minute episode of TV-viewing while also completing a secondary activity were selected (N=5418). Secondary activities were categorized by intensity: 1-1.5METs were considered sedentary, activities >1.5 METs were coded as active. Sample-weighted mixed-effects multi-level logistic regression models were used to obtain adjusted ORs for socio-economic factors associated with sedentary and active TV viewing. **Results:** Participants reported 28,980 episodes of doing an activity while watching TV, with 154 different activities reported during TV-viewing (12,223 active TV-viewing episodes; 16,757 sedentary TV-viewing episodes). Active TV-viewing was associated with older age (OR=2.94; 95% CI: 2.38-3.65 30-39-year-olds compared to 15-19-year-olds); number of dependent children in the family (OR=2.17; 95% CI: 1.81-2.60 ≥ 3 children compared to no children); sex (female vs male: OR=1.96; 95% CI: 1.80-2.07); self-rated health (OR=0.70; 95% CI: 0.54-0.90 'poor' compared to 'excellent'); and having someone present in the room (OR=0.74; 95% CI: 0.67-0.81 compared to being alone). Risk of sedentary TV-viewing was higher among males, 15-19-year-olds, residents in major cities, being alone in the room, having no dependent children in the family, reporting poorer self-rated health ($p < 0.001$). **Conclusions:** This study shows that TV-viewing can be sedentary or active, further demonstrating the limitations of TV-viewing as an indicator of sedentary behaviour.

Keywords: Sedentary Behaviour, TV-Viewing, Adults

Oral Presentation A10.6 Occupational physical activity in relation to all-cause, CVD, and cancer mortality in 349,248 adults: Prospective & longitudinal analyses of Taiwan's MJ Cohort

5:00 pm - 5:10 pm (Sydney, Australia, Tuesday, October 12, 2021)

Emmanuel Stamatakis¹, Tiana-Lee Elphick¹, Matthew Ahmadi¹, Li-Jung Chen², Yun-Ju Lai³, Susan Paudel¹, Po-Wen Ku⁴

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Background: Previous studies on the health effects of occupational physical activity (OPA) have reported conflicting results. No study has examined the role of changes in OPA over time. **Purpose:** To examine the associations of baseline OPA and OPA changes with mortality risk. **Methods:** Baseline OPA was categorized as light (ref)/moderate/moderately heavy/ heavy. OPA

changes over time were categorized as stable (ref)/decreased/ increased. We used Cox regression adjusted for a comprehensive set of potential confounders and excluded a) participants with existing CVD/cancer, and b) deaths occurring in the first two years. **Results:** 349,248 participants (177,314 women) with baseline OPA were followed up for 14.6 (5.1) years. In the age adjusted models, higher OPA showed detrimental associations with all three mortality outcomes in men only [e.g. all-cause mortality (ACM) HR: 1.33, 95%CI: 1.21 to 1.45] for heavy compared to light OPA. Adjustments for confounders reversed the baseline OPA and ACM associations in men (0.92, 0.86 to 0.98 for moderately heavy OPA), and revealed beneficial associations in women (ACM HR 0.87, 0.79 to 0.97). The OPA changes analyses included 105,715 (52,503 women) followed up over 6.3 (4.2) years. Compared to stable OPA, OPA decrease was associated with higher ACM risk in men only (fully adjusted HR: 1.18, 1.00 to 1.38). (Baseline or changes in) OPA showed no associations with CVD or cancer mortality. **Conclusions:** Higher baseline OPA levels were beneficially associated with ACM risk in men and women, and OPA decreases over time were associated with highest risk in men. Our results support potential health gains through higher OPA. **Funding:** This work was supported by a NHMRC Investigator Grant (APP1194510).

Keywords: Physical Activity, Mortality, Socioeconomic Status, Confounding, Physical Activity Paradox

Mini-Oral Presentations Session A1

Mini-Oral Presentation A1.2 Effectiveness of school-based PA interventions on cognitive function among children and adolescents: A systematic review and meta-analysis

10:17 am - 10:19 am (Sydney, Australia, Tuesday, October 12, 2021)

Xiaoqing Hu¹, Xiao Ma¹, Fei Xin¹, Yan Tang¹

¹School of Physical Education and Sport Training, Shanghai University of Sport, Shanghai, China

Background: Physical activity (PA) is important for children's development of cognitive function (CF), but the effect of school-based PA intervention remains to be discussed. Purpose: To examine the impact of school-based PA intervention on overall CF and the potential moderating effects of gender, BMI, and time and frequency of interventions among children and adolescents via meta-analyses. **Method:** There were seven electronic databases included for eligible studies that investigated the effect of school-based PA interventions on CFs in children and adolescents. Results were reported as standardized mean differences with 95% confidence intervals by a random-effects model. Subgroup analyses compared the effects of PA on different CF domains. The protocol was registered at PROSPERO numbered CRD42020158970. **Results:** Twenty studies with 5274 participants aged 6–17 years were included. The results indicated a significant improvement of school-based PA interventions on the overall CFs (Cohens' $d = 0.21$; 95% CI 0.09 to 0.34; $p < 0.01$) and executive function (Cohens' $d = 0.14$; 95% CI 0.05 to 0.23; $p < 0.01$). Subgroup analysis showed a unique improvement of sports and PA programme on CFs (Cohens' $d = 0.34$; 95% CI 0.10 to 0.59; $p = 0.006$) without any significant moderators. **Conclusions:** School-based PA has a small positive effect on CF among children and adolescents. More research is needed to reveal the dose-response effect between school-based PA intervention and CFs in children and adolescents and to mine the moderators of this association. **Funding:** Key Project of the National Social Science Foundation of China (No.18ATY008).

Keywords: School-Based Interventions, Physical Activity, Cognitive Function

Mini-Oral Presentation A1.3 The Role of Physical Education to In-school Moderate to Vigorous Physical Activity among Primary School Children

10:19 am - 10:21 am (Sydney, Australia, Tuesday, October 12, 2021)

Xiaoqing Hu¹, Sitong Chen², Yan Tang¹

¹School of Physical Education and Sport Training, Shanghai University of Sport, Shanghai, China, ²Institute for Health and Sport (iHeS), Victoria University, Melbourne, Australia

Background: Physical education (PE) is an important opportunity to increase moderate to vigorous physical activity (MVPA) in school. The purpose of the study was to identify the role of PE classes to in-school MVPA in primary school children. **Methods:** 382 children aged 9–11 years from 18 primary schools in Shanghai China were reanalyzed. Accelerometers were used to assess participants' sedentary behavior (SED), lightPA (LPA), and MVPA during in-school hours and PE classes. Multiple linear regression was used to examine the roles of PE classes to in-school MVPA. **Results:** Boys accumulated more LPA and MVPA, and less SED than girls during in-school hours ($p < 0.001$). More boys met in-school MVPA recommendations than girls ($p < 0.001$). During PE classes, boys accumulated more LPA and less SED than girls ($p < 0.001$). The accumulated MVPA in PE classes was not significantly different in sexes ($p > 0.05$). None of the children met the MVPA recommendation in PE classes (50% of time spent on MVPA). Regression analyses indicated that for each one-minute increase in MVPA during PE, there was an associated 1.4-minute increase in in-school MVPA after controlling for sex and BMI ($R^2 = 0.361$, $p < 0.001$). **Conclusions:** PE classes positively contribute to in-school MVPA among primary schoolchildren. Participations in high-quality PE classes seem to be a promising strategy to increase accumulated MVPA in-school hours. **Funding:** Key Project of the National Social Science Foundation of China (No.18ATY008).

Keywords: Physical Education, Moderate-To-Vigorous Physical Activity, Primary School Children

Mini-Oral Presentation A1.4 Effects of activity video games on physical activity and energy consumption of overweight children

10:21 am - 10:23 am (Sydney, Australia, Tuesday, October 12, 2021)

Hua Hewen¹

¹Zhejiang Normal University

Background: Childhood obesity has become a major global health problem, and active video games can be used to increase children's physical activity and energy consumption. **Objective:** to investigate the effect of activity video game intervention on physical activity and energy consumption of overweight children. **Methods:** twenty overweight or obese children (10 males and 10 females) participated in video games, each for one hour, and a total of three tests were conducted. The main games used were dance pads and bicycle simulators. Energy consumption is calculated based on the data of heart rate and individual maximum heart rate recorded during the activity. **Results:** the study found that active video games had a significant effect on energy consumption, girls consumed the most energy on dance mats, boys consumed the most on cycling, and boys and girls had significant differences in different video games. The reason may be due to differences in gender and hobbies. **Conclusion:** active video games are effective strategies to increase physical activity and energy consumption in overweight or obese children and adolescents. **Funding:** research initiated by individuals.

Keywords: Active Video Games, Obesity, Physical Activity, Energy Consumption

Mini-Oral Presentation A1.5 Associations between family environment and physical activity of Chinese children and adolescents

10:23 am - 10:25 am (Sydney, Australia, Tuesday, October 12, 2021)

Kai Li¹, Fei Xin¹, Huan Chen², Si-tong Chen², Xinxin Sheng³, Yujun Cai¹¹School of Physical Education and Sport Training, Shanghai University of Sport, ²Institute for Health and Sport, Victoria University,³School of Physical Education, Changzhou University

Background: Family environment is an important factor to promote the physical activity among children and adolescents. **Purpose:** To study the family environment factors related to physical activity among Chinese children and adolescents. **Methods:** The sample comprises 4,523 Chinese children and adolescents (51.6% girls; mean age 13.5 years). The information including moderate-to-vigorous physical activity (MVPA) and family environment variables were obtained. The family environment factors include family property (family children, education level, child-rearing style, economic level), family physical environment (physical activity equipment, exercise space, bedroom media equipment), and family social environment (family support, screen limit, motor skills level, exercise frequency, policy awareness, knowledge awareness). Binary logistic regression was used to analyze the relationship between family environment and the recommendations. **Results:** Overall, 35.5% of children and adolescence met the recommendations (60-minute MVPA per day). Children and adolescence from larger family (OR=1.27, 95% CI: 1.12,1.45), more stationary physical activity equipment (OR=1.15, 95% CI: 1.01,1.31) and more mobile physical activity equipment (OR=1.63, 95% CI: 1.21,2.18) were more likely to participate in MVPA. Family support (OR=1.32, 95% CI: 1.03,1.70), screen limit (OR=1.21, 95% CI: 1.05,1.39), exercise frequency (OR=1.43, 95% CI: 1.20,1.71), motor skills level (OR=1.34, 95% CI: 1.07,1.69), and policy awareness (OR=1.59, 95% CI: 1.11,2.28) were significantly associated with MVPA. **Conclusion:** Our findings provide evidence of significant associations between specific family environment factors and MVPA among Chinese children and adolescents. **Funding:** Study founded by The National Social Science Foundation of China (No. 16BTY082), The Shanghai Human Movement Key Laboratory Project of Dynamic Capability Development and Guarantee (No. 11DZ2261100).

Keywords: Family Environment, Physical Activity, Children, Adolescents**Mini-Oral Presentation A1.6 A study on monitoring the level of scientific fitness literacy of Chinese youth**

10:25 am - 10:27 am (Sydney, Australia, Tuesday, October 12, 2021)

Haibing Su¹¹School of Physical Education, Southwest University

Background: The results of a survey on the physical health of Chinese adolescents over the past 30 years indicated that the physical health of adolescents has been in continuous decline. The state has implemented a series of policies to curb the decline in the physical health of China's youth. **Purpose:** Some studies revealed that one of the critical factors affecting the declining physical fitness of Chinese adolescents is low scientific fitness literacy. For this reason, this study aimed to monitor the level of scientific fitness literacy among Chinese adolescents and provide a reference for scientific fitness decisions among Chinese adolescents. **Method:** A total of 4663 valid samples (94.4% effective rate) were included in the study. The age distribution of the subjects was 12-40 years old. The study sample data were analyzed using questionnaires and mathematical and statistical methods, and SPSS 24.0 software was used to perform descriptive statistics and ANOVA. **Results:** The overall scores of Chinese adolescents' scientific fitness literacy showed the following characteristics: (1) the central region scored the highest (28.63), the western region scored the second (28.14), and the eastern region scored the lowest (27.84); (2) adolescents with postgraduate education background scored the highest (28.53), adolescents with university education background scored the second highest (28.41), and adolescents with secondary education (3) adolescents with non-student status scored slightly higher than students (28.19>28.11); (4) females scored higher than males (28.60>27.58). **Conclusions:** (1) the overall level of scientific fitness literacy among Chinese adolescents is Abstract ID: 265 for ISPAH 2021 Vancouver (Auto-Generated August 13, 2021 9:21 pm) Copyright 2021 ISPAH 2021 Vancouver powered by WPAbstracts Pro not high; (2) the level of scientific fitness literacy among Chinese adolescents varies significantly across regions and educational backgrounds; (3) the gap between the health literacy levels of students and non-students is not significant, and physical education in Chinese schools has achieved concrete results and shows a steady upward trend overall.

Keywords: Scientific Fitness Literacy, Chinese Youth, Health, Behavior**Mini-Oral Presentation A1.7 Prevalence and correlates of muscle-strengthening exercise among Chinese children and adolescents**

10:27 am - 10:29 am (Sydney, Australia, Tuesday, October 12, 2021)

Fei Xin¹, Zheng Zhu^{2,3}, Xiaqing Hu¹, Si-tong Chen⁴, Huan Chen¹, Yang Liu^{1,2}, Lijuan Wang¹, Yujun Cai¹, Ang Chen⁵, Yan Tang¹¹School of Physical Education and Sport Training, Shanghai University of Sport, ²Shanghai Research Centre for Physical Fitness and Health of Children and Adolescents, Shanghai University of Sport, ³School of Kinesiology, Shanghai University of Sport, ⁴Institute for Health and Sport, Victoria University, ⁵Department of Kinesiology, University of North Carolina

Background: Understanding the correlates of muscle-strengthening exercise (MSE) is beneficial for developing health promotion interventions. **Purpose:** To identify the prevalence of meeting the MSE recommendations (≥ 3 days/week) and its correlates among Chinese children. **Methods:** The sample comprises 80,413 Chinese children (mean age 13.7 years; 53.5% girls). Self-reported data on MSE, demographics (sex, grade, ethnicity, residence, height, weight, family composition, income, and parental education), behavior (sport skills, moderate-to-vigorous physical activity (MVPA), screen time, and sleep duration), psychology (exercise intention), and sociocultural background (peer and parental support, parental MSE) were obtained. Logistic regressions were used to determine the correlates of meeting the recommendations. **Results:** Overall, 39.3% of children met the recommendations. Girls,

10th–12th graders, overweight/obese students, minorities, and those with lower income and education were less likely to engage in MSE. Children participated in more MVPA (OR = 1.57, 95% CI: 1.53–1.61) and sport skills (OR = 1.44, 95% CI: 1.26–1.66) were more likely to engage in MSE. Exercise intention (OR = 1.59, 95% CI: 1.51–1.68), parents MSE (OR = 1.46, 95% CI: 1.40–1.53), peer support (OR = 1.27, 95% CI: 1.20–1.35), and parental support (OR = 1.08, 95% CI: 1.03–1.12) were significantly associated with MSE. Conclusion: Sex, age, weight status, ethnicity, income, education, sport skills, MVPA, exercise intention, peer and parental support, and parental MSE were significantly associated with meeting the MSE recommendations. **Funding:** Study founded by The National Social Science Foundation of China (No. 16ZDA227).

Keywords: Correlate, Muscle-Strengthening Exercise, Physical Activity, Children

Mini-Oral Presentation A1.8 Association between schools' healthy space and happiness in Thailand primary schools

10:29 am - 10:31 am (Sydney, Australia, Tuesday, October 12, 2021)

Aubdul Aunampai¹, Piyawat Katewongsa¹, Dyah Anantalia Widayastari¹

¹Thailand Physical Activity Knowledge Development Centre (TPAK), Institute for Population and Social Research, Mahidol University

Background: School as the main setting where children spend most of their daily lives plays a significant role in determining children's happiness. **Purpose:** The purpose of the study is to investigate the association between schools' healthy space and happiness of primary school students in Thailand's urban and rural areas. **Methods:** Thailand Healthy School Data 2017 was employed. A total of 7,825 primary school students from 160 schools in 9 regions Thailand were included in the analysis. The Healthy School questionnaire collected participant characteristics and assessed school environment including: 1) outdoor environment, 2) indoor environment and 3) quality of space for physical activity. **Results:** Overall, the quality of space for physical activity in school (an open courtyard, a sports field with concrete floor and rubber floor for indoor activities and a playground with sand, grass, rubber or ground surface) has a significant effect on the happiness of primary school students. Girls and early graders scored higher on the happiness scale than boys and students in higher grades. Rural students are relatively happier (94.8%) than their urban counterparts (92.6%). **Conclusions:** Not only the students' gender and age will determine their happiness, but also the school environment, in particular schools that have areas for children to play independently, will affect the happiness and health of students and also affect the development and success of learning. **Funding:** This study is funded by Thai Health Promotion Foundation.

Keywords: Healthy Space, Student's Happiness, Thailand Primary School

Mini-Oral Presentation A1.9 Exploration of the Exercise and Self-Esteem Model revised with self-compassion among Hong Kong secondary school students: An Abductive Qualitative Approach

10:31 am - 10:33 am (Sydney, Australia, Tuesday, October 12, 2021)

Ming Yu Claudia Wong¹, Pak Kwong Chung¹, Ka Man Leung²

¹Department of Sport, Physical Education and Health, Hong Kong Baptist University, Kowloon, Hong Kong, ²Department of Health and Physical Education, Education University of Hong Kong, Tai Po, Hong Kong

Background: This study regards the mental health risks confronting Hong Kong's youths as a significant issue. However, due to the conservative attitude of Chinese people toward seeking mental health services, participating in physical activity as a self-help instrument in developing a positive self-concept should be promoted. **Purpose:** Given that, self-compassion was shown to be more precise than global self-esteem in predicting both negative and positive mental well-being compared to self-esteem. The current study thus aimed to investigate the relationship between physical activity and self-compassion based on Exercise and Self-Esteem Model, by replacing self-esteem with self-compassion. **Methods:** Using the abductive grounded theory approach, a total of 25 (Mage = 14.84, sd=1.40) students recruited from secondary schools in Hong Kong were involved in the in-depth interviews. **Results:** The results demonstrated four major categories based on the EXSEM revised with self-compassion (EXSEM-SC): Physical activity, exercise self-efficacy, self-compassion, and body compassion; thus, deductively revealed the expected relationship. Moreover, two new categories, personality traits and injuries were determined inductively from the outcomes. **Conclusions:** This study identified the relationship between physical activity and self-compassion among Hong Kong secondary school students, and further showed the progression towards mental well-being. Future studies should explore the quantitative properties of the model. **Funding:** N/A.

Keywords: Adolescents, Self-Compassion, Physical Activity, Abductive Qualitative Approach, Exercise and Self-Esteem Model

Mini-Oral Presentations Session A2

Mini-Oral Presentation A2.1 Exploring contemporary screen time in Australian adolescents: A qualitative study

11:15 am - 11:17 am (Sydney, Australia, Tuesday, October 12, 2021)

George Thomas¹, Jason A. Bennie¹, Katrien De Cocker¹, Stuart J. H. Biddle¹

¹Centre for Health Research, University of Southern Queensland

Background: Screen time, a highly prevalent behaviour, can be detrimental to adolescent health. However, little is known about the nature of adolescents' screen use, in addition to the context in which their screen use occurs. **Purpose:** To qualitatively explore the nature of and reasons for contemporary screen use among adolescents. **Methods:** Sixteen adolescents (9 girls and 7 boys) aged 13-17 years from a secondary school in Queensland, Australia participated in semi-structured one-on-one interviews. All interviews

were transcribed verbatim, anonymised, and thematically analysed using an inductive approach. **Results:** Smartphone use was ubiquitous, occurring mostly at home, after school, and typically used for social, entertainment and functional activities. Binge-watching and multi-screening emerged as common sedentary patterns of contemporary screen engagement, often performed solitary. Screen time appeared to be an important aspect of adolescents' social lives, while there were also some psychological, physical and behavioural concerns. Family and friends were thought to influence adolescents' screen time either directly (co-participation) or indirectly (modelling), while social smartphone notifications were said to prompt habitual, frequent and prolonged screen engagement. **Conclusion:** This study provided several new insights into the nature, functions, patterns, and benefits and concerns of adolescents' contemporary screen engagement. On the whole, adolescents engaged in a wide variety of screen-viewing practices, including newer digital media, mostly as a function to connect with friends and family. It might be desirable for screen time reduction interventions and policies to take into account the underlying social and psychological factors, and habitual nature of contemporary screen engagement among adolescents. **Funding:** This research was supported by the Research Training Program - International Stipend and Tuition Fees Scholarship.

Keywords: Screen Time, Adolescents, Health Behaviours, Qualitative Methods, Social Media

Mini-Oral Presentation A2.2 Research on the correlation of College Students' physical exercise, mental health and mobile phone dependence

11:17 am - 11:19 am (Sydney, Australia, Tuesday, October 12, 2021)

Wen Ting Yin¹, Rui Ma¹

¹Zhengzhou University

Background: Studies have shown that the comprehensive prevalence of mobile phone dependence among college students has been increasing year by year. Physical exercise has strong benign psychological benefits and significantly improves negative emotions. It not only improves physical and mental health, but also improves social adaptability. **Purpose:** This study will investigate the physical exercise and mobile phone dependence of college students, and verify the relationship between the three from the symptoms of mental health. The hypothesis will provide a theoretical basis for physical exercise to effectively intervene in mobile phone dependence. **Methods:** The sample includes a total of 1385 college students from a university in a province in China, including freshmen, sophomores, and juniors. Using the "Mobile Dependence Index Scale" compiled by Leung, "Clinical Psychological Symptom Self-Rating Scale", and "Survey on the Status Quo of College Students' Physical Exercise", a stratified cluster random sampling of 1,500 freshmen, sophomores, and juniors in school. The method selected five classes of each grade for questionnaire surveys, and recovered 1385 valid questionnaires, with an effective recovery rate of 92.3%. The internal consistency coefficient of the total scale is 0.97, and the internal consistency coefficient of each subscale is above 0.69. The psychological symptom scale can accurately measure the individual's mental health, and the positive judgment rate is 80.6%. **Results:** 1. The detection rate of male mobile phone dependence is 25.7%, and the detection rate of female mobile phone dependence is as high as 72.4%. 2. Physical exercise time (within 30 minutes, 31-60 minutes, 61-90 minutes, 91 minutes or more each time) is inversely proportional to the average number of cell phone dependent scores of various factors. The longer the exercise time, the smaller the average value.; Exercise time has a significant impact on the factors and total scores of mobile phone dependence (out of control $F=2.695$, $P<0.05$, withdrawal $F=3.785$, $P<0.01$, avoidance $F=2.282$, $P<0.05$, low efficiency Sexuality $F=3.885$, $P<0.01$, mobile phone dependence total score $F=3.856$, $P<0.01$). 3. The frequency of physical exercise (0 times a week, 1-2 times, 3-4 times, 5 times or more) is inversely proportional to the average score of the mobile phone depending on each factor. The more exercises per week, the smaller the average score.; Exercise frequency has a significant impact on the factors and total scores of mobile phone dependence (out of control $F=3.889$, $p<0.01$, abstinence $F=3.875$, $P<0.01$, avoidance $F=2.652$, $P<0.05$, inefficiency $F=3.889$, $P<0.01$, mobile phone dependence total score $F=4.598$, $P<0.01$). 4. Physical exercise intensity (low intensity, medium intensity, high intensity each time) has no significant effect on the factors of mobile phone dependence (failure $F=0.752$, avoidance $F=0.896$, abstinence $F=0.658$, low Effectiveness $F=0.663$, mobile phone dependence total score $F=0.769$). 5. Questions 3, 5, 6, 7, 8, 10, 15, and 16 in the "Mobile Phone Dependence Index Table" are screening questions for mobile phone dependence. If there are 5 or more items, select "always" or "always". It is judged as a mobile phone dependent person. The higher the score, the more serious the mobile phone dependence. The survey was divided into mobile phone dependent students and non-dependent students to compare the levels of mental health from various factors of psychological symptoms. The results showed that the two groups of students had a highly significant difference in the total score of psychological symptoms ($T=4.876$, $P<0.01$); the specific manifestations were in somatization ($T=5.477$, $P<0.01$), interpersonal relationship ($T=4.612$, $P<0.01$), depression ($T=3.385$, $P<0.01$), anxiety ($T=3.981$, $P<0.01$), paranoia ($T=3.378$, $P<0.01$) factors have highly significant differences; in obsessive-compulsive symptoms ($T=3.461$, $P<0.05$), hostility ($T=1.986$, $P<0.05$), fear ($T=2.261$, $P<0.05$), psychiatric ($T=2.311$, $P<0.05$) factors have significant differences. The average score of each factor of psychological symptoms of mobile phone dependent students (significantly higher than that of non-mobile phone dependent students, indicating that the mental health level of non-mobile phone dependent students is generally higher than that of mobile phone dependent students. 6. The relationship between exercise time and somatization ($r=-0.063$), obsessive-compulsive symptoms ($r=-0.068$), hostility ($r=-0.078$), fear ($r=-0.116$) was significantly negatively correlated ($P<0.05$), and the relationship with interpersonal relationship ($r=-0.106$), depression ($r=-0.107$), anxiety ($r=-0.117$), paranoia ($r=-0.155$), and psychosexuality ($r=-0.137$). Highly significant negative correlation ($P<0.01$); the relationship between exercise frequency and various factors of psychological symptoms is highly significant negative correlation ($P<0.01$); the influence of exercise intensity on various factors of psychological symptoms is not significant ($P>0.05$); The relationship between the total score of exercise and the total score of psychological symptoms showed a highly significant negative correlation ($P<0.01$). **Conclusions:** 1. The overall detection rate of mobile phone dependence among college students is not optimistic, especially for girls, as high as 72.4%. Colleges and universities should actively implement the relevant policy documents of school sports, and strengthen the prevention and intervention of college students' mobile phone dependence behavior. Actively create a good atmosphere for physical exercise and create an environment for everyone to participate in sports competitions. 2. Physical exercise time and frequency have significant effects on college students' mobile phone dependence, but physical exercise intensity has no significant effect on college students' mobile phone dependence. Recommendation: Increase the frequency of college students' participation in extracurricular sports activities and the number of sports competitions. 3. The mental health of students who are not dependent on mobile phones is

generally better than that of students who are dependent on mobile phones. There is a significant negative correlation between physical exercise, psychological symptoms and various factors of mobile phone addiction, indicating that physical exercise is helpful to the cultivation of college students' good mood and the formation of healthy psychology, and can reduce the degree of mobile phone dependence of college students to a certain extent.

Keywords: Physical Exercise, Mental Health, Mobile Phone Dependence, College Students, Correlation

Mini-Oral Presentation A2.3 The relationship between physical fitness and internet game disorder of emerging adults in Macao

11:19 am - 11:21 am (Sydney, Australia, Tuesday, October 12, 2021)

Si Man Lei^{1,3}, Chi Chong Wu², Jingguo Cao³, Soi Po Wong¹

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Background: The impact of internet or video game addiction on physical health and diagnosis as a kind of disorder has become a crucial public health issue among emerging adults. In 2018, World Health Organization classified gaming disorder as an international disease. However, relatively few studies have examined the relationship between game disorder and health-related physical fitness outcomes. **Purpose:** This study aimed to investigate the status and explore the relationship between the internet game disorder (IGD) and physical fitness (PF) of emerging adults in Macao. **Methods:** A cross-sectional study recruited 410 emerging adults (age range 18 – 22, 46.8% male and 53.2% female) in Macao. The physical fitness test has conducted to collect data, and the questionnaire included background information and Internet Gaming Disorder Scale (IGDS-20) with high internal reliability ($\alpha = .88$), consisting of six components. In addition, One way ANOVA, t-test, and Pearson's correlation coefficient were used for data analysis. **Result:** The key findings included (1) Multivariate analysis indicated a significant effect of age, gender, year of study on the level of IGD and PF. (2) Muscle strength had a positive relationship with the IGD ($r = .113$, $p < .05$), while cardiovascular fitness and flexibility had a negative relationship with the IGD ($r = -.126$, $p < .05$; $r = -.161$, $p < .01$). **Conclusions:** The result is consistent with other related studies, and internet/video addiction affects different dimensions of physical issues. The level of IGD and PF among Macao emerging adults are correlated. Future studies may focus on the impact of cardiovascular fitness and flexibility on IGD.

Keywords: Physical Fitness, Internet Game Disorder, Emerging Adults

Mini-Oral Presentation A2.4 Technology-supported university courses for increasing University Students' physical activity levels: A systematic review and set of design principles for future practice

11:21 am - 11:23 am (Sydney, Australia, Tuesday, October 12, 2021)

Kuston Sultoni^{1,2}, Louisa Peralta¹, Wayne Cotton¹

¹University of Sydney, ²Univeritas Pendidikan Indonesia

Background: Physical activity levels tend to decrease as adolescents' transition to adulthood. University course-based interventions utilising technology are a promising idea to combat this decrease. **Purpose:** This review aims to systematically identify, critically appraise, and summarise the best available evidence regarding technology-supported university courses that aim to increase student's physical activity levels. The second aim is to create initial design principles that will inform future practice in the area. **Methods:** Data Sources: CINAHL, ERIC, MEDLINE, ProQuest, PsycINFO, Scopus, SPORTDiscus, Web of Science. Search dates from January 2010 to December 2020. Study Inclusion: RCT or non-RCT or quasi-experimental studies describing university course-based interventions using technology that aim to increase the physical activity levels of university students. Data Extraction: Source (country), methods, participants, interventions, theoretical frameworks and type of technologies, outcome and measurement instrument, and results. Data Synthesis: Systematic review. **Results:** A total of 1939 articles were identified through databases. Six studies met the inclusion criteria. **Conclusions:** Four of the six included studies reported significant increases in university students' physical activity levels. An analysis of the six included studies identified four design principles that future course designers could utilise as they develop technology-supported university courses that aim to increase the physical activity levels of university students. Further work is required to test the effectiveness of these four design principles. **Funding:** The primary author (KS) is supported by the Indonesia Endowment Fund for Education Scholarship (Lembaga Pengelola Dana Pendidikan: 202001222015860) under a doctoral degree scholarship.

Keywords: College, Course, Design Principles, Physical Activity, Technology, University

Mini-Oral Presentation A2.5 Design-based research approach of technology-supported physical education for increasing physical activity of university students: Study Protocol

11:23 am - 11:25 am (Sydney, Australia, Tuesday, October 12, 2021)

Kuston Sultoni^{1,2}, Louisa Peralta¹, Wayne Cotton¹

¹University of Sydney, ²Univeritas Pendidikan Indonesia

Background: Promoting physical activity for university students is essential because physical activity levels decrease in this life transition. Providing technology-supported university courses targeting student's physical activity levels can be a viable option to combat the problem. However, it is still unclear how and what technologies could be supported in the university course setting. **Purpose:** This study aims to create a series of design principles for technology-supported university courses to increase the physical activity levels of university students. The design principles would be a guideline for designing a technology-supported

course underpinned by theoretical and empirical principles and knowledge of the affordance of current technology. **Methods:** The proposed theoretical framework underpinning the research program is a seven-phase design-based research approach. However, these seven phases will incorporate four separate but aligned studies. These are a (1) systematic review, (2) qualitative focus group study, (3) pilot study, and (4) randomised controlled trial study. Ethical approvals for phase 1 to phase 3 have been obtained. This study will take place in Bandung, Indonesia. **Discussions:** The purpose of this protocol is to detail the plan for conducting four aligned studies incorporate a seven-phase design-based research approach of technology-supported physical education course for increasing university students' physical activity levels in a comprehensive, transparent manner, contributing to the methodological evidence base in this field. **Funding:** The primary author (KS) is supported by the Indonesia Endowment Fund for Education Scholarship (Lembaga Pengelola Dana Pendidikan: 202001222015860) under a doctoral degree scholarship.

Keywords: Course-Based Intervention, Physical Activity, Physical Education, Technology, University Students

Mini-Oral Presentation A2.6 The effect of virtual challenge on physical activity and mental health among university students

11:25 am - 11:27 am (Sydney, Australia, Tuesday, October 12, 2021)

Rakmat Ari Wibowo¹, Zaenal Muttaqien Sofro¹, Widya Wasityastuti¹, Prattama Santoso Utomo², I. Gusti Bagus Budi Dharma³, Denny Agustini¹

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Background: Containment measures during the COVID-19 pandemic led to decreased physical activity (PA) and increased mental distress among university students. Utilizing technology to deliver PA intervention during the pandemic offered a wider reach than face-to-face intervention. **Purpose:** To examine the feasibility and the effect of a three-week virtual challenge based on self-determination theory (SDT) on PA level and mental distress among university students. **Methods:** A one-group quasi-experimental study was conducted among 73 students. We examined participants' PA using the Global Physical Activity Questionnaire v.2, mental distress using the WHO self-reporting questionnaire 20 and the motivational process in PA using The Behavioral Regulation in Exercise Questionnaire 3 before the challenge and at the end of the challenge. Wilcoxon signed ranked tests were used to determine whether there were changes in outcome measures. Weighted linear regression was used to identify behavior regulations as correlates of PA. **Results:** We over recruited by 558% and identified incompatibility problems, lost to follow up, and implausible GPAQ values in eight, seven, and three participants. Among students who were previously insufficiently active, there were 210 minutes increase in weekly moderate-vigorous PA ($z=4.008, p<.001$) and 3 points decrease in mental distress ($z=-2.594, p=0.009$). Integrated regulation predicted PA level at the end of the challenge [R square 0.384, $F(1,53)=33.056$, adjusted R square 0.373, $p<.001$]. **Conclusion:** Virtual challenge based on SDT could increase PA level through increasing integrated regulation and decrease mental distress among university students.

Keywords: COVID-19, Mental Health, Physical Activity, Self-Determination Theory, University Students

Mini-Oral Presentation A2.7 Study on the difference of plantar pressure distribution between football male college students and ordinary male college students

11:27 am - 11:29 am (Sydney, Australia, Tuesday, October 12, 2021)

JingMing Qin¹, Yun Chen²

¹Beijing Sport University, ²Shanghai University of Sport

Background: With the development of football, there are more and more football fans. In colleges and universities, there are also a large number of football students. The current situation of Chinese football is generally the low level of the league, the poor level of the national team, the small number of professional football population, sports injuries, vicious circle and so on. Fierce competition against strong is the essential characteristics of football, football determines the characteristics of the athletes often needs to be done in a short time, quick start, stop turning, fast shot and develop technology such as action, these techniques will lead to all sorts of sports injury, and a football match the risk of ankle, knee and shoulder joint injury is very high. Sports injury not only affects physical and mental health, but also hinders technical training, which will eventually affect the development of sports skills and function improvement, and shorten the life of special sports. Therefore, the prevention of sports injury becomes extremely important. In football, the main function of sports biomechanics is to define and understand technical movements, which is not only helpful to coaching, but also to improve the cognition and application ability of technical movements. Using biomechanics analysis characterization of the size and location of the weight parameters of sole, not only can help prevent injury, understand the general mechanical properties of the technical movements, and can be described in detail the achievements of technical action and analysis of factors, such as objective measurement can provide an effective tool for clinical doctors, to determine the relative susceptibility to damage of the athletes. The measurement of the plantar pressure can provide a lot of useful information for the study of the structure, function and movement of the foot, make a reasonable explanation for the foot and lower limbs, and then carry out targeted training. **Purpose:** Through the football male college students and ordinary male college students, while jogging, comparing the characteristics of plantar pressure distribution analysis football plantar pressure distribution characteristics of college students while jogging, football sports injury prevention for the future and provide theory evidence for targeted training, ensure the smooth progress of football teaching in training and competition. **Methods:** The choice of ordinary university sports college football of male college students, 18 of whom were experimental group, 18 control departments male college students, using Foot-scan plantar pressure gait analyzer, plantar pressure distribution characteristics of test subjects while jogging, the plantar pressure peak load rate, pressure peak value, pulse and a comparative study of four characteristic parameters. The plantar pressure gait test system was used to derive the data of each subject, and all the data were statistically analyzed by SPSS21.0 statistical software package. Two independent sample T test was applied to the two groups of data, and all the values were represented by means \pm standard deviation (Mean \pm sd). $P < 0.05$ indicated that the data were significantly different < 0.01 indicates a significant

difference in data. **Results:** Compared with ordinary male college students, the plantar pressure distribution of male football college students has the following changes: (1) The plantar pressure peak values of the third metatarsal bone of the left foot, the medial heel of the right foot and the lateral heel of the right foot are significantly lower than those of ordinary college students ($P < 0.05$). The peak value of plantar pressure in the area of the 2nd to 5th phalanges and the arch of the right foot of the special football college students was higher than that of the ordinary college students ($P < 0.05$), and the other areas showed a decreasing trend. (2) The first phalanges and third metatarsal area, left foot heel medial and heel lateral area of the plantar peak pressure are much smaller than ordinary college students ($P < 0.01$), the second metatarsal in his left foot and inside of the heel are a, the right foot first phalanges and third metatarsal area of plantar pressure peak value were significantly less than the ordinary college students ($P < 0.05$); The peak values of plantar pressure in other areas were all lower than those of ordinary college students, but there was no statistical significance. (3) The impulse of the third metatarsal of the left foot and the medial heel of the right foot were significantly lower than those of the ordinary college students ($P < 0.01$), the impulse of the second metatarsal of the left foot and the lateral heel of the right foot were significantly lower than those of the ordinary college students ($P < 0.05$), and the other areas were generally decreased. (4) The plantar load rate of the third metatarsal region of the left foot was significantly lower than that of ordinary college students ($P < 0.01$), the load rate of the first metatarsal bone and the second metatarsal region of the left foot and the outside of the heel of the right foot was significantly lower than that of ordinary college students ($P < 0.05$), and the other areas showed a decreasing trend. **Conclusions:** Compared with ordinary college students, the leg muscle strength of football specialized college students presents asymmetric changes, and the center of gravity shifts to the supporting leg, the lower limb stability and balance ability is stronger, the foot buffer ability is improved, the lower limb resistance to impact is enhanced, and the lower limb protection ability is improved. **Funding:** N/A.

Keywords: Football Special, Male College Students, Jogging, Plantar Pressure, Distribution Characteristics

Mini-Oral Presentation A2.8 Comparison of clinical parameters and 3D gait kinematics of pelvis, hip and knee in crouch gait In Cerebral Palsy

11:29 am - 11:31 am (Sydney, Australia, Tuesday, October 12, 2021)

Mayuri Gad^{1,2}, Chasanal Rathod^{1,2}, Taral Nagda^{1,2}

¹Jupiter Cerebral Palsy Clinic, ²Jupiter Gait Lab

Background: Crouch gait pattern in Cerebral Palsy is defined as flexion of hip, knee with excessive dorsiflexion of ankle, however less importance is given to the Pelvic tilts either anterior or posterior, which could be due to contracture of Rectus and hamstring respectively. **Purpose:** The aim of the study is to correlate the clinical parameters with Gait kinematics of Pelvis, hip and knee in crouch gait in cerebral palsy. **Methods:** 64 patients of SDCP with crouch gait pattern (Males 47, females 17), with an average age group of 14.2 years, GMFCS level 2 and 3 were included in this study. These patients underwent a 3D gait analysis. **Results:** The presence of Hip FFD in 16.7% or absence in 83.3% did not have any significance to the anterior tilt (p-value 0.806). A positive prone rectus test was noted in 26/64 (40%), but these patients did not have a significant anterior tilt (p-value 0.076). The posterior pelvic tilt was statistically significant (p-value 0.028) when correlated with presence of knee FFD, 25/36 (69.4%). The double pelvic bump pattern was positive in 36 patients (55.64%) and on correlating it with Hip FFD, 16% had presence of FFD and 38% had positive prone rectus test. Although the cross-tabulation correlation of Anterior pelvic tilt with double bump pattern with Positive prone rectus was not significant (P-value 0.99). **Conclusions:** The comparison of clinical parameters and 3D Gait kinematics proves that clinical signs of hamstring contractures have a significant posterior pelvic tilt; However, a Hip FFD and a Rectus or iliopsoas spasticity/contracture does not necessarily cause anterior tilt or double bump and hence these gait parameters should be cautiously used in decision making for the treatment of hip FFD or Rectus contracture.

Keywords: Crouch Gait, 3D Gait, Kinematics

Mini-Oral Presentation A2.9 Correlation between clinical rotational deformities with transverse plane kinematic gait parameters and Ct rotational profile In Spastic Diplegic Cerebral Palsy

11:31 am - 11:33 am (Sydney, Australia, Tuesday, October 12, 2021)

Mayuri Gad^{1,2}, Chasanal Rathod^{1,2}, Taral Nagda^{1,2}

¹Jupiter Cerebral Palsy Clinic, ²Jupiter Gait Lab

Background: Torsional deformities in lower extremities is common among spastic diplegics. In-toeing or out-toeing is very often seen. In-toeing is caused by one of the three types of deformity: increased femoral anteversion, internal tibial torsion, and metatarsus varus, while out-toeing, the less common form, is caused by femoral retro-version and external tibial torsion. **Purpose:** To analyse correlation between rotational deformities on clinical evaluation, Gait study and CT study to ascertain the most reliable parameter for decision making before derotation osteotomy. **Methods:** Cross sectional data of 50 diplegics with GMFCS 1-3, mean age of 15 years were included. Additionally, 10 segments of post-operative femoral and Tibial derotation osteotomy were evaluated for outcome. Data was evaluated with Pearson's test. **Results:** A significant correlation was noted between Clinical Rotations and femoral Anteversion (FAV), Thigh Foot Angle (TFA) and tibial torsion (TT) did not correlate significantly. Significant correlation between Gait parameters and Clinical evaluation was present for TFA and Foot progression angle (FPA) and Hip rotation, while the Pelvic and Knee rotations did not correlate. Between the Gait parameters and CT study no correlation was noted. Comparison of pre and post data showed significant outcome. **Conclusions:** Static and dynamic evaluations together are important for surgical decision making. Clinically increased IR and FAV does warrant a femoral derotation osteotomy while gait kinematics alone should not be considered. For Tibial derotation, Kinematics and TFA are more reliable for decision making rather than tibial torsion on CT study.

Keywords: Torsional Malalignment, Gait, Derotation Osteotomy

Mini-Oral Presentations Session A3

Mini-Oral Presentation A3.1 Physical activity and mental health in children and adolescent during the COVID-19 pandemic 2020

1:20 pm - 1:22 pm (Sydney, Australia, Tuesday, October 12, 2021)
Nattaporn Nilwatta^{1,2}, Piyawat Katewongsa^{1,2}

¹Institute for Population and Social Research, Mahidol University, Salaya, Phutthamothon, Thailand, ²Thailand Physical Activity Knowledge Development Centre (TPAK), Institute for Population and Social Research, Mahidol University, Thailand

Background: The prolonged COVID-19 pandemic has caused anxiety in children and adolescents. Restriction of movement have reduced physical activity (PA) opportunities, including playing time. **Purpose:** This study aims to describe the level of physical activity and anxiety among children and adolescents during the COVID-19 pandemic. **Methods:** This study employed 2020 datasets of Thailand's Surveillance on Physical Activity (SPA) and involved a total of 814 persons and 178 persons aged 5–17 years in the analysis, of whom were selected with multi-stages random sampling. Anxiety was measured by questionnaire whereas PA was assessed by using assessment criteria form WHO. **Results:** The findings showed that, during the severe pandemic, the level of anxiety of children and adolescents. Measured from the mean (SD) increased from 1.31 in May to 2.87 in June. In December, the mean level of anxiety decreased to 2.48, presumably due to various intervention implemented by the government that encouraged behaviors changes which improves mental health. During the pandemic, the prevalence of sufficient MVPA of children and youth continue to decline, from 19.7% in May to 19.3% in June and reached the lowest point in December 17.4%. **Conclusions:** The containment measures by the government have increased anxiety level and reduced the prevalence of sufficient MVPA among children and adolescents during the Covid-19 pandemic. With the closure of schools and public amenities, children and adolescents are losing the opportunities and venues for active play and PA. **Funding:** Thai Health Promotion Foundation.

Keywords: Physical Activity, Mental Health, Children, Adolescent, Covid-19 Pandemic

Mini-Oral Presentation A3.2 Virtual Community Model for physical activity promotion among Generation Y population during COVID-19 pandemic

1:22 pm - 1:24 pm (Sydney, Australia, Tuesday, October 12, 2021)
Nattaporn Nilwatta¹, Piyawat Katewongsa¹

¹Thailand Physical Activity Knowledge Development Centre (TPAK), Institute for Population and Social Research, Mahidol University

Background: COVID-19 pandemic has reduced physical activity level of generation Y population "gen Y" (who was born in 1981 - 2000). Therefore, it is essentially needed to design the model to increase level of physical activity as a lifestyle in accordance with gen Y. **Purpose:** This study aims to design virtual community model and to measures its effectiveness in promoting PA for Generation Y population by applying collective action theory. **Methods:** A quasi-experimental research with experimental and control-group involved a total of 120-person gen Y that were assigned equally to experimental and control group randomly. The experimental group is exposed to 2 interventions consist of (1) physical activity education for 2 weeks and (2) motivation, based on collective action of physical activity for 6 weeks. The control group will not be exposed to any. Physical Activity as the main outcomes is measured using of both subjective (self-report; online questionnaire) and objective (step counter apps) measures. **Results:** The baseline data showed that, during COVID-19 pandemic, 53% of gen Y accumulated sufficient MVPA in 2020. In the next phase, the sample will be exposed to 2 interventions consist of (1) physical activity education and (2) motivation, which will be completed in August 2021. **Conclusions:** Virtual community is the importance area to enhance opportunities for physical activity, especially gen Y who spent the most time on virtual community (e.g., Line, Facebook, Instagram etc.). **Funding:** Study founded by Thai Health Promotion Foundation.

Keywords: Physical Activity, Virtual Community, Collective Action, Generation Y Population

Mini-Oral Presentation A3.3 The Influence of coaches' performance on athletes' mental health and competitive level under the background of the delay of major events

1:24 pm - 1:26 pm (Sydney, Australia, Tuesday, October 12, 2021)
Ru Zhang¹

¹Guangzhou University

Purpose: Based on the postponement of large-scale competitions, this paper focuses on the influence of coaches' coaching performance on athletes' mental health and competitive level, aiming to remind coaches to pay attention to the influence of coaches' coaching performance on athletes' mental health, to help them avoid potential risks and overcome psychological obstacles in training. **Methods:** Literature and Logical analysis. **Results:** 1. Coaches can support athletes' technical and tactical development in terms of mental health. 2. The expression of athletes' emotions can reflect the recent mental health status, and is an important source of coaching theories for coaches. It is beneficial for coaches to update coaching methods and maintain athletes' competitive level and reasonable improvement. **Conclusions:** 1. Under the background of postponement of large-scale events, coaches' reasonable coaching performance is conducive to the construction of athletes' good mental health and the improvement of their competitive level. 2. Coaches' coaching performance is considered to promote or weaken athletes' performance. In the face of postponement, coaches should pay attention to athletes' emotional reactions and psychological state regulation during coaching. 3. In the context of postponement, coaches should pay attention to some psychological problems of athletes, make new preparation plans after postponement, and adjust the influence of negative emotions of athletes.

Keywords: COVID-19 Epidemic, Postpone of Major Events, Mental Health, Solution

Mini-Oral Presentation A3.4 Physical activity and mental health in Thai elderly people during the COVID-19 lockdown

1:26 pm - 1:28 pm (Sydney, Australia, Tuesday, October 12, 2021)

Yaowapa Trangan^{1,2}, Piyawat Katewongsa^{1,2}

¹Institute for Population and Social Research, Mahidol University, Salaya, Phutthamonthon, Thailand, ²Thailand Physical Activity Knowledge Development Centre (TPAK), Institute for Population and Social Research, Mahidol University, Salaya, Phutthamonthon, Thailand

Background: It has been suggested that physical activity (PA) was involved in several neurotransmitters in the brain which may affect poor mental health of the elderly. **Purpose:** To study the association between sufficient PA and mental health in Thai elderly people. **Methods:** Sample was 60 years and over comprised 302 respondents from the relaxation of the curfew period and 117 respondents from the curfew enforcement period during Covid-19 pandemic were included in the analysis. GPAQ (V2.0), were used to measure PA in both periods. Sufficient MVPA for older adults was defined based on the recommendation of 75 mins of vigorous PA and/or 150 mins of moderate per week. Rating scales questionnaire was used to assess the mental health. **Results:** There is no different in age, gender, education, career, and underlying diseases in these two study groups. The level of MVPA in Thai elderly during the relaxation of the curfew were significantly different from the curfew enforcement period ($p < .0205$) with a reduction in the cumulative minutes of MVPA from 428 min to 237 min, respectively. The mental health during the curfew enforcement period also was significantly different from the relaxation of the curfew period ($p < .0001$). These reductions of MVPA were significantly associated with worse mental health during the curfew enforcement ($B = -0.191$, $p = 0.039$). **Conclusions:** PA reduction was associated with the worse mental health in Thai elderly during the curfew enforcement, suggesting that MVPA should be promoted.

Keywords: Elderly, Physical Activity, Mental Health, COVID-19 Lockdown

Mini-Oral Presentation A3.5 Daily activity participation and physical activity level in Chinese mid-to-old, retired adults

1:28 PM - 1:30 PM (Sydney, Australia, Tuesday, October 12, 2021)

Ying Huang¹, Amy Ha¹

¹Chinese University of Hong Kong

Background: Interest in the study of activity participation has grown substantially in previous research. Little is known about the association between daily activity and physical activity (PA). **Purpose:** To study the relationship between activity participation, specific activities and PA in Chinese mid-to-old, retired adults. **Methods:** People aged 50 years older, retired, healthy were invited into the phone survey. The 21-item daily activity checklist was used to measure daily activity. PA level was measured by International physical activity questionnaire (IPAQ-SF). Bivariate correlations were conducted with all variables; regression was conducted with those activities significantly associated with PA. **Results:** The sample comprises 138 participants (age: 65.64 ± 6.64) from both sexes (25% male and 75% female). Participants engaged in an average of 12 activities per week. The number of daily activities engaged has a significant positive association with PA level ($r = 0.285$, $p < 0.05$). Among specific activity, providing childcare was the only activity negative associated with PA significantly, doing exercise with families, visiting, chatting through mobile phone and doing exercises with friends were significantly positive associated with PA. Providing childcare, doing exercises with friends and families also significantly predicted PA, $R^2 = 0.199$, $F(3, 134) = 7.258$, $p < .000$. **Conclusions:** Providing childcare is likely to have a 'side effect' at PA level in Chinese retired adults. Future intervention studies could also consider adding the social component such as visiting and connecting through mobile phone with friends. **Funding:** N/A.

Keywords: Physical Activity, Daily Activity, Retired Adults, Aging

Mini-Oral Presentation A3.6 Research progress on the relationship between gait speed and physical fitness in the elderly

1:30 pm - 1:32 pm (Sydney, Australia, Tuesday, October 12, 2021)

JingMing Qin¹, Ran Li¹, Liyuan Huang¹, Runsheng Yan¹, Shumeng Tian¹, Tianqi Dong¹

¹Beijing Sport University

Background: Aging is a major problem facing human beings. When the human body enters old age, most elderly people will show a significant decrease in gait speed due to the influence of the body degenerative changes caused by aging. **Purpose:** By searching domestic and foreign studies on the relationship between strength, balance, stamina, agility and gait speed of the elderly from 2015 to 2021, relevant evidence was obtained, provides a brief summary and update about literature, comprehensive understanding of nearly seven years old pace of research status quo and insufficiency, to improve the physical fitness of the elderly, reduce the risk of falls and fractures, to provide theoretical basis for improving the health level and life quality of the elderly. **Methods:** In daily life, we often use timed stand up walk test (TUGT), 6min walk test (6MWT), 3M constant pace walking test to judge the body quality of the elderly, which is simple and convenient, and save money and effective. Literature retrieval was conducted from CNKI, Wanfang and PubMed respectively. Inclusion criteria: 1. Gait speed unit is m/s; 2. The target is the elderly; 3. Physical fitness such as strength, balance, stamina and agility; 4. Systematic review or meta-analysis; 5. The period from 2015 to 2021. A total of 1558 related articles were retrieved, and the articles were sorted out and read to write a review. **Results:** 1. Walking speed is a simple measure of skeletal muscle function. The walking speed of normal adults is about 1.5m/s, and when the walking speed is less than 1.5m/s, the lower limb strength is considered weak. Lower limb muscle strength can also predict gait speed in healthy older adults, with lower limb muscle strength associated with lower gait speed. 2. The decrease of walking speed can reflect the decrease of balance ability, and the age-related balance restriction is related to the decrease of

walking speed; A loss of balance can also lead to a decrease in walking speed. 3. Elderly people with good cardiopulmonary endurance can walk for a long time and at a fast pace. 4. Reaction ability requires the coordination of nerve, speed, balance, flexibility and other ability elements to reach a certain level. In the elderly, cell apoptosis leads to loss of spinal motor neurons, increase in the number of circulating cytokines and increase in cellular oxidative function. These age-related changes often lead to the decrease of gait speed, which can also reflect the aging and weakening of the nervous system in the elderly. **Conclusions:** The study found that strength, balance, stamina, agility and gait speed affect each other. The elderly with good physical fitness have relatively faster gait speed. The elderly with faster gait (fast gait: top 25% of the sample size) had better physical fitness. Gait speed is a useful predictor of falls, hospitalizations, impairments in daily living and survival in the elderly, as well as quality of life, health status and physical function. It is hoped that this simple, rapid and easily measurable gait speed indicator will be popularized and encouraged in clinical and research settings. **Funding:** No.

Keywords: The Elderly, Gait Speed, Physical Fitness

Mini-Oral Presentation A3.7 Validation of acceleration in sit-to-stand for assessing lower-limb function in older adults utilizing 3-axis accelerometer

1:32 pm - 1:34 pm (Sydney, Australia, Tuesday, October 12, 2021)

Korin Tateoka¹, Takuro Shoji², Koki Nagata², Taiki Inoue³, Tomahiro Okura⁴

¹Doctoral Program in Health and Sport Science, University of Tsukuba, ²Doctoral Program in Public Health, University of Tsukuba,

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Background: The vertical acceleration (Vacc) parameter in sit-to-stand movement (STS) are useful for measuring lower-limb function in older adults. However few reports are available on whether Vacc parameter in STS movement reflect lower-limb functional status in older adults. **Purpose:** To investigate the concurrent validity of Vacc parameter in STS for assessing lower-limb function. **Methods:** A total of 399 older adults participated in a cross-sectional study. Participants performed the STS with a 3-axis accelerometer attached to the lower back first and then holding in their hand. Two parameters were measured: maximal acceleration, maximal jerk. Objective assessment such as vertical ground reaction force, timed up and go test (TUG), 5-time sit-to-stand test, 5-m habitual walk, one-leg balance with eyes open were used to assess lower-limb function. Subjective assessment such as history of falls, fear of falling and mobility limitation were examined. Concurrent validity was evaluated using Pearson correlation coefficient (r) and analysis of covariance adjusted for the age and sex and Trend test (Jonckheele-Terpstra). **Results:** Lower back maximal acceleration was relatively higher correlated with RFD8.75/w ($r = 0.75$), TUG and 5-time sit-to-stand ($r = -0.45 \sim -0.54$). Lower back maximal acceleration was tend to small in subjects reporting falls, a fear of falling or a mobility limitation compared to those who didn't report it. **Conclusions:** Lower back maximal acceleration can be a valid parameter for the quantification of the lower-limb function in older adults.

Keywords: Vertical Acceleration Parameter, Sit-To-Stand, Older Adults

Mini-Oral Presentation A3.8 Walk Score® walkability index is associated with sedentary behavior and physical activity recommendation in rural older adults

1:34 pm - 1:36 pm (Sydney, Australia, Tuesday, October 12, 2021)

Yi-Chien Yu¹, Ming-Chun Hsueh², Yung Liao³, I-Chun Chen⁴, Shao-Hsi Chang¹

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Background: To date, there is no studies have investigated the associations between the Walk Scores of neighborhood environments and the physical activity (PA) and sedentary behavior (SB) of older adults in rural areas. **Purpose:** The aim of this study was thus to examine the correlations of Walk Scores with sufficient PA and prolonged SB in order to provide appropriate recommendations for older adults living in rural areas. **Methods:** The sample comprised 1,083 older adults (aged ≥ 65 years). Cross-sectional data on PA, SB, and screen time were obtained by using computer-assisted telephone-based interviews. The Walk Score, which indicates the walkability of a neighborhood, was assessed for each participant's neighborhood, with the resulting scores divided into five classes ranging from class 1 to class 5. Binary logistic regression analyses were adopted. **Results:** Compared with those living in very car-dependent locations (class 1), older adults who lived in locations classified as a "walker's paradise" (class 5) were more likely to meet the moderate-to-vigorous physical activity (MVPA) recommendation (≥ 150 min/week) (odds ratio [OR] = 2.35; 95% confidence interval [CI]: 1.37-4.02). However, older adults who lived in a somewhat walkable area (class 3) (OR= 1.61; 95% CI = 1.05-2.47), very walkable area (class 4) (OR= 1.75; 95% CI= 1.11-2.75), or a walker's paradise (class 5) (OR= 2.58; 95% CI= 1.54-4.33) also had significant likelihoods of excessive SB (≥ 7 hr/day). In addition, similar results were found regarding to excessive screen time (≥ 2 hr/day). **Conclusions:** The results of this study indicate that living in a more walkable neighborhood may support MVPA while also being associated with excessive SB among older adults living in rural areas. These findings provide critical information for improving neighborhood walkability and the health-related behaviors of suburban or rural area residents. **Funding:** This work was supported by Shao-Hsi Chang received a personal grant from the College of Sports and Recreation, National Taiwan Normal University, and from the Ministry of Science and Technology of Taiwan (Grant Number: MOST 108-2410-H-003-117).

Keywords: Walkability, Walk Score, Older Adults, Physical Activity, Sedentary Behavior

Mini-Oral Presentation A3.9 The effectiveness of a national-wide health promotion program for community-dwelling older adults in Taiwan: Secondary analysis of a preliminary study

1:36 pm - 1:38 pm (Sydney, Australia, Tuesday, October 12, 2021)

Ling-Hui Chang¹, Hui-Fen Mao¹, Ching-Yi Wu¹, Ying-Wei Wang², Shu-Li Chia³, Chia-Hsiu Liu³, Chiung-Dan Chang³, Shih-Ying Wu³

¹Taiwan Occupational Therapy Association, ²Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, ³Health Promotion Administration, Ministry of Health and Welfare, Taiwan, R.O.C.

Background: The world's older population is rapidly growing, especially Asian regions that the number of elderly are projected to double between 2019 and 2050. Frailty is an aging-associated clinical syndrome with high risk for falls, disability, hospitalization, and mortality, as well as psychological characteristics such loneliness and depression. The study is a nation-wide aging prevention project for health and sub-healthy community-dwelling older adults in Taiwan to implement a community-based physical exercise program. **Purpose:** To examine the effectiveness and influencing factors of a national-wide multi-component health promotion program for community-dwelling Taiwanese older adults. This program was developed and promoted by the Health Promotion Administration, Ministry of Health and Welfare, Taiwan. **Methods:** This study was a secondary analysis of one-group pretest-posttest design. The participants, ≥ 65 years and without disabilities, received 12 weekly 2-hour group sessions. The health promotion program was led by trained instructors and consisted of physical activity, health education, and cognitive training. Level of frailty was measured by the Study of Osteoporotic Fracture (SOF) Checklist, the risk of disability by Kihon Checklist (KCL), and the life satisfaction by a single question. Pre-post comparison was assessed by the paired-t test and the effect sizes analyzed by Cohen's d. The factors affecting the improvement of the SOF were analyzed by logistic regression analysis. **Results:** 3383 participants were recruited from 79 community centers in Taiwan. 2017 participants with valid post-test SOF scores were included in the analysis. The mean age was 74.32 ± 6.48 . 74.62% were female. Pre-post comparison of SOF score showed that 1249 (61.92%) remained the same. 768 (38.08%) showed changes of levels. 77.36% (N=164) improved from frail to pre-frail and robust and 350 (54.35%) from pre-frail to robust. 189 (16.28%) deteriorated from robust to pre-frail and frail, and 63 (9.78%) from pre-frail to frail. Significant improvements of KCL were found in the domains of daily function ($d = 0.058$, $P = .009$), physical strength ($d = 0.056$, $P = .012$), depressive mood ($d = 0.134$, $P < .001$), and total ($d = 0.100$, $P < .001$). Life satisfaction also improved ($P < .001$). Gender ($OR = 1.36$, $P = .015$) and initial mood status ($OR = 2.11$, $P < .001$) significantly affected the effectiveness on frailty status. **Conclusions:** This study is one of the firsts to evaluate the effectiveness of a national-wide health promotion program for community-dwelling older adults in real-world settings. Multicomponent health promotion program had promising effect in changing the frailty status, decreasing the risks of mood and physical problems, and improving the life satisfaction. Women and those with initial depressed mood showed the most progress. **Funding:** Study funded by Health Promotion Administration, Ministry of Health and Welfare, Taiwan, R.O.C.

Keywords: Frail Elderly, Health Promotion, Kihon Checklist

Mini-Oral Presentation A3.10 Physical activity, social capital and health status among older adults: a structural equation modeling analysis

1:38 pm - 1:40 pm (Sydney, Australia, Tuesday, October 12, 2021)

Yoshinobu Saito¹, Yuko Oguma², Haruhiko Imamura³, Takayuki Tajima⁴, Sho Nakamura¹, Kaname Watanabe⁵, Hiroto Narimatsu⁵

¹Kanagawa University of Human Services, ²Keio University, ³Toho University, ⁴Tokyo Metropolitan University, ⁵Kanagawa Cancer Center

Background: Recent studies have shown that not only individual physical activity but also group exercise and social capital are effective for the health status of older adults. **Purpose:** This study aimed to clarify how physical activity including group exercise and social capital are related to health status in older adults. **Methods:** The participants were 4,102 older people who belonged to the senior club in Fujisawa, Kanagawa, JAPAN. Outcomes evaluated locomotor function (0-5 points), cognitive function (0-3 points), and depression (0-5 points). Physical activity (presence or absence of group exercise, individual living activity/exercise (minutes/day), sitting time (minutes/day)), individual-level social capital (attachment, reciprocity, trust, network), individual factors (age, living alone) were used as latent variables, and structural equation modeling was performed by sex. **Results:** The participants' average age (standard deviation) was 78.6 (6.5) years. High physical activity positively associated locomotor dysfunction ($\beta = -0.25$ in men, -0.65 in women) and depression ($\beta = -0.22$ in men, -0.62 in women). Only women had a positive association between high physical activity and cognitive decline ($\beta = -0.62$). High social capital positively associated cognitive dysfunction ($\beta = -0.10$ in men, -0.06 in women) and depression ($\beta = -0.32$ in men, -0.11 in women). Individual factors were found to be directly associated with all outcomes in men, but not in women. **Conclusions:** Physical activity including group exercise and social capital revealed that directly and indirectly positively affects the health status of older men and women. **Funding:** JSPS KAKENHI JP18K11055, 19H03910, KISTEC, Kanagawa prefecture.

Keywords: Group Exercise, Social Capital, Aging, Well-Being

Mini-Oral Presentation A3.11 Baduanjin in sitting position improves coordination function in Chronic Stroke Patient: A case report

1:40 pm - 1:42 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Coordination dysfunction is quite common after pontine infarction, contributing to the decreased ability of activity of daily living (ADL). Baduanjin is a traditional Chinese exercise characterized by smooth and slow movements which may benefit to the coordination function. **Purpose:** To explore the effect of Baduanjin on the coordination function in an individual with pontine

infarction. **Methods:** One patient with chronic stroke was included in this study. This patient is male aged 38, who suffered pontine infarction 7 months ago. The Brunnstrom recovery stage evaluated for the patient was VI but the coordination dysfunction was severe. The score of the International Cooperative Ataxia Rating Scale (ICARS) assessment was 28, indicating a severe coordination disorder. A regime of Baduanjin training for 5 days each with 30 min was provided. As the patient was not able to stand independently, sitting position was applied for the whole training sessions. The physiotherapist supervised all the training with 5min warm-up exercise, 20min Baduanjin practice and 5min cool-down exercise. For each day training session, pre and post assessments using ICARS were conducted whereas the ADL ability was also evaluated with Modified Barthel index before and after for the whole training. **Results:** After 3 days of training, the score of ICARS was decreased to 22 and at the end of the whole training period, the score of ICARS declined to 17. The score of Modified Barthel index increased 5 points at the end of training. **Conclusions:** Baduanjin is a treatment which can increase the coordination of pontine infarction patient. **Funding:** Study founded by the “Chong Bu Qiang” funding of Guangzhou Sport University (721018020185).

Keywords: Baduanjin, Coordination, Stroke

Mini-Oral Presentation A3.12 Muscle-strengthening exercise and health: Does session duration or weekly volume influence the prevalence of chronic health conditions?

1:42 pm - 1:44 pm (Sydney, Australia, Tuesday, October 12, 2021)

Jane Shakespear-Druery¹, Katrien DeCocker^{1,2}, Stuart Biddle¹, Jason Bennie¹

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Background: Muscle-strengthening exercise (MSE) has multiple health benefits. However, with epidemiological research largely focussing on participation frequency (times/week), little is known about the associations between other participation parameters (i.e. duration/volume) with health conditions. **Purpose:** To examine the association between weekly duration and volume of MSE with chronic health conditions in a representative sample of UK adults. **Methods:** Cross-sectional data from 16,301 UK adults aged ≥ 16 years, from the Health Survey for England (2012, 2016). Self-reported MSE mode (own bodyweight, gym-based strength exercise) duration and volume, was assessed against five self-reported chronic conditions (diabetes; anxiety/depression; heart, respiratory and musculoskeletal conditions). Poisson regression with robust error variance were used to calculate the prevalence ratios of each chronic condition (outcome variable) across MSE (exposure variables: duration (minutes: 0 [reference]; 10-20; 21-59; ≥ 60 /session); and volume (0 [reference]; low <mean; high \geq mean/week) for each mode and the modes combined. **Results:** Most (81.5%) did no MSE. However, in those who did, undertaking any MSE regardless of mode, duration or volume was associated with a reduced likelihood of conditions such as diabetes (APRs 0.39-0.25; 0.35-0.34), conditions affecting the heart (APRs 0.60-0.33; 0.51-0.32), respiratory (APRs 0.67-0.49; 0.50-0.49), and musculoskeletal systems (APRs 0.63-0.45; 0.57-0.43), and anxiety/depression (APRs 0.68-0.46; 0.59). Associations remained after adjustment for potential cofounders e.g. sex, age, body mass index, smoking, alcohol). **Conclusions:** While participation in own bodyweight or gym-based strength MSE is low, irrespective of mode, duration or volume, MSE was associated with a lower prevalence of chronic health conditions. **Funding:** Nil.

Keywords: Muscle-Strengthening Exercise, Prevalence, Chronic Health Conditions, Physical Activity

Mini-Oral Presentation A3.13 Translating GAPP into local government policy – The example of Fujisawa City, Japan

1:44 pm - 1:46 pm (Sydney, Australia, Tuesday, October 12, 2021)

Yuko Oguma¹, Yoshinobu Saito², Takayuki Tajima³, Tomoya Ito¹, Tao Yu¹, Natsue Doihara¹, Noriko Takeda⁴, Yukio Oida⁵

¹Keio University, ²Kanagawa University of Human Services, ³Tokyo Metropolitan University, ⁴Kogakuin University, ⁵Chukyo University

Background: The Physical Activity (PA) policy of Fujisawa city was formulated as part of the Fujisawa Health Promotion Plan (2nd stage, 2015–2024), which is based on Japan's national 10-year health promotion plan (2013–2022). In 2018, the World Health Organization launched the Global Action Plan on Physical Activity 2018–2030 (GAPPA), which provides guidance through a framework of effective and feasible policy actions for increasing PA using the systems approach. **Purpose:** We examined if the PA policy was well applicable to the GAPPA framework and if there were any missing elements so that the policy could be improved upon. **Method:** The PA policy was categorized to comply with 20 policy actions under GAPPA. The public health nurses at the health promotion section of the city and university researchers discussed and applied these to the GAPPA framework. **Results:** The 76 PA projects in 2020 were categorized into three themes and six sub-themes. Fujisawa +10 project, a community-wide intervention using social marketing (Saito et al., 2018), fit particularly well into GAPPA 1-1. We found that each of the GAPPA areas could be fulfilled by including non-PA measures, in the environmental, transportation, and city planning sections of the city. **Discussion:** It is necessary to share the co-benefits with the above sections not included in the PA policy, monitor common indicators, and evaluate the progress and results to help meet the country's sustainable development goals (SDGs) because, according to WHO, PA policy action contributes to 13 of the 17 SDGs. **Funding:** JSPS KAKENHI 17K01795, JP18K11055, KISTEC, Kanagawa prefecture.

Keywords: Physical Activity Promotion, SDGs, Whole Systems Approach, Co-benefits

Mini-Oral Presentation A3.14 Cost-effectiveness estimation of brief advice as part of routine care intervention on physical activity promotion in Thailand

1:46 pm - 1:48 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Brief advice as a part of routine care intervention for physical activity promotion have been implemented in Thailand, however, information on its cost-effectiveness is lacking. **Purpose:** This study aims to estimate the cost-effectiveness of brief advice implementation from the perspective of health outcomes in Thailand during 2021–2040. **Methods:** This study collected data on the costing, quantity assumption and unit price of implementing brief advice as part of routine care intervention on physical activity promotion in Thailand. In the data analysis process, OneHealth Tool program was used. **Results:** The findings of the study found that physical activity promotion with brief advice as part of routine care reduced the mortality of Thai population. **Conclusions:** The results informed that the promoting physical activity through brief advice as part of routine care intervention have contributed to mortality reduction from stroke (post-acute), ischemic heart disease (post-acute), diabetes, and colorectal cancer. **Funding:** This research was funded by Thai Health Promotion Foundation.

Keywords: Cost-Effectiveness, Physical Activity, Brief Advice

Mini-Oral Presentation A3.15 Adverse events and near-misses during sports activities conducted independently by community residents

1:48 pm - 1:50 pm (Sydney, Australia, Tuesday, October 12, 2021)

Akihiro Hirata^{1,2}, Yuko Oguma^{1,2}, Takeshi Hashimoto^{1,2}, Sayuri Hosoi³, Rie Segawa³, Masanobu Shirakawa⁴

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Background: Although physical activity has many health benefits, adverse events and near-misses, such as injuries and falls, can occur during physical activity. **Purpose:** This study aimed to determine the occurrence of adverse events and near-misses during sports activities conducted independently by community residents. **Methods:** This questionnaire survey was sent via the internet to the leader or director of sports at six public sports centers or associations to be disseminated to local residents. In total, 108 individuals responded answered. In total, there were 60% and 40% male and female respondents. Individuals aged 50–69 years accounted for 60% of the total respondents. The respondents were asked about their experiences of adverse events and near-misses in the past 3 years. **Results:** Most of the respondents' activities as staff were performed once a month, with each activity lasting 1–2 hours. Forty-five adverse events were reported, including 26 injuries, 13 falls, and 6 other events (such as heat stroke, vertigo, and presyncope). Twenty-four near-misses were reported, including 12 near-collisions with people or objects, 5 near-falls, and 7 other incidents. **Conclusions:** We found that adverse events or near-misses occurred during sports activities conducted independently by community residents. **Funding:** This study was commissioned by the Sakae Ward Safe Community Promotion Council Sports Safety Measures Subcommittee, "Project to Promote Measures to Prevent Injuries and Accidents During Exercise."

Keywords: Safe Community, Adverse Events, Near-Misses, Physical Activity, Community Residents

Mini-Oral Presentation A3.16 Review of empowered running events as physical activity promotion for NCDs prevention in Thailand

1:50 pm - 1:52 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Running boom in the early 2000s campaigned by Thai Health Promotion Foundation (Thai Health) and Thai Jogging Federation Foundation (TJF) emerged as Physical Activity promotion for NCDs prevention in Thailand. **Program Delivery:** Health promotion campaigns by running program aimed to: 1) encourage new runners to shift their unhealthy behaviors such as smoking, unhealthy diet, and lack of physical activity; and 2) to promote healthy lifestyle by knowledge distribution, social bridging, and policy drive. The campaigns were channeled via diverse routes i.e. challenges, film, charity, social media and role models. **Evaluation:** The two-decade-review collected data from documentary research, in-depth-interview and focus group discussion. The sources were from Thai Health and Ministry of Public Health. The ongoing TJF's campaign has increased the number of Thais running from 5 million in 2007 to 10 million in 2017. The proportion of Thais who engaged in walking/running as their regular physical activity rose from 15.4 percent in 2014 to 18.2 percent in 2016 and is likely to increase steadily to 23.1 percent and 24.4 percent in 2017 and 2018 respectively. The health promotion campaigns also have helped to prevent 400,236 NCDs cases among Thai population by averting 222,441 cases of diabetes, 79,748 cases of ischemic heart disease, 78,246 cases of stroke and 19,802 cases of colorectal cancer. **Conclusions:** The impact of empowered running as health promotion campaigns was not only the increase of the number of people participated in running events or engaged in regular physical activity, but also in reducing NCDs risks.

Keywords: Physical Activity, Running, NCDs

Mini-Oral Presentation A3.17 A study on the characteristics of the foot pressure distribution in Basketball players jogging

1:52 pm - 1:54 pm (Sydney, Australia, Tuesday, October 12, 2021)

Yun Chen¹, JingMing Qin²

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Background: Basketball is a very competitive sport, the players often have to make a rush to grab the rebound, slide move, three step hurdle, jump shot and other complex technical actions. These technical movements are mostly through the change of foot movement on the ground to achieve the purpose of changing the state of the body movement. Therefore, after the basketball students have been trained with a large amount of exercise and intensity for a long time, their lower limb strength and control ability are bound to be affected, and their plantar pressure is bound to change accordingly. The distribution of plantar pressure is an indicator reflecting the control of the whole body posture and the function of the foot structure. The analysis of plantar pressure has become an important means of foot research in many fields, such as sports biomechanics, rehabilitation medicine, shoe making and orthodontic surgery, etc. **Objective:** The research purpose of this paper is to compare the characteristics of the foot pressure distribution of basketball players and ordinary college students jogging, the characteristics of the foot pressure distribution of basketball players jogging in groups were obtained, so as to better understand the foot force and cushioning characteristics of basketball players. **Methods:** This article selected 20 Henan Normal University basketball special students as experimental group, 20 college students in Henan Normal University as the control group, to test the plantar pressure of the subjects when jogging, the characteristics of the plantar pressure distribution of basketball players were analyzed by selecting such indicators as peak plantar pressure, peak plantar pressure, plantar impulse, and plantar load rate. **Results:** Were compared with normal college students, the basketball team ball players jogging plantar pressure distribution in the following several characteristics: (1) The peak pressure of the plantar showed an increasing trend, and the first metatarsal bone, the second metatarsal bone and the medial heel of the left foot increased significantly ($P<0.05$), and the medial heel of the right foot increased significantly ($P<0.05$). (2) The peak pressure of the plantar in the preplantar area increased, and the second and third metatarsal bone of the left foot increased significantly ($P<0.05$), and the first metatarsal bone and the fourth metatarsal bone of the right foot increased significantly ($P<0.05$). The peak pressure of arch and heel decreased, and the medial and lateral heels of the left heel decreased significantly ($P<0.05$), and the medial heels of the right foot decreased significantly ($P<0.05$). (3) Plantar impulse decreased, and the third metatarsal bone of the left foot decreased significantly ($P<0.05$), and the arch of the right foot decreased significantly ($P<0.05$). (4) The plantar load rate showed a trend of decrease, and the 2-4 metatarsal bone of the left foot was significantly decreased ($P<0.05$), and the 3rd metatarsal bone of the right foot was significantly decreased ($P<0.05$). **Conclusion:** Compared with ordinary college students, the peak pressure of basketball special students after basketball training is generally increased, and the strength of foot is increased, and the peak impulse, foot load rate, foot arch area and foot heel area have decreasing trend, and the ability of foot slow decompression is enhanced.

Keywords: Jogging, Basketball, Plantar Pressure, Distribution Characteristics

Mini-Oral Presentation A3.18 The effect of orienteering on visual working memory: evidence from ERP

1:54 pm - 1:56 pm (Sydney, Australia)

Qiqi Zhu¹, Yu Zhu¹

¹Southwest University

Purpose: To study the relationship between different types of physical activities (orienteering, mountain cross-country and sedentary) and visual working memory, so as to provide reference for people who want to improve VWM. **Methods:** The forty-eight subjects comprise of orienteering expert (OP), mountain cross-country expert (MP) and sedentary group (SG), with 16 each, and both genders are in equal numbers, with an average age of 20.56 ± 1.25 . The VWM index includes the capacity and accuracy of memory. According to the delayed matching-to-sample (DMS), the experimental program was compiled. The potential activities during the keystroke reaction experiment were recorded by ERP, and the correct rate and reaction time were analyzed by SPSS24.0. **Results:** Behavioral results: the accuracy of OP and MP were both higher than that of SG, even the accuracy of OP significantly higher than that of MP. The reaction time of OP and MP were both remarkably higher than that of SG, but there was no considerable difference between OP and MP. ERP results: During the delayed phase of the experiment, the activation of the left central region of OP was significant, while the other regions were significantly suppressed; the activation of the right frontal of MP was remarkable, while the other regions were significantly inhibited; there are significant activation in several brain regions of SG, including the right prefrontal, the right frontal, the left temporal and so on. In the probe phase of the experiment, the left occipital, the left parietal and other vision-related brain regions of OP were significantly activated, while other unrelated brain regions were significantly suppressed; EEG of MP showed activation in all brain regions except the right frontal, in which the occipital and temporal showed the most significant activation; most of the brain regions of SG showed abnormal activity, except the central frontal. **Conclusions:** Compared with sedentary, physical activity can improve the capacity of VWM. However, in almost all types of physical activity, orienteering, which exerts load on visual cognition, can improve the capacity and accuracy of VWM to a large extent.

Keywords: Orienteering, Mountain Cross-Country, Sedentary Group, Visual Working Memory (VWM), Event-Related Potential (ERP)

Mini-Oral Presentation A3.19 Habitualizing resistance exercises in Seniors in Singapore – As easy as a walk in the park

1:56 pm - 1:58 pm (Sydney, Australia, Tuesday, October 12, 2021)

Jingyi Shannon Chia¹, Hock Woon Chiang²

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In Singapore, about one in five would be 65 years or older by 2030. While recent trends in 2018 showed an encouraging and upward trend with 74% of seniors participating in physical activity at least once a week, most of which are largely confined to walking. It is well-established that aging, even in the absence of chronic disease, is associated with a variety of biological changes that contributes to increased risks of sarcopenia, warranting the need to emphasize resistance exercises. It is apparent that the “traditional” delivery of resistance exercises through structured training often entails low long-term adherence especially in older individuals. It is, therefore, critical to re-think active ageing beyond COVID especially on ways to incorporate resistance exercises

without having to visit the gym or rely on physical group-based activities to ensure the safety and health of seniors amidst this global pandemic. This study aims to leveraging on the power of habit to assimilate resistance exercises into existing walking routines. 80 seniors aged 60 and above participated in this study where they were introduced to 8 different resistance exercises along with the habit loop concept (Cue, routine, reward). Tapping on their existing cues that primed the walking behaviours, we present a case example of a Discovery Walk in the Park where participants are exposed to key elements in the park where they can incorporate resistance exercises. Our goal is to empower seniors and bring resistance exercises “closer” to the citizens so they can enjoy active living in their neighbourhoods and live life to the fullest. This is the first of such a programme in Singapore and in this presentation, we share useful insights on habituating resistance exercises in a sustainable manner amidst the challenges of an ageing population globally, opening new doors of opportunities for the promotion of active ageing in Singapore.

Keywords: Seniors, Sarcopenia, Resistance Exercise, Walking, Habit

Mini-Oral Presentation A3.20 Genetic susceptibility, screen-based sedentary activities and incidence of coronary heart disease

1:58 pm - 2:00 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Sedentary behavior has been recognized as a strong risk marker of coronary heart disease (CHD). However, whether the association of time spent sedentary with CHD is independent of genetic susceptibility to CHD is currently unknown. **Purpose:** This study examined the interplay of genetic susceptibility to CHD and two prevalent types of screen-based sedentary behavior (television [TV] viewing and computer use) relative to CHD incidence. **Methods:** We analyzed data from 374,055 white British participants of UK Biobank without CHD/stroke at baseline. Each individual's genetic risk for CHD was assessed using weighted polygenic risk scores, calculated by summing 300 genome-wide significant, independent risk alleles, multiplied by their corresponding effect estimates. TV viewing and computer use were assessed through touch-screen questionnaires. CHD incidence (n=9,562) was adjudicated over a median 12.1-year follow-up (i.e. 4,495,844 person-years). Cox regression models with age as the underlying timescale were fit. **Results:** Compared with ≥ 4 hours/day of TV viewing, the hazard ratio (HR) of CHD was 0.83 (95% confidence interval [CI]: 0.78-0.89) for ≤ 1 hour/day of TV viewing and 0.93 (0.89-0.98) for 2-3hours/day of TV viewing, after adjusting for all confounders including genetic risk for CHD. The HR of CHD for middle and high genetic risk was 1.45 (1.37-1.53) and 2.08 (1.98-2.19), respectively, compared with low genetic risk, after adjustment for all confounders. Decreased CHD was observed for ≤ 1 hour/day of TV viewing at high and middle genetic risk and 2-3hours/day of TV viewing at low genetic risk: no evidence of multiplicative interaction between genetic risk and TV viewing (p-value: 0.593). Estimates of the population attributable fractions (PAF) suggested that 11.4% (95% CI: 6.8%-15.7%) of the population risk of CHD could be prevented if TV viewing time were reduced from ≥ 2 hours/day to ≤ 1 hour/day. The PAF values were relatively larger for middle-to-high genetic risk than for low genetic risk, although the confidence intervals were wide and overlapping. No evidence of associations was observed for computer use. **Conclusions:** Reduced TV viewing time was associated with decreased CHD risk independently of genetic risk. Relatively stronger associations were found for lower TV viewing time at high and middle genetic risk. The results suggest that individuals with high genetic susceptibility may receive greater CHD-risk reducing benefits from a given reduction in TV viewing time. **Funding:** Strengthened Start-up Funds for New Staff at The University of Hong Kong Li Ka Shing Faculty of Medicine. This research has been conducted using the UK Biobank Resource under Application Number 43528.

Keywords: Genetic Risk, Coronary Heart Disease, TV Viewing, Computer Use, Sedentary Behavior, UK Biobank

Mini-Oral Presentation A3.21 Lifestyle behaviour profile during Ramadan: A pilot study

2:00 pm - 2:02 pm (Sydney, Australia, Tuesday, October 12, 2021)

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Background: Lifestyle behaviors such as physical activity, sedentary behavior and sleep may be affected by fasting during Ramadan due to numerous factors such as long fasting hours in summer season, cultural shifts in daily activity such as shorter working hours, or shopping in non-fasting hours. **Purpose:** To assess changes in lifestyle behaviors profile among Muslim adults during Ramadan compared with non-fasting months. **Method:** A three visits quasi-experimental study conducted among Muslim adults aged 18 years or older. Visits took place as follows: first visit (V1), before Ramadan; second visit (V2), during Ramadan; third visit (V3), after Ramadan. Anthropometrics and vital signs were measured during each visit. Physical activity, sedentary behaviors and sleep were evaluated subjectively using Global Physical Activity Questionnaire and Pittsburgh Sleep Quality Index (PSQI) respectively, and objectively via ActivPAL (stepping time, standing time, sitting time, sleep time). Data were analyzed using repeated one-way ANOVA or Friedman test. **Result:** 21 participants (age= 30.6 \pm 9.4 years, sex= 15 females /6 males, BMI= 25.8 \pm 7.1) were included in the final analysis. Sleep time was different between visits (F=6.8; p=0.004) with mean time spent sleeping 464.5 \pm 64.1, 412.8 \pm 113, and 474.5 \pm 119 minutes in V1, V2 and V3, respectively. Other variables did not reach statistical significance. **Conclusion:** Ramadan fasting had a significant effect on sleep behavior. Future studies might want to evaluate the effect of promoting healthy sleep during Ramadan on overall lifestyle behaviors profile. **Funding:** Not funded.

Keywords: Physical Activity, Sedentary Behavior, Sleep

Mini-Oral Presentation A3.22 Tackling physical inactivity through sport

2:02 pm - 2:04 pm (Sydney, Australia, Tuesday, October 12, 2021)

Catriona Rose¹, Matt Warr², Katherine Owen¹, Bridget Foley¹, Lindsey Reece¹

¹SPRINTER (Sport and Recreation Intervention and Epidemiology Research Group), Prevention Research Collaboration, Sydney School of Public Health, University of Sydney, ²Sport Australia, Canberra

Background: Physical activity and sport participation are essential to improving and maintaining the health and wellbeing of inactive individuals and communities within society, particularly minority groups who are the most critically inactive. However, embedded evaluations to appraise the impact of physical activity interventions are scarce. Sport Australia's \$150m "Move It AUS Program" funded initiatives specifically catered to overcoming barriers to participation for physically inactive people. The evaluation aimed to objectively determine what worked, and what didn't, in tackling physical inactivity through the "Move It AUS" funded sport programs in Australia. **Methods:** The evaluation adopted a pragmatic, mixed method approach involving standardised pre and post quantitative surveys for program participants (n=3,837), and thematically analysed qualitative interviews with program staff. **Results:** The program successfully reached priority target groups, with 75% of participants physically inactive and significant representation of Indigenous communities (5%), culturally and linguistically diverse groups (11%), and rural and remote locations (32%). 38% of respondents lived in most disadvantaged communities. Participation in Move it AUS program increased the proportion of participants meeting PA guidelines for their age from 25% to 27%. Findings from 26 qualitative interviews were synthesised into seven key insights, namely; 1) Clarity of 'who' you're targeting; 2) Partnerships for knowledge or resources; 3) Modifying internal and external communication from "performance" to "participation"; 4) Flexible program design; 5) Impact of COVID-19 modifications on reach and retention; 6) How federal governing body support provides legitimacy to participation strategies; 7) Understanding that physical inactivity is a priority across the sport ecosystem. **Conclusions:** Creating physical activity and sport interventions specifically targeting physically inactive communities is a key priority to Australian government. These data were the first to understanding what worked and what needs improvement within Australian sport sector to improve reach, engagement, and effectiveness of programs. These novel findings contribute to a fundamental base of knowledge supporting approaches to enable more people to achieve physical activity through targeted sport and physical activity interventions.

Keywords: Physical Activity, Sport, Community Intervention, CALD, Indigenous

Mini-Oral Presentation A3.23 Influence of the difference in ankle movement on the affect experienced after light foot exercise

2:04 pm - 2:06 pm (Sydney, Australia, Tuesday, October 12, 2021)

Minako Hosono¹, Hiroshi Endo¹, Shuichi Ino¹

¹Human Informatics and Interaction Research Institute, National Institute of Advanced Industrial Science and Technology

Background: Positive affect induced by exercise is gaining interest to promote one's level of physical activity. However, factors concerning light-intensity exercises, along with their influence on affective response, remain unclear. **Purpose:** To study the post-exercise influence of the differences in ankle movement during light foot exercises on affective response. **Methods:** The study included 58 participants (30 males; mean age 72±3.6). Each participant sat and placed his/her right foot on an air bag, and passively dorsiflexed the ankle joint through the expansion of the air bag; they then released air from the bag by vent valves via active plantar-flexion in the form of a light foot exercise. The duration of the active plantar-flexion (active plantar flexing until/before the sole fully touched the ground), the knee-joint angle, and the resistance of air release were prepared as parameters. Affective response after the exercise was measured with the Feeling Scale (FS) and the 8-item Physical Activity Enjoyment Scale (PACES-8). A series of mixed ANOVAs were conducted after performing an aligned ranking transformation on the data. **Results:** Engaging in the plantar flexion motion until the sole fully touched the ground increased the scores on FS ($p < 0.001$, $\eta^2 = 0.03$) and PACES-8 ($p < 0.001$, $\eta^2 = 0.05$). Other parameters showed no significant effects on either FS or PACES-8. **Conclusion:** Ankle movement can potentially influence affective response concerning light foot exercises. **Funding:** This work was supported by JSPS KAKENHI Grant Numbers 17K20019, 17H00755.

Keywords: Light-Intensity Exercise, Affective Response, Foot Exercise, Ankle Movement

Mini-Oral Presentation A3.24 Study on the effect of aerobic exercise combined with whole body vibration on bone and cardiorespiratory function in patients with Stable Chronic Obstructive Pulmonary Disease Complicated with Osteoporosis

2:06 pm - 2:08 pm (Sydney, Australia, Tuesday, October 12, 2021)

Tingran Zhang^{1,2}, Kun Wang¹, Ning Li¹, Chansol Hurr¹

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Background and Purpose: Chronic obstructive pulmonary disease (COPD) has become a common chronic respiratory disease, which seriously threatens human health. Its morbidity and mortality rank in the forefront of all kinds of diseases. The prevalence of osteoporosis (OP) in patients with COPD is about 38%, and about 38% of patients have bone loss, resulting in brittle fracture which greatly increases the mortality and disability rate of patients with COPD. However, OP, as an extra complication of COPD, has not received enough attention and it is often not treated in time in clinical practice. In this study, aerobic exercise (AE) combined with whole body vibration (WBV) was used as an adjuvant treatment for patients with stable COPD complicated with OP. The aim of this study was to investigate the effects of this program on BMD and cardiorespiratory function of patients. **Methods:** In this study, 40 male patients with stable COPD complicated with OP were recruited and divided into control group by random number table method (maintain current living status, C group) and AE group (on 50%VO₂max speed, intermittent running for 30 minutes, 3 times a week, A group), WBV group (squatting posture on the vibration training platform, intermittent training for 30 minutes, 3 times a

week, whole body vibration, W group), AE+WBV group (on 50%VO₂max speed for 3 times a week, squatting posture on the vibration training platform for 15 minutes plus squatting posture on the vibration training platform, intermittent training for 15 minutes, AW group), with 10 patients in each group. The subjects were tested for dual energy X-ray absorptiometry (DXA) and Cardiopulmonary Exercise Test (CPET) before the experiment. The experiment lasted for 40 weeks while the subjects maintained normal treatment. DXA and CPET posttests were performed in each group at the end of intervention. Paired samples T test and one-way ANOVA were performed using spss22.0, $p = 0.05$. **Results:** After 40 weeks of intervention, for Neck of Femur BMD index, A group, W group, AW group results were higher than pre-test (pre) results and C group ($P < 0.05$), W group, AW group was significantly higher than A group ($P < 0.05$); for L1-L4BMD indexes, W group and AW group were higher than pretest results and C group ($P < 0.05$). As for the indexes of Peak VO₂/kg, Peak Power and Peak VCO₂, A group, W group and AW group were all higher than those in pre-test (pre) and C group ($P < 0.05$), while the results of A group and AW group were significantly higher than that of W group ($P < 0.05$). **Conclusions:** In the exercise adjuvant therapy of patients with stable COPD complicated with OP, it was found that WBV had a good effect on the improvement of BMD, and AE had a significant effect on the improvement of cardiopulmonary endurance. AE combined with WBV can comprehensively improve BMD and cardiopulmonary endurance of patients, which is worthy of promotion as exercise prescription.

Keywords: Aerobic Exercise, Whole Body Vibration, Cardiorespiratory Function, Chronic Obstructive Pulmonary Disease, Osteoporosis

Mini-Oral Presentation A3.25 Effect of Hypoxic Training on carbohydrate metabolism, bone, and oxidative stress in Elderly Patients

2:08 pm - 2:10 pm (Sydney, Australia, Tuesday, October 12, 2021)

Ning Li¹

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Purpose: From normal people to diabetes mellitus (DM) patients, it is not overnight, but a long course of disease. Between normal people and patients with DM, there is a stage of impaired glucose regulation, which is also called pre-diabetes (PD). People with PD are more likely to develop DM without effective intervention. PD does not reach the disease level, and after effective intervention, the development of PD can be delayed or not developed into DM and may even return to the normal state. Studies have found that altitude training can improve the ability of glucose transport in DM patients and help patients control their blood glucose. However, previous studies have found that high altitude hypoxia can lead to increased bone resorption, so hypoxia is one of the risk factors for osteoporosis (OP). Therefore, hypoxic training as a treatment for hypoglycemia may have the side effect of accelerating bone loss. At present, the intervention effect and potential risk of hypoxic training in PD population still need to be further explored. Based on this, this study aims to explore the effects of hypoxic training on bone mineral density (BMD), bone metabolism, glucose metabolism, antioxidant capacity and other factors in the elderly with PD, to further determine the improvement effect of hypoxic training on glucose metabolism in the PD population and to evaluate the potential risks of bone loss and oxidative stress proposed by previous studies. **Methods:** In this study, 12 healthy elderly men were recruited from community resident service centers (age: 63.41 ± 3.03 years; body mass index (BMI): 25.34 ± 4.76 kg/m³; maximal oxygen consumption (VO₂max): 38.87 ± 4.76 ml/kg/min; fasting plasma glucose (FPG): 5.71 ± 3.82 mmol/l; oral glucose tolerance test (OGTT): 7.21 ± 1.19 mmol/l; femoral neck bone mineral density (FN-BMD): 0.96 ± 0.08 g/cm²; L1-L4BMD: 1.02 ± 0.06 g/cm²). Thirty-six elderly men with PD and osteopenia (OST) were recruited from community hospitals (age: 62.23 ± 1.58 years; BMI: 26.92 ± 6.98 kg/m³; VO₂max: 36.22 ± 5.98 ml/kg/min; FPG: 6.53 ± 3.26 mmol/l; OGTT: 9.55 ± 1.58 mmol/l; FN-BMD: 0.82 ± 0.12 g/cm²; L1-L4BMD: 0.90 ± 0.12 g/cm²). 36 elderly PD patients with OST were divided into hypoxic training group (HT group, n=12), normoxia training group (NT group, n=12), and model control group (MC group, n=12). Twelve healthy elderly people were classified as normal control group (NC group n=12), and were tested for VO₂max, BMD and glucose metabolism indexes. Then each group was interfered for 36 weeks according to the intervention plan (Table 1). After the intervention, blood and urine were collected, BMD, bone metabolism, glucose metabolism and insulin sensitivity were detected by bone scanning (post-test). At an interval of 48 hours after blood collection, exhaustive uphill running was conducted. Blood collection was conducted at 24 hours after the end of running to detect oxidative stress indicators. SPSS22.0 was used for paired samples T-test and one-way ANOVA, values were provided as the mean \pm standard deviation (SD) significant was set at $p < 0.05$. **Results:** After 36 weeks of training, in terms of glucose metabolism, FPG, OGTT-2HPG, HOMA-IR indexes, the post-measured values of HT group and NT group were significantly decreased compared with the pre-measured values ($P < 0.05$), and HT group was significantly lower than NT group and MC group ($P < 0.05$). BMD of HT group, NT group, post-test and pre-test were significantly increased ($P < 0.05$), but there was no significant difference between HT group and NT group ($P > 0.05$), and they were significantly higher than MC group ($P < 0.05$). In bone metabolism, the indexes of the indexes of parathyroid hormone (PTH), deoxypyridinoline (D-PYR), tartar-resistant acidphosphatase-5b (TRACP-5b), bone alkaline phosphatase (BALP), and the post-test values of HT and NT groups were significantly decreased compared with the pre-test values ($P < 0.05$). The insulin-like growth factor-1 (IGF-1) and osteocalcin (OC) indexes in HT and NT, which the corresponding post-test values were significantly increased compared with the pre-test values ($P < 0.05$). The indexes of nitric oxide (NO) and malonaldehyde (MDA) in oxidative stress in HT and NT groups were significantly lower than those in MC group, and the post-test results in HT group were significantly lower than those in NT group and PC group ($P < 0.05$). Superoxide dismutase (SOD) index, NT group and HT group were significantly higher than MC group ($P < 0.05$), HT group was significantly higher than NT group ($P < 0.05$). **Conclusion:** 1) Hypoxic training can control blood glucose, relieve insulin resistance, reduce bone resorption conversion rate, and improve bone density and antioxidant capacity of the body in the elderly with PD. 2) Training in hypoxic conditions simulating an altitude of 2,400 m did not pose a risk of BMD loss, bone resorption, and increased metabolic stress in PD patients.

Keywords: Hypoxic Training, Pre-Diabetes, Carbohydrate Metabolism, Oxidative Stress

Mini-Oral Presentation A3.26: Effect of Exercise on body composition and insulin resistance in obese women after weight-loss surgery

2:10 PM - 2:20 PM (Sydney, Australia, Tuesday Oct 12, 2021)

Hezhang Yun¹, Yaowei Sun¹, Yuhui Su¹, Fan Bian¹, Qian Sang¹, Wenbo Zhang¹, Yafeng Song¹, Hua Meng²¹Beijing Sport University, Beijing, China, ²Department of General Surgery, China-Japan Friendship Hospital, Beijing, China

Background: Weight loss surgery is a way of weight loss that can quickly reduce the weight of patients and improve their health. However, complications such as skeletal muscle loss, basal metabolism decline, fatigue and low blood sugar are common in the early stages of surgery. Exercise plays a positive role in maintaining muscle mass, improving metabolism and improving cardiopulmonary function in patients with weight loss. However, whether exercise training after weight-loss surgery can improve the postoperative complications of obese patients still needs further verification. **Purpose:** In this study, through 4-week exercise intervention and routine postoperative management of female obese patients after weight loss, the changes of body composition and insulin resistance of obese patients after weight loss were observed, hoping to reduce the postoperative adverse reactions through exercise training. to provide theoretical reference for obese patients to make scientific exercise prescription after weight loss. **Methods:** In this paper, 17 obese female patients after weight loss (laparoscopic sleeve gastrectomy) were studied. Body mass index (BMI) 28–40 kg/m², age 20–40 years old, good health and no other diseases. They were randomly divided into exercise group (n = 8) and control group (n = 9). Sports training lasts 4 weeks, 3 times a week (alternate day training), 30min strength training, the intensity is 40% 1RM, during the training period, the 1RM is re-measured every week in order to adjust the strength training load in a timely manner. 30min aerobic training, the intensity is 50% HR_{max}, mainly in the way of fast walking. The maximum heart rate was calculated as: maximum heart rate = (220-age). The control group did not take any exercise except for normal physical activity. The diet of the subjects was uniformly managed by the dietitian of the China-Japan Friendship Hospital. SPSS22.0 statistical software is used to process the data, and the experimental data are expressed in the way of average \pm standard deviation ($\bar{x} \pm SD$). First, whether the experimental data belong to normal distribution is detected, and independent sample T test is used for comparison between groups. Nonparametric Mann-Whitney U test is used for non-normal distribution. The significant level was $P < 0.05$, and the very significant level was $P < 0.01$. **Results:** After 4-week exercise intervention, there was no significant difference in body weight and BMI between the exercise group and the control group. There was no significant difference in heart rate, systolic blood pressure (SBP) and diastolic blood pressure (DBP) between the two groups. The decrease of SBP in control group and exercise group was 3.44 ± 12.91 mmHg and 7.75 ± 11.18 mmHg, respectively, DBP control group increased 0.01 ± 12.47 mmHg, exercise group decreased 5 ± 6.44 mmHg. In terms of body composition, the exercise group was superior to the control group in reducing body fat percentage (BF%) ($P < 0.05$), visceral fat area (VFA) ($P < 0.01$) and trunk fat (TF) ($P < 0.05$). Among them, the decrease of protein weight, muscle weight and skeletal muscle in the control group was 0.90 ± 0.49 kg, 3.93 ± 2.40 kg and 2.62 ± 1.45 kg, respectively, and that in the exercise group was 0.54 ± 0.45 kg, 2.26 ± 2.11 kg and 1.65 ± 1.39 kg, respectively. The exercise group was superior to the control group in delaying the decrease of basal metabolic rate (BMR) ($P < 0.05$). There was no significant difference in fasting insulin (FINS), C-peptide (CP), Homeostatic model assessment for insulin (HOMA-IR) and insulin sensitivity index (ISI) between the two groups. The decrease of FINS, CP and HOMA-IR in the control group was 14.27 ± 10.12 uIU/ml, 1.71 ± 0.94 ng/ml and 4.81 ± 3.42 respectively, and that in the exercise group was 12.47 ± 9.68 uIU/ml, 0.75 ± 0.97 ng/ml and 3.03 ± 2.18 respectively. The increase of ISI in control group and exercise group was 0.09 ± 0.11 , 0.02 ± 0.02 respectively. **Conclusions:** The main results are as follows: (1) Although there is no significant difference in body weight between the control group and the exercise group, the exercise group is superior to the control group in improving BF%, VFA and TF, indicating that exercise training has additional benefits for fat reduction after weight loss surgery. (2) BMR is determined by the total weight of the body, mainly the total amount of non-fat, and the massive loss of muscle after operation will reduce the level of BMR, so the difference of BMR between the two groups can indirectly reflect that exercise training can slow down the loss of protein and skeletal muscle. From the point of view of body composition, exercise can also reduce the loss rate of protein and muscle mass after operation. (3) Compared with the control group, although there was no statistical difference in heart rate and blood pressure between the exercise group and the control group, the overall data of the exercise group decreased more than that of the control group. (4) There was no statistical difference in the effect of exercise training on FINS, CP, ISI and HOMA-IR of patients after weight loss, but exercise training could reduce the decline of the above-mentioned indexes. **Funding:** No.

Keywords: Exercise, Weight Loss Surgery, Obesity, Body Composition, Insulin Resistance

Congress Day Two

Symposia

Symposium B1: I-PARC: A whole of system approach for enhancing effective interventions, implementation strategies, and enabling contexts to reduce population levels of physical inactivity

9:20 am - 10:50 am (London, England, Wednesday, October 13, 2021)

Joseph J Murphy^{1,2}, Catherine B Woods¹, James Lavelle³, Sarah O'Brien⁴, Peter Smyth⁵, Colette Brolly⁶, Marie H Murphy⁷, Niamh Murphy⁸, Paul Kelly⁹, Femke van Nassau¹⁰, Jemima Cooper¹¹, Fiona Mansergh¹²¹University of Limerick, Ireland, ²University of Bristol, England, ³Department of Transport, Tourism and Sport, ⁴Health Service Executive, ⁵Sport Ireland, ⁶Public Health Agency, ⁷Ulster University, Northern Ireland, ⁸Waterford Institute of Technology, Ireland, ⁹University of Edinburgh, Scotland, ¹⁰Health Research Institute, Amsterdam UMC, VUmc, the Netherlands, ¹¹University of Bath, England, ¹²Department of Health**Purpose:** The purpose of the symposium is to disseminate and translate the learnings from the Irish Physical Activity Research

Collaboration (I-PARC; <https://i-parc.ie>). Using the physical activity (PA) landscape in Ireland, it will discuss how a collaboration between researchers, practitioners and policy makers generated relevant and valid intelligence to determine what PA interventions work, why and in what contexts.

Description:

Chair/Discussant: Professor Catherine Woods, University of Limerick, Ireland. Description: Despite known benefits and continued efforts to improve population levels of PA, insufficient numbers of children (13.5%), adults (34%) and older adults (33%) in Ireland achieve the recommended guidelines. A solution is to use effective interventions with effective implementation methods within enabling local or national contexts to achieve socially significant outcomes (i.e. reduced inactivity). However, this requires collaboration of key stakeholder from multiple sectors. I-PARC is such a collaboration, and with assistance from Scotland, the Netherlands and Australia, current practices, policies and processes across Ireland have been evaluated, refined and developed to improve their effectiveness, implementation and yield a greater understanding of contextual factors.

Speaker 1: Professor Marie Murphy, Ulster University, Northern Ireland and Dr. Niamh Murphy, Waterford Institute of Technology, Ireland. Title: Systems approach to physical activity based on the GAPPA framework – an example from Ireland. Description: Knowledge translation between relevant stakeholders is essential for bridging the gap between practice, policy and research. Elements of the participatory action approach, guided by the GAPPA framework, were used to evaluate current PA promotion practices and suggest recommendations for improvement using a systems approach. Lessons learned on how to run an effective national collaboration to address inactivity will be discussed.

Speaker 2: Dr. Paul Kelly, University of Edinburgh, Scotland and Dr. Joey Murphy, University of Limerick, Ireland and University of Bristol, England. Title: Effective interventions: Development of a standardised monitoring and evaluation framework for physical activity interventions. Description: Many interventions for promoting PA exist, yet limited resources dictate that those that are effective and feasible for real world application are funded, scaled up and sustained long-term. Similarly, numerous evaluation frameworks to acquire this intelligence exist, yet few are used in practice due to feasibility issues. Through a 5-stage process that included online consultations, focus groups, and a pilot, the I-PARC evaluation toolkit for effectively evaluating PA interventions in the real world emerged and its challenging journey will be presented.

Speaker 3: Ms. Jemima Cooper, University of Limerick, Ireland and University of Bath, England, and Dr. Femke van Nassau, Amsterdam UMC, location VUmc, The Netherlands. Title: Making physical activity interventions work: facilitators and evidence-based strategies linked with implementation success. Description: Effective interventions rely on effective implementation strategies to reach their desired outcome. Consequently, it is crucial to understand the enabling and hindering factors to implementation success. Through I-PARC, data from a systematic literature review, surveys and interviews with various stakeholders involved in eleven different interventions have identified these factors and the recommendations for successful implementation of PA interventions.

Results: Facilitating an effective multi-sectoral collaboration is challenging. Learnings include the chair's ability to manage multiple agendas around a common goal, generating acceptable protocols for operation, recognising positive outcomes, ensuring roles are clearly defined, and planning for sustainability. The I-PARC evaluation toolkit will be presented highlighting the key learnings and challenges that emerged when developing a framework that is both feasible in practice and research acceptable. Several factors that facilitate and challenge intervention implementation were identified. The I-PARC recommended strategies are presented under the headings of the Consolidated Framework for Implementation Research focusing on ensuring stakeholder buy-in, intervention usability, and staffing and financial considerations. How the project adapted to the COVID-19 pandemic will also be presented, which include changes in data collection, hosting of the collaboration and continued engagement with the I-PARC members. Participants will engage in opportunities to reflect on the I-PARC solutions presented, provide critique and discuss next steps.

Conclusions: The symposium will promote several ISPAH themes and topics, including advocacy with relevant stakeholders, the promotion of PA across the life-course, effective implementation strategies and the need for a whole of systems approach to PA promotion.

Keywords: Implementation, Collaboration, Evaluation

Symposium B2: Mental health and physical activity: Understanding the nature of causal effects

9:20 am - 10:50 am (London, England, Wednesday, October 13, 2021)

Adrian Taylor¹, Eco de Geus², Jeff Lambert³, Marit Sørensen⁴

¹University of Plymouth, UK, ²Vrije Universiteit, the Netherlands, ³University of Bath, UK, ⁴Norwegian School of Sports Sciences, Norway

Purpose: The purpose of this symposium is to present three international perspectives on the nature of the causal relationship between physical activity and mental health.

Description: There is evidence from randomised trials that exercise improves mental health but not for everyone. A better understanding of how exercise has this effect and for whom will help to design more tailored interventions. The symposium will involve presentations from three different countries which seek to enhance our understanding of how physical activity interventions can improve mental health and well-being.

Chair: Dr. Adrian Taylor, University of Plymouth, UK.

Presenter 1: Dr. Eco de Geus, Vrije Universiteit, the Netherlands. Title: A genetic perspective on regular exercise and mental health in the era of genome wide association studies. Description: This presentation will triangulate various methods for causal inference in the extant literature that support both the existence of causal effects of physical as well as confounding by genetic factors that independently influence participation in regular physical activity and mental health.

Presenter 2: Dr. Jeff Lambert, University of Bath, UK. Title: Effects of adding web-based behavioural support to exercise referral schemes on symptoms of depression and/or anxiety. Exploratory findings from the e-coachER study. Description: This presentation will describe the e-coachER intervention, a web-based behavioural support programme designed to augment the effects of usual exercise referral scheme, and its effect on mental health outcomes.

Presenter 3: Dr. Marit Sørensen, Norwegian School of Sport Sciences, Norway. Title: Longitudinal relations between physical activity, illness symptoms and affect among psychiatric patients (with dual diagnoses) under treatment. Description: This presentation will analyze cross-sectional-, autoregressive- as well as cross-lagged effects between physical activity and symptoms of mental illness, positive/negative affective responses during a ten-week intervention.

Discussant: Dr. Adrian Taylor, University of Plymouth

Results: RCT and prospective studies support the value of physical activity to improve mental health but the effects could potentially be greater with additional support for those less inclined to be physically active.

Conclusions: There is a need to move from a 'population-based' to 'personalized' intervention strategies using genomic and other information on the likelihood that individuals will increase their physical activity for mental health benefit.

Keywords: Children, Physical Activity, Health, Accelerometry, Metabolic Health

Symposium B3: Digital Biomarkers for Monitoring Intrinsic Capacity for Healthy Ageing (BioMIC)

9:20 am - 10:50 am (London, England, Wednesday, October 13, 2021)

Veerle Knoop¹, Melvyn Hillsdon², Brad Metcalf², Joss Langford³

¹Vrije Universiteit Brussel, ²University of Exeter, ³Activinsights

Purpose: This symposium will report on the development of digital biomarkers data that will contribute to a panel of measures for proactively assessing different aspects of intrinsic capacity, a critical component of healthy ageing.

Description:

Chair: Dr. Melvyn Hillsdon, University of Exeter. Introduction to symposium

Presenter 1: Dr. Veerle Knoop, PhD, Vrije Universiteit Brussel. Title: Intrinsic capacity - a model of healthy ageing.

Presenter 2: Dr. Melvyn Hillsdon, University of Exeter. Title: The potential of remote monitoring of digital biomarkers of intrinsic capacity.

Presenter 3: Dr. Brad Metcalf, University of Exeter. Title: The clinical validity of digital biomarkers of stepping.

Presenter 4: Joss Langford, Activinsights. Title: Developing digital biomarkers for public health.

The World Health Organisation (WHO) has called for a move away from a disease management model of ageing and frailty that involves counting deficits and providing expensive medical intervention, to a more positive model of healthy ageing that focuses on preserving functional ability and preventing loss of capacity. They describe a pre-symptomatic phase of pre-frailty signaled by a decline in intrinsic capacity (IC). Intrinsic capacity is the combination of the individual's physical and mental, including psychological, capacities. Capacities tend to peak in early adulthood and fade with ageing, increasing the gap between what the person desires to do and what in reality they actually do. Early detection of deterioration and interventions that preserve or increase IC, would allow older persons to (1) do what they have reason to value, and (2) make them again active and functional in the society where they live. Several challenges must be addressed before IC can be an integral part of a healthcare system designed to promote health ageing. These include developing standardised, valid, objective, community-level tools for assessing IC and determining how to monitor IC in mid-life. The ubiquity and rapid development of wearable devices could be used as early indicators of declining IC, but algorithms are needed to translate metadata from these devices, to meaningful metrics for use by clinicians and the public to understand how to enhance IC. Wearable movement detection devices such as accelerometers provide a tool with which to detect, monitor and assess specific parameters of IC remotely in the community. Whilst accelerometers alone cannot capture all the proposed domains of IC, they are very well suited to understanding parameters of locomotion and mobility. This symposium will report on the development, analytic and clinical validity of several early, pre-symptomatic biomarkers of a compromised intrinsic capacity derived from a wrist worn accelerometer.

Results: The symposium will report on the context of use of a panel of digital biomarkers of intrinsic capacity, and tests of fit-for-purpose. Clinical validity will be assessed by examining the associations between digital biomarkers and objective measures of physical function and prevalent disease in a sample of 768, sedentary, community-dwelling older people aged 65 year and older. Cross-sectional analysis of the association between biomarkers and the Short Physical Performance Battery test will be reported.

Conclusions: The development of a panel of digital biomarkers, when combined with other routine public health data, could provide insights about the unmet demand of people with a loss of capacity in the community. This will enable better modelling of

the trajectory of how frailty in the community is associated with visit rates to primary and secondary care.

Keywords: Frailty, Intrinsic Capacity, Physical Activity, Accelerometers, Healthy Ageing

Symposium B4: Occupational activity and health: Dilemmas and conundrums

9:20 am - 10:50 am (London, England, Wednesday, October 13, 2021)

Luciana Torquati¹, Pieter Coenen², Bart Cillekens², Tracy Kolbe-Alexander³, Gregore I. Mielke⁴, Wendy J. Brown⁴

¹Sport and Health Sciences, University of Exeter, UK, ²Department of Public and Occupational Health, VU University Medical Centre, the Netherlands, ³School of Health & Wellbeing, University of Southern Queensland, Australia, ⁴Centre for Research in Exercise, Physical Activity and Health, University of Queensland, Australia

Purpose: The aim of this symposium is to discuss the challenges of assessing associations between occupational activity and health outcomes.

Description: This symposium will provide an overview of the current state of the evidence on associations between occupational activity and health outcomes. The presenters will provide different perspectives on methodological challenges and important factors that confound and mediate the associations between occupational activity and health.

Chair: Professor Wendy J Brown, University of Queensland. Introduction to Symposium.

Presenter 1: Dr Pieter Coenen and Dr Bart Cillekens, Vrije Universiteit Amsterdam University Medical Centre. Title: The association of occupation physical activity and health: An umbrella review for the WHO PA guideline review committee. Description: This talk will provide an overarching view on the plethora of health effects associated with occupational activity, including all-cause mortality, non-communicable diseases, osteoarthritis, adiposity, sleep quality, and quality of life.

Presenter 2: Dr. Tracy L Kolbe-Alexander, University of Southern Queensland. Title: Patterns of physical activity during and outside work. Description: This talk will focus on movement pattern analyses to understand physical activity and potential compensatory behaviours on work and non-work days.

Presenter 3: Dr, Luciana Torquati, University of Exeter. Title: Dietary intake, occupational activity, and health. Description: This presentation will discuss the roles that dietary intake and quality play in the relationship between occupational activity and health outcomes.

Presenter 4: Dr Gregore Mielke, University of Queensland. Title: Methodological aspects of occupational activity research. Description: This presentation will discuss the challenges of assessing physical activity at work/outside work, including strengths and limitations of different data collection and analysis methods.

Interactive discussion: the presenters will form a "Q and A" style panel to answer questions from delegates (posted on-line) and engage in debate about the most contentious issues in this field, moderated by the Chair.

Results: Occupational activity plays a role in health outcomes, but there can be both negative and positive associations. Conflicting results reflect different methods and analyses, failure to account for multiple confounders (including PA outside work, diet, and other risk factors), and the increased risk of injury associated with some very active occupations.

Conclusions: The associations between occupational activity and health outcomes are unclear. Holistic and multidisciplinary approaches are required, acknowledging that these are complex relationships that may not be generalisable to all occupations in all countries.

Keywords: Occupational Health, Methodology, Activity Patterns, Diet

Symposium B5: Providing policymakers with the evidence and practices to act and improve lives through physical activity

9:20 am - 10:50 am (London, England, Wednesday, October 13, 2021)

Elena Portas¹, Lee Huei Chern², Lottie Birdsall-Strong³, Thomas Fleurot¹

¹Portas Consulting, ²Sport Singapore, ³The Football Association, England

Purpose: Illustrate how data and analytics has been used to bridge the gap between policymakers and academia.

Description: Policymakers often lack the evidence to drive change and improve the lives of citizens through physical activity. We will discuss how two unique global programs, 'Active Citizens Worldwide' (ACW) and 'Sport Impacts: Children' (SIC), have bridged the gap between academia and policymakers. Combining advanced data analytics, the latest in health, social and economic research and global benchmarking these programs have delivered unique insights on the drivers and outcomes of physical activity. These new perspectives highlight the importance of evidence-led decision-making and have led to tangible results across the globe.

Chair: Thomas Fleurot, Portas Consulting

Presenter 1: Lee Huei Chern, Sport Singapore. Title: Active Citizens Worldwide – a policy makers perspective. Description: A founding partner of ACW, Sport Singapore uses in-depth data analytics to inform its policy and funding decisions within a city setting. The ACW framework has generated a new understanding of the relationship between citizens and physical activity. By

conducting a detailed review of the barriers, motivations and opportunities for physical activity, Sport Singapore was able to design policies and interventions which will have the greatest positive impact on citizens.

Presenter 2: Elena Portas, Portas Consulting. Title: Sport Health and Activity Realisation Programme. Description: The Sport, Health and Activity Research Project (SHARP) was set up in 2017 to gather the leading academic research on the benefits of sport and physical activity on individuals' health and wellbeing. SHARP is used as the foundation to both ACW and SIC to quantify the monetary and non-monetary value of these individual benefits to communities. This clear evidence of impact has enabled policy makers to make the case for additional investment.

Presenter 3: James Kendall, The Football Association. Title: The social and economic value of grassroots football in England. Description: Sports bodies are coming under increasing pressure to prove the true value of their sport. By combining data and analytics with secondary research of published academic papers, The Football Association conducted a detailed assessment of the socio-economic value of football in England. This included primary analysis of participation data that showed varying impact for different demographic groups including women, children and low socioeconomic groups.

Results: Through a deeper understanding of the drivers of physical activity and a clear understanding of its impact, this approach has allowed policymakers to have tangible results:

Funding: Aktive Auckland has secured an additional NZ\$120M for sport and recreation in the 10-year annual national budget after results showed the annual contribution of \$1.9Bn to the local economy through physical activity

New policies: Sports federations in England are reshaping their strategies towards childhood sport and activity based on data led insights from 'Sport Impacts: Children'

International best practice sharing: Singapore Sport is leading global thinking and sharing their experiences through a network of like-minded cities

Conclusions: These programs illustrate how a collaborative approach using data and analytics has connected research with policy and practice and lead to substantial impacts in countries around the world.

Keywords: Data and Insights, Policymakers, City Activity, Childhood Sport, Football

Symposium B6: Insights into benchmarking, evaluation and implementation of public policies to create healthy physical activity policy environments

9:20 am - 10:50 am (London, England, Wednesday, October 13, 2021)

Liam Kelly¹, Enrique García Bengoechea¹, Wolfgang Ahrens², Antje Hebestreit³, Sarah Forberger³

¹University of Limerick, Ireland, ²University of Bremen, Leibniz Institute for Prevention Research and Epidemiology – BIPS, Germany,

³Leibniz Institute for Prevention Research and Epidemiology, Bremen, Germany

Purpose: This symposium will present evidence that may inform physical activity (PA) policy bench-marking, evaluation and implementation.

Description:

Chair: Professor Wolfgang Ahrens, University of Bremen, Leibniz Institute for Prevention Research and Epidemiology – BIPS, Germany. Description: The 'Policy Evaluation Network' is a multi-disciplinary European research network aimed at understanding the impact of public policy for promoting healthy lifestyles in an effort to prevent non-communicable disease. Research highlights the need to move beyond individual behaviour change to broader policy and system approaches. To understand the progress governments are making in creating healthy policy environments, the bench-marking of best practice has proven effective for advancing the food policy agenda; however its usefulness for PA requires evaluation. Individual country results promote mutual learning between countries. In addition, to catalyse action for active and healthy environments, monitoring and surveillance systems, as well as knowledge of implementation pathways, are needed to link government actions to the best way to implement them.

Presenter 1: Dr. Liam Kelly, University of Limerick, Ireland. Title: Insights into benchmarking, evaluation and implementation policies to create healthy physical activity policy environments. Description: This presentation will outline the development of 'Good Practice Statements' or 'Benchmarks', a core component of a Physical Activity Policy Environment Policy Index (PA-EPI).

Presenter 2: Dr. Antje Hebestreit, Leibniz Institute for Prevention Research and Epidemiology, Bremen, Germany.

Title: Development of screening instruments for assessment of physical activity indicators in harmonized European health surveillance. Description: This presentation will examine a short set of instruments ('screeners') allowing assessment of harmonized physical activity indicators in EU surveillance systems using an iterative approach.

Presenter 3: Dr. Sarah Forberger, Leibniz Institute for Prevention Research and Epidemiology, Bremen, Germany. Title:

Implementation pathways of public physical activity policies: Lessons learned from a scoping review. Description: This presentation will examine implementation pathways to understand what happens between PA policy publication/enactment and measured outcome.

Results: 'Good Practice Statements' (GPS) or 'Benchmarks' (review consultation currently ongoing) will be presented. These GPS form a core component in the development of a PA-EPI tool which aims to assess and compare the extent of implementation of national government policies and actions, for creating physically active environments against international best practice. Preliminary evidence indicates that 86% of PA indicators (n=67) could be mapped onto at least one suitable variable in an ongoing surveillance system. In terms of implementation, from 11,935 publications identified, 11 could be included in the analysis. Results cover mostly USA with examples for New Zealand, India/Indonesia, England and Switzerland. Governmental structures ranges from

city level to nation level; policy fields from school to active design guidelines. Results of ongoing data synthesis will be presented.

Conclusions: The Discussant, Professor Joanna Zukowska, Gdansk University of Technology (Poland), responsible for transport and mobility, engineering and safety, and principal investigator/co-chair PEN Work Package 1, will critique the evidence presented with respect to its usefulness to policy-makers in terms of bench-marking, evaluation and implementation of public policies to promote PA.

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Keywords: Physical Activity, Policy, Bench-Marking, Evaluation, Implementation

Satellite Symposium B7: Indigenous Health and Wellness Workshop

1:50 pm - 3:20 pm (London, England, Wednesday, October 13, 2021)

Darren E. R. Warburton¹, Shannon Field¹, Shawn Hanna^{2,3}, Kyle Kaayák'w Worl⁴, Madelaine McCallum⁵, Quinn Pickering, Zakary Myers

¹Indigenous Health and Physical Activity Program, University of British Columbia, ²University of British Columbia, ³Indigenous Physical Activity and Cultural Circle, ⁴Tlingit & Haida Indian Tribes of Alaska, ⁵Louis Riel Métis Dancers, V'ni Dansi

Purpose: The purpose of this workshop is to feature a series of talks from the recent Indigenous health and wellness satellite event sponsored by the Canadian Institutes of Health Research. Highlighted talks will be presented followed by a panel discussion. The live discussion including (participant interaction in a sharing circle format) will focus on the lessons learned from these featured talks and the Indigenous health and wellness event.

Chair: Darren Warburton, University of British Columbia

Featured Speakers:

Kyle Kaayák'w Worl, Tlingit & Haida Indian Tribes of Alaska. Title: Arctic Sports: Games for Survival

Madelaine McCallum, Louis Riel Métis Dancers. Title: Traditional Dance

Quinn Pickering, Métis. Title: Traditional Dance: Métis Jigging

Shannon Field, University of British Columbia. Title: Movement is Medicine

Zakary Myers, Fort Nelson First Nation, Capilano University. Title: Wholistic Health and Wellness

Symposium B8: The evaluation of large-scale speed limit policies in two major UK cities

1:50 pm - 3:20 pm (London, England, Wednesday, October 13, 2021)

Graham Baker¹, Paul Kelly¹, Karen Milton², Claire Cleland³

¹University of Edinburgh, ²Norwich Medical School, University of East Anglia, ³Queen's University Belfast

Purpose: Over the past four years, an interdisciplinary team from the UK have been evaluating a large-scale policy intervention to reduce traffic speeds in two major cities.

Description: Transport interventions, including those aimed at reducing traffic speed, have the potential to contribute to public health. However, these types of interventions have rarely been implemented at scale and pose numerous challenges for designing and undertaking robust evaluation to demonstrate effectiveness. This symposium will pull together: previous evidence on speed reduction interventions; how the team approached the evaluation of this complex public health intervention in two UK cities; the political processes that made the large-scale speed limit policies a reality; and the impact of the interventions on key outcomes including speed, collisions and casualties.

Chair: Dr. Karen Milton

Presenter 1: Dr. Graham Baker. *Introduction*

Presenter 1: Dr. Paul Kelly. *Study design and methods to evaluate a complex 20mph speed reduction intervention.*

Presenter 2: Dr. Karen Milton. *Exploration of the political processes that made large-scale speed limit policies a reality in two major UK cities.*

Presenter 3: Dr. Claire Cleland. *Behaviour change and public health outcomes of 20 mph speed limit interventions implemented in two major UK cities*

Results: The chair will summarise the key take home messages from the presentations, which will be followed by at least 30 minutes for Q and A and discussion with the audience.

Conclusions: The findings enhance understanding of the political decision-making process underlying large-scale public health action, which is important for informing future advocacy efforts. The study has also generated substantial evidence of effectiveness to advance scientific knowledge. Delivering this symposium also contributes to a third ISPAH goal, to communicate excellence in research and practice on physical activity and public health.

Keywords: Transport, Policy, Health, Evaluation

Symposium B9: Using Physical Activity to Promote Health and Wellness in older age: Lessons Learnt in Three Continents

Afroditi Stathi¹, Anne Tiedemann², Mark Tully³

¹School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, UK, ²Institute for Musculoskeletal Health, University of Sydney, AUS, ³Ulster University

Purpose: The symposium will develop ideas about future methods for designing and evaluating active ageing interventions using a more holistic, inclusive, and context-sensitive approach.

Description: This symposium will compare, contrast and deconstruct the experiences of active ageing experts from the USA, Australia and UK of conducting randomised controlled trials (RCTs) of physical activity (PA) interventions to maximise health and wellness in older adults from diverse ethnic and socioeconomic backgrounds. Limitations of current trial methods and new, more holistic approaches will be discussed.

Chair: Assoc Prof Afroditi Stathi, University of Birmingham, UK. Title: Introduction to Symposium. Description: The Chair will highlight gaps in the evidence on the community-based promotion of active ageing. She will outline the problems with dealing with complexity of people, interventions and contextual influences when evaluating such initiatives.

Presenter 1: Assoc Prof Anne Tiedemann, University of Sydney, AUS. Title: Yoga-based Exercise for Promoting Health in Older Age: Project Results & Future Directions. Description: This presentation outlines a culturally and contextually sensitive program of research that led to the first RCT (n=560) internationally to test the effect of a yoga-based exercise program (Successful AGEing (SAGE)) for reducing falls in older people. It will discuss the potential for different PA modes to support holistic wellness outcomes.

Presenter 2: Assoc Prof Afroditi Stathi, University of Birmingham, UK. Title: Using Diverse Measures and Process Evaluation to Develop a More Holistic Account of Outcomes in a Group-Based Active Ageing Intervention. Description: The findings of the REtirement in ACTion (REACT) study, the UK's first large-scale (n=777), multi-centre, pragmatic RCT targeting mobility disability will be presented for the first time. REACT evaluates a "real-world" version of the LIFE intervention. Using mixed-methods process evaluation, we will unpick how the health and wellness effects vary between people and provide recommendations for maximising reach and effectiveness in the real world.

Presenter 3: Professor Mark Tully, Ulster University. Title: Older adults' experiences of a Multi-Country 'SITLESS' Physical Activity and Sedentary Behaviour Intervention Description: This SITLESS study was a multi-country randomized controlled trial across Europe. This presentation will report on the findings from qualitative research exploring the implementation and contextual aspects of the intervention in relation to the mechanisms of impact and to explore the perceived effects. In particular, we identified that when designing and implementing interventions for older adults, components should focus on enhancing social interaction, enjoyment and continuity to successfully promote sustained behaviour change.

Results: Key findings include the need to account for complexity of (a) outcomes (especially in physical activity and the way it interacts with physical function); (b) people (via intensive stakeholder involvement and in-depth process evaluation); (c) interventions and (d) social and community-level systems operating around the intervention and around the individual (which are as yet largely unaddressed). A set of ideas from the presenters on ways to adapt our intervention development and evaluation methods going forward will be presented for discussion with the audience.

Conclusions: Whilst methods for active ageing promotion make advances, understanding implementation processes and complexities and influences around these programs will help us increase reach and effectiveness.

Keywords: Ageing, Physical Activity, Wellness, Evaluation, Intervention

Symposium B10: Teaming up with schools: Advancing school-based physical activity (PA) initiatives through co-creation

1:50 pm - 3:20 pm (London, England, Wednesday, October 13, 2021)

Andy Daly-Smith¹, John Bartholomew², Jorge Mata³, Geir K. Resaland⁴, Tuija Tammelin⁵, Amika Singh⁶

¹Leeds Beckett University, ²University of Texas at Austin, USA, ³University of Porto, Portugal, ⁴Western Norway University of Applied Sciences, Norway, ⁵LIKES Research Centre for Physical Activity and Health, Finland, ⁶Amsterdam UMC, Amsterdam Public Health Research Institute, the Netherlands

Background: School-based interventions have small impacts on daily PA levels and academic performance in children. Such failures reside in sub-optimal implementation rates and poor sustainability. To enhance implementation, literature suggests co-production of programmes with all relevant stakeholders to increase the likelihood of implementation success. While co-production approaches are commonly used to design health care interventions, limited contemporary school-based projects deploy such design methodologies.

Introduction: Professor John Bartholomew, University of Texas at Austin. Title: Why moving beyond traditional research- and policy-led intervention design is essential for modern school-based PA programmes.

Individual presentations:

Presenter 1: Dr. Andy Daly-Smith, University of Bradford. Title: Experience-based co-design to develop the Creating Active Schools (CAS) Framework. Description: The UK-based CAS Framework was developed utilising the UK Design Council's Double Diamond Method. Fifty stakeholders, representing 9 stakeholder groups (e.g. (head)teachers, policymakers and researchers), engaged in a 6-step iterative design process. The presentation outlines the development process, the CAS framework and the impact since the framework's release.

Presenter 2: Professor Geir K. Resaland, Western Norway University of Applied Sciences. Title: A national approach to co-developing a teacher training programme in physically active learning (PAL) Description: Center for PAL (SEFAL) have co-created a PAL teacher education program with the practice field, with the aim of developing PAL as a quality-assured teaching method for theoretical subjects. SEFAL is underpinned by three conceptual pillars; motivation, well-being and relationships. SEFAL carries out research on teachers and headteachers taking part in the education program.

Presenter 3: Dr. Tuija Tammelin, LIKES Research Centre for Physical Activity and Health, Finland. Title: Co-development of the Finnish Schools on the Move programme with teachers, principals, policymakers and stakeholders – a key for successful implementation? Description: Finnish Schools on the Move is a national action programme establishing a physically active operating culture in schools. Over 90% of Finnish schools are involved in the programme that was co-developed since 2010 with a wide network of stakeholders including (non) governmental organisations, municipalities, schools, teachers and students.

Presenter 4: Dr Amika Singh, Mulier Institute. Title: A European-wide approach to co-develop a PAL curriculum and teacher training programme: the ACTivate project. Description: The aim of ACTivate is to enhance teachers' capability, opportunity and motivation to implement PAL in schools. In ACTivate, a six-nation partnership, we co- create, with practising teachers and other school stakeholders, an innovative European-wide open-access training programme and web portal. The presentation will outline the process of co-creation in the first phase of ACTivate.

Summary: Professors Bartholomew and Mota will summarise cross-cutting themes across the four presentations, discussing possible impacts on policy and practice; reflecting on similar approaches beyond the European context. Following the summary, an interactive discussion will involve all symposium presenters and the audience with specific reference to co-production and knowledge translation in school- based PA.

Keywords: Physically Active Learning, Co-creation, Whole-School Physical Activity

Symposium B11: Combining Global Positioning System and Accelerometer Data: tools, methods, and headaches

1:50 pm - 3:20 pm (London, England, Wednesday, October 13, 2021)

Daniel Fuller¹, Kevin Stanley², Christine Voss³, Meghan Winters⁴, Caislin Firth⁴, Yan Kestens⁵

¹Memorial University of Newfoundland, ²University of Saskatchewan, ³University of British Columbia, ⁴Simon Fraser University, ⁵Universite de Montreal

Purpose: This workshop will present, discuss, and share tools, methods, and challenges for researchers interested in combining Global Positioning System (GPS) and accelerometer data. There has been considerable research and technical development in this area including the creation and distribution of tools like the Personal Activity and Location Measurement System (PALMS) and the development of new tool systems for example, Human Activity Behavior Identification Tool and data Unification System (HABITUS). Despite the development of these tools, there are still many challenges and methodological developments required before researchers are able to fully take advantage of combine GPS and accelerometer data. This workshop will provide an overview of these challenges and some of the state of the art methods in this area.

Learning Objectives: This 90-minute workshop will cover tools, methods, and challenges of combining GPS and accelerometer data. We will begin with a brief history of the promise of combining these data, including spatiotemporal physical activity measurement, transportation mode detection, and improved exposure measurement. We will use case studies from the INTERventions, Research, and Action in Cities Team (INTERACT) studies to evidence the advantages and difficulties of combining data. We will outline the utility and operation of off the shelf tools (ArcGIS, QGIS), code based (R, python), and bespoke methods for combining these data. We will provide methodological guidance for researchers on how to combine these data to answer research questions. For example, how to treat GPS data sparseness compared to high velocity accelerometer data? What are new metrics to understand combined spatial and physical activity data? Finally, we will outline common challenges and propose solutions to those challenges when researchers are combining these data, for example, ensuring matching time stamps and resampling data.

Learning objective 1: Manage the complex trade-offs of combining GPS and accelerometer data.

Learning objective 2: Understand the advantages and disadvantages of different data analysis tools.

Learning objective 3: Use tools to combine GPS and accelerometer data.

Learning objective 4: Learn about key spatio-temporal indicators of physical activity from combined GPS and accelerometer data.

Target Audience: The target audience for this workshop is students and researchers who plan to or are working on combining GPS and accelerometer data.

Organization and Method of Presentation: This workshop will combine three primary methods of presentation, small group discussion, application of methods, and demonstration of more advanced methods. The content and sample data for the workshop will all be publicly available so that materials can be accessed in the future.

Conclusions: This workshop will contribute to advancing the standardization and use of combined GPS and accelerometer data. This research is crucial to healthy cities, parks, and recreation research, and to the promotion of holistic physical activity.

Keywords: Global Positioning System, Accelerometer, Measurement

Symposium B12: Play, Learning, and Teaching Outdoors Network (PLaTO-Net): International Consensus on Terminology, Taxonomy, and Ontology

1:50 pm - 3:20 pm (London, England, Wednesday, October 13, 2021)

Peter Bentsen¹, Mark S. Tremblay², Louise de Lannoy³, Eun-Young Lee⁴

¹Center for Clinical Research and Prevention, Copenhagen University Hospital - Bispebjerg and Frederiksberg, ²Healthy Active Living and Obesity Research Group, Children's Hospital of Eastern Ontario Research Institute, Ottawa, Canada, ³Research Manager, Outdoor Play Canada, Ottawa, Canada ⁴Assistant Professor, School of Kinesiology and Health Studies, Queen's University, Kingston, Canada

Purpose: The main goal of this symposium session is to present the overview, process, and outcome of this globally collaborative, interdisciplinary project aimed at achieving international consensus on terminology, taxonomy, and ontology of outdoor play, learning, and teaching.

Description: The symposium session will be chaired by Professor Peter Bentsen. Three presenters (Professor Mark S. Tremblay, Dr. Louise de Lannoy, and Dr. Eun-Young Lee) will present on the overview, process, and outcome of the consensus project.

Chair: Professor Peter Bentsen, Director, Center for Clinical Research and Prevention, Frederiksberg Hospital & Affiliated Professor, University of Copenhagen, Denmark.

Presenter 1: Professor Mark S. Tremblay, Director, Healthy Active Living and Obesity Research Group, Children's Hospital of Eastern Ontario Research Institute, Ottawa, Canada. Title: Vision, mission, and ethos of the PLaTO-Net. Description: Professor Tremblay will provide an overview of the vision, mission, and ethos of the PLaTO-Net (Play, Learning, and Teaching Outdoors Network), a global network of thought-leaders interested in advancing research and practice related to outdoor play, risky play, outdoor learning and teaching through play.

Presenter 2: Dr. Louise de Lannoy, Research Manager, Outdoor Play Canada, Ottawa, Canada. Title: Process of the PLaTO-Net International Consensus Project on Terminology, Taxonomy, and Ontology. Description: Dr. de Lannoy will present the four-phase process of the PLaTO-Net international consensus project: 1) a systematic scoping review, 2) terminology, taxonomy, and ontology development, 3) international consensus, and 4) knowledge translation and dissemination.

Presenter 3: Dr. Eun-Young Lee, Assistant Professor, School of Kinesiology and Health Studies, Queen's University, Kingston, Canada. Title: Outcome of the PLaTO-Net International Consensus Project on Terminology, Taxonomy, and Ontology. Description: Dr. Lee will present on the resultant outcomes of the international consensus project, which will include an overarching ontological model that expresses the intertwined and dynamic relationships between outdoor play, learning, and teaching. Working definitions and caveats on key and emerging terms will also be presented.

Results: Development of clear, standardized terminology, taxonomy, and ontology will help researchers and practitioners gain clarity on outdoor play, learning, and teaching as they evolve and diversify their approaches, content, and contexts over time and across different countries, cultures, and settings.

Conclusions: Clarifying terminology, taxonomy, and ontology will contribute to advancing research, policy, and practice in outdoor play, learning, and teaching given their increasing importance in human, animal, and plant life in the wake of climate change and environmental degradation, and the health and environmental injustices and inequities that follow in relation to access to outdoor spaces.

Funding: This project is supported in part from a grant from The Lawson Foundation.

Keywords: Delphi Method, Outdoor Education, Outdoor Play, Scoping Review

Symposium B13: Co-benefits of Physical Activity in LMIC

1:50 pm - 3:20 pm (London, England, Wednesday, October 13, 2021)

Nana Anokye^{1,2}, Andrea Ramirez^{3,4}, Deborah Salvo⁵, Prarthna Mukerjee^{6,7}, Alejandra Jauregui⁸, Kingsley Agyeman¹

¹Brunel University London, ²ISPAH LMIC Research Chair of Council, ³Universidad de los Andes in Colombia, ⁴Coordinator, Global Observatory for Physical Activity – GoPA!, ⁵Washington University in St. Louis, USA, ⁶Public Health Foundation India, ⁷Center for Chronic Disease Control, ⁸National Institute of Public Health of Mexico

Introduction: Dr. Nana Anokye, Brunel University London; ISPAH LMIC Research Chair of Council. Title: Setting the scene and introducing the speakers

Speaker 1: Dr. Andrea Ramirez, Universidad de los Andes in Colombia; Coordinator, Global Observatory for Physical Activity – GoPA!. Title: COVID and Physical Activity in LMIC. Description: Andrea will reflect on data in the past year on the correlations between physical inactivity and COVID-19 outcomes and vice versa, the effects of COVID-19 on physical activity, and the wider impacts of the pandemic on physical activity.

Speaker 2: Dr. Deborah Salvo, Washington University and Prarthna Mukerjee, Public Health Foundation India. Title: Roll call on Sustainable Development Goals and Physical Activity. Description: This session will provide up to date evidence on the linkages, supported by science, between SDGs and PA; focusing on the portions relevant to LMICs. This will include findings on simulated gains to SDGs due to different PA promotion strategies in cities of LMIC.

Speaker 3: Prarthna Mukerjee, Public Health Foundation of India, Center for Chronic disease Control. Title: Urban Forests, Parks in Delhi enhance Physical Activity SDGs 3, 5, 10

Speaker 4: Alejandra Jauregui, National Institute of Public Health of Mexico. Title: Nexus between Obesity, Physical Activity and Diet in LMIC: The experiences in Mexico

Speaker 5: Kingsley Agyemang, Brunel University London and Alejandra Jauregui, National Institute of Public Health of Mexico. Title: Nexus between Obesity, Physical Activity and Diet in LMIC. Description: The speakers will present findings of recent empirical analyses using data from West Africa and Latin America. This will include an overview of the findings from the 2021 Ghana Obesity Survey, the first comprehensive survey on lifestyle behaviour in Ghana.

Results: Development of clear, standardized terminology, taxonomy, and ontology will help researchers and practitioners gain clarity on outdoor play, learning, and teaching as they evolve and diversify their approaches, content, and contexts over time and across different countries, cultures, and settings.

Conclusions: Clarifying terminology, taxonomy, and ontology will contribute to advancing research, policy, and practice in outdoor play, learning, and teaching given their increasing importance in human, animal, and plant life in the wake of climate change and environmental degradation, and the health and environmental injustices and inequities that follow in relation to access to outdoor spaces.

Funding: This project is supported in part from a grant from The Lawson Foundation.

Keywords: Delphi Method, Outdoor Education, Outdoor Play, Scoping Review

Oral Presentations Session B1

Oral Presentation B1.1 Population levels and types of physical activity before and after a national Covid-19 lockdown

11:00 am - 11:10 am (London, England, Wednesday, October 13, 2021)

Tessa Strain^{1,2}, Katrien Wijndaele¹, Søren Brage¹, Stephen Sharp¹, Andrew Spiers³, Helen Price³, Ciara Williams³, Carol Fraser³, Paul Kelly²

¹MRC Epidemiology Unit, University of Cambridge, UK, ²Physical Activity for Health Research Centre, University of Edinburgh, UK, ³Sport England, London, UK

Background: To limit the spread of COVID-19 in March 2020, individuals in England were instructed to stay home, leaving only for essential shopping, health-care, work, or exercise. The effects on population activity levels are not clear. **Purpose:** To describe changes in levels and types of activity undertaken by adults ≥ 16 years in England in the first month of restrictions compared to that period in 2016-19. **Methods:** Using nationally representative data from $n=74,430$ mid-April to mid-May respondents to the Sport England Active Lives Surveys 2016-2020, we used multivariable-adjusted logistic regressions to estimate the odds ratios (OR) of reporting any non-occupational moderate-to-vigorous physical activity in the four-week recall period in 2020 compared to 2016-19. Gamma regressions estimated the mean ratios (MR) of minutes/week amongst those reporting any activity in 2020 compared to 2016-19. **Results:** The odds of reporting any activity were 30% (95% confidence interval (CI) 26-34%) lower in 2020 than 2016-19. The largest differences were amongst non-white ethnicities, younger age groups, and the unemployed; no socio-demographic subgroup had higher odds. MRs amongst those undertaking activity mostly suggested stable minutes/week, except for a decrease in younger adults (e.g. 16-24 years 0.80 (95%CI 0.72-0.88)), and an increase in older adults (e.g. 75-84 years 1.30 (95%CI 1.17-1.45)) in 2020 versus 2016-19. Walking for leisure and gardening increased; team sport and walking for travel decreased. **Conclusions:** Restrictions introduced in Spring 2020 may have reduced physical activity levels in England. Impacts were not uniform by demographic groups or by activity type, which future policies should consider. **Funding:** TS, KW, SJS, and SB are supported by UK Medical Research Council [grant numbers MC_UU_00006/4 and MC_UU_12015/3]. **Declaration of interests:** AS, HP, CW, and CF are employees of Sport England, an arms-length body of government responsible for growing and developing grassroots sport and getting more people active across England. It is funded by the UK Government and the National Lottery.

Keywords: Adults, Physical Activity, Covid-19, Surveillance, Domains

Oral Presentation B1.2 Effects of the COVID-19 national lockdown on physical activity and sitting time in England

11:10 am - 11:20 am (London, England, Wednesday, October 13, 2021)

Daniel P. Bailey¹, Amy Wells², Terun Desai², Keith Sullivan², Lindsay Kass²

¹Sedentary Behaviour, Health and Disease Research Group, Brunel University London, ²Life and Medical Sciences, University of Hertfordshire

Background: National lockdowns were implemented in numerous countries around the globe in order to reduce COVID-19 transmission, affecting many aspects of living due to social distancing, isolation and home confinement. **Purpose:** The aims of this study were to evaluate changes in physical activity and sitting in response to the first COVID-19 lockdown in England and factors associated with these changes. **Methods:** An online survey was completed by 818 adults between 29 April and 13 May 2020. T-tests compared physical activity levels (MET-min/week) and X² compared the proportion of participants engaging in low (<8 hours/day) and high sitting (≥8 hours/day) before and during lockdown. Logistic regression explored factors associated with physical activity and sitting during lockdown. **Results:** There was an increase in physical activity by 302 (155, 457) MET-min/week during lockdown (p<0.001). There were 19.81 and 5.83 higher odds of low physical activity for individuals with low and moderate levels pre-lockdown. Being higher educated and non-White ethnicity were associated with 1.70 higher and 0.24 lower odds of physical activity, respectively. More participants engaged in high sitting during lockdown than before (29% and 41%, respectively, p<0.001). High pre-lockdown sitting and being aged 40-59 years were associated with increased odds of high sitting during lockdown. **Conclusions:** Physical activity decreased and sitting increased during lockdown. Individuals with lower physical activity and higher sitting pre-lockdown in addition to lower education level, non-White ethnicity and middle-aged were more likely to engage in low physical activity and high sitting. **Funding:** N/A.

Keywords: COVID-19, Physical Activity, Sedentary Behaviour

Oral Presentation B1.3 Barriers and enablers to physical activity during COVID-19 restrictions in Ireland

11:20 am - 11:30 am (London, England, Wednesday, October 13, 2021)

Emer M. Barrett¹, Cuisle Forde¹, Jason Wyse²

¹Discipline of Physiotherapy, School of Medicine, Trinity College Dublin, University of Dublin, Ireland. ²Discipline of Statistics and Information Systems, School of Computer Science and Statistics, Trinity College Dublin, University of Dublin, Ireland

Background: Restrictions imposed to curb the spread of COVID-19 have limited many opportunities for physical activity. **Purpose:** This study investigated physical activity and its associated barriers and enablers during the first two phases of COVID-19 restrictions in Ireland. **Methods:** An online survey collated data from Irish adults at two timepoints, the first during COVID-19 restrictions in May 2020 (Wave 1) and the second during restrictions in November 2020 (Wave 2). Logistic regression (Bayesian lasso) determined the main barriers for being less active than usual and enablers for being more active than usual during restrictions. **Results:** A total of 2064 adults participated (Wave 1:1260, Wave 2:804, 26% male). During Wave 1 restrictions, 46% of participants reported that they were more active than usual and 54% met the national physical activity guidelines. During Wave 2, 26% reported they were more active than usual (p<0.001) and the percentage meeting the guidelines decreased to 42% (p=0.01). Being advised to remain indoors, being unable to meet friends and their usual means of exercise being unavailable were predictive of being less active than usual. Having more time, a positive view on the importance of exercise and finding new ways to be active were predictive of being more active than usual. **Conclusions:** Physical activity of Irish adults decreased during consecutive periods of COVID-19 restrictions. Home based activities and supporting access to physical activity with social support from others appear important. **Funding:** Nil.

Keywords: Physical Activity, COVID-19, Barriers, Enablers, Adults

Oral Presentation B1.4 Trail visits in Ireland during the COVID-19 pandemic: Using multiple data sources to describe trends

11:30 am - 11:40 am (London, England, Wednesday, October 13, 2021)

Dylan Power¹, Barry Lambe¹, Niamh Murphy¹

¹Centre for Health Behaviour Research, Waterford Institute of Technology

Background: There has been some effort to understand changes in recreational walking in Ireland during the COVID-19 pandemic period, yet little is known about recreational walking trail usage during the same period. **Purpose:** To use footfall count data and other forms of open-source mobility data to describe trends in trail usage in Ireland before and during the COVID-19 pandemic. **Methods:** Footfall count data were gathered from passive infra-red (PIR) sensors on 33 Irish walking trails and analysed between January 2019 and December 2020. Google Community Mobility Report (GCMR) data were also analysed to corroborate the footfall count data. Descriptive statistics were employed to highlight trends in footfall over time. **Results:** Total footfall counts increased by 5% between 2019 and 2020 on the trails included in this analysis. During phases of movement restrictions, trails that were <2km from urban areas were more frequently used than more remote trails. GCMR data from park areas mirrored findings found within the footfall analysis. Mean footfall on trails was 29% higher in December 2020 (when movement restrictions were lifted) than December 2019. **Conclusions:** The conclusions of this study are twofold. Firstly, openly available data, such as aggregated mobility data can be used to corroborate findings from PIR sensors. Secondly, the COVID-19 pandemic has left a legacy of increased recreational walking trail usage in Ireland, especially on trails closer to urban areas. There is now an opportunity to sustain this increase in trail usage through better understanding of the determinants of trail use. **Funding:** This study is part of a PhD project which is co-funded by Waterford Institute of Technology and Get Ireland Walking.

Keywords: Walking, Footfall Counters, COVID-19, Trail Use, Monitoring

Oral Presentation B1.5 Organizational structures for physical activity promotion in German long-term care facilities in pandemic contexts

11:40 am - 11:50 am (London, England, Wednesday, October 13, 2021)

Annika Frahsa¹, Dorothee Altmeier², Viola Dembeck², Gerhard W. Eschweiler³, Andreas M. Nieß⁴, Gorden Sudeck², Ansgar Thiel²

¹Institute of Social and Preventive Medicine, University of Bern, ²Institute of Sport Science, University of Tübingen, ³Geriatric Centre, University Clinic Tübingen, ⁴Institute of Sport Medicine, University Clinic Tübingen

Background: Given the multiple positive effects of physical activity (PA) in old age, infection control measures during the COVID-19 pandemic have had paradoxical effects, particularly in nursing homes: measures contribute to the protection of vulnerable residents, and they result in residents becoming socially isolated, exposed to psychological stress, and physically declining due to increased sedentariness. **Purpose:** To analyze the options and challenges for PA promotion in LTC facilities, as (pseudo-) 'total' institutions in Goffman's sense, under current pandemic conditions. **Methods:** Mixed-method study in eight LTC facilities in Southern Germany, based upon semi-structured interviews with executive and nursing staff (n=31), documents, such as nursing concepts, mission statements, and weekly activity plans, a photovoice study (n=27 participants, and n=169 photographs), and systematic observation on-sites (200hrs in 2020, 625hrs in 2021). We interpreted data through reflexive thematic analysis. **Results:** PA promotion is not integrated into organizational structure and culture. Nursing homes represent pseudo-total institutions, focused on caring for and protecting vulnerable people, rather than empowering residents as agents of their well-being and context and enabling them to age in a self-determined way. This trend is further exacerbated by a pandemic event. **Conclusions:** While nursing homes often demonstrate high levels of coping belief, the long-term effects of COVID-19 on PA promotion remain unclear, given the absence of external actors and lack of integration of PA promotion into organizational structure and culture. **Funding:** Study funded by the German Federal Ministry of Health 2019-2022 (grant no. ZMW11-2519FSB114).

Keywords: Aging, Physical Activity, COVID-19, Organizational Culture

Oral Presentation B1.6 Physical activity and sedentariness of French adults during the COVID-19 lockdown

11:50 am - 12:00 pm (London, England, Wednesday, October 13, 2021)

Charlotte Verdot¹, Hélène Escalon², Enguerrand Rolland du Roscoat², Pierre Arwidson², Benoît Salanave¹, Valérie Deschamps¹

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Background: It has been suggested that physical activity (PA) declined and sedentariness increased during the Covid-19 lockdown. **Purpose:** In France, a surveillance system using repeated surveys has been set up during lockdown, to study adult health behaviours, including PA and sedentariness. **Methods:** A sample of 2,000 adults were interviewed online. Representativeness was ensured by quota sampling and adjustment on census data. The prevalence of insufficient PA (<30 min/day), noteworthy sedentariness (sitting time >7 hours/day) and the frequency of sitting time breaks were assessed and analysed, with their associations with sociodemographic and mental health variables. Reported changes in PA and sitting time compared to before lockdown were analysed using multivariate models. **Results:** During the lockdown, 51% of the adults had insufficient PA, 33% reported a noteworthy sedentariness, and 55% did not break sitting time at the recommended frequencies. Compared to before lockdown, 47% reported decreasing their PA and 61% increasing their daily sitting time. Insufficient PA was more prevalent among adults with low socioeconomic status; but the decline in PA affected the higher socioeconomic categories. All these factors were associated, differently by gender, with anxiety, depression or sleep disorders. **Conclusions:** There was a decline of PA and an increase of sedentariness in French adults during the COVID-19 lockdown. It highlights the importance of promoting an active lifestyle in such a situation, in order to maintain the physical and mental health of the population. **Funding:** Study funded by Santé publique France, the national public health agency.

Keywords: Adults, Physical Activity, Sedentary Behaviours, COVID-19, Lockdown

Oral Presentation B1.7 Social processes and well-being for runners within the UK during the COVID-19 lockdown

12:00 pm - 12:10 pm (London, England, Wednesday, October 13, 2021)

Meredith Schertzinger¹, Fergus Neville¹, Gozde Ozakinci¹

¹University of St Andrews

Background: The COVID-19 lockdown period was the 1st time all group exercise was paused by government legislation. This provided a unique opportunity to assess how lack of group exercise impacted physical activity habits and wellbeing. This study used a combination of the Social Identity Approach (SIA) and Self-Determination Theory (SDT) to examine UK runners' motivation, physical activity, and well-being during the pandemic. **Purpose:** To understand how running social identities, autonomy, and competence were associated with participants' motivation for physical activity and well-being during the COVID-19 lockdown. **Methods:** 602 runners living within the UK completed an online cross-sectional survey between the 15th-28th of June 2020. Participants completed self-reported measures about their demographics, running social identities, motivation, autonomy, competence, physical activity levels, and mental well-being. In addition, a sample of 138 participants also recorded behavioural data of their daily step count and total running mileage to compare April 2019 and April 2020. **Results:** Linear regressions demonstrated that identification with a running club was negatively predicted physical activity ($\beta = -.39, p < .01$) while shared

runner identity positively predicted mental well-being ($\beta = .24$, $p < .01$). Competence positively predicted physical activity ($\beta = .29$, $p < .01$) and mental well-being ($\beta = .28$, $p < .05$). There was a statistically significant difference in daily step count and total running mileage between April 2019 and 2020 ($p < .01$); on average, participants took 1,700 fewer steps in April 2019 than April 2020, but increased their total running mileage by 12.26 miles. **Conclusions:** During the lockdown period participants decreased their daily step count but increased their total running mileage. The SDT variable competence, one's perceived confidence and ability in a behaviour, was associated with maintenance of physical activity during lockdown. The SIA variables revealed that participants who identified with their running group decreased in physical activity during the lockdown period. However, despite the lack of physical group interaction, participants could still feel a shared psychological connection to the running community as a whole which was positively associated with mental well-being. This study revealed how one's perceived competence in running and group memberships may be associated with physical activity levels and mental well-being during the lockdown period. **Funding:** Study funded by University of St Andrews St Leonard's Interdisciplinary Scholarship Fund.

Keywords: Running, Social Identity Approach, Self-Determination Theory, COVID-19, Mental Well-Being

Oral Presentations Session B2

Oral Presentation B2.1 Walking and its association with the perception of the neighborhood built environment

11:00 am - 11:10 am (London, England, Wednesday, October 13, 2021)

Florian Herbolzheimer¹, Atiya Mahmood², Nadine Ungar³, Habib Chaudhury²

¹German Cancer Research Center, Heidelberg, Germany, ²Simon Fraser University, Burnaby, Canada, ³Heidelberg University, Heidelberg, Germany

Background: Research indicates that the perception of various features of the neighborhood built environment supports walking among older adults. However, there is also an indication for the reversed direction. A walking intervention resulted in a more positive perception of the built environment. Consequently, the interpretation of the direction between walking and the perceived neighborhood built environment remains unclear. **Purpose:** This study examined if levels of walking in the neighborhood are related to different perceptions of the same built environment among older adults. **Methods:** In four neighborhoods in Metro Vancouver, Canada, and four neighborhoods in Metro Portland, United States, older adults reported their walking behavior and perception of the neighborhood built environment. Individuals were grouped if they lived 400 meters or closer to each other. The discordance between the individual and the group-wise perception of the same built environment was used as the outcome measure in linear regression models. **Results:** Higher walking levels were associated with increased positive evaluations of the built neighborhood environment. Older adults who walked more often for transport in the neighborhood also experienced the same neighborhood as more walkable ($\beta = .19$; $p = .011$) with better pedestrian infrastructure ($\beta = .16$; $p = .037$). **Conclusions:** The results support the notion that walking alters the environment's perception. Bidirectional effects should be considered when studying the relationship between the perceived built environment and individual behavior. **Funding:** Study funded by the Canadian Institutes of Health Research (CIHR).

Keywords: GIS, Neighbourhood, Physical Environment, Perception, Walking

Oral Presentation B2.2 Trends in active commuting to school from 2003 to 2017 among children and adolescents from Germany: The MoMo-Study

11:10 am - 11:20 am (London, England, Wednesday, October 13, 2021)

Isabel Marzi¹, Anne K. Reimers¹, Steffen C. E. Schmidt², Claudia Niessner², Doris Oriwol², Annette Worth³, Alexander Woll²

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Background: To overcome the high prevalence of inactivity in children and adolescents different domains of physical activity such as active transport need to be targeted in intervention programs. **Purpose:** The aim of this study was to assess the prevalence, time-trend, and socio-demographic correlates of ACS in a nationwide sample of girls and boys from Germany. **Methods:** Self-reports on commuting to school and its socio-demographic correlates from 11,387 participants aged 4 to 17 years were analyzed at three measurement points between 2003 and 2017. The sample is representative regarding sex, age, region, migration background, and education level among children and adolescents in Germany (MoMo-Study). **Results:** Overall, ACS decreased from 84.4% in 2003-2006 to 78.3% in 2014-2017. The proportion of passive commuting predominantly increased in children aged 4-5, in children with low and medium SES, and in small and medium-sized towns. No gender differences were found in active commuting. Results of multinomial logistic regression identified age, migrations background and residential area as correlates of walking in boys. In girls, the chance of walking, bicycling and taking public transport compared to motorized transport increased with age. **Conclusions:** Intervention programs to increase active transport in children and adolescents should target different age groups and promote parental involvement to change children's choice of transport mode. **Funding:** MoMo is funded by the Federal Ministry of Education and Research (funding reference number: 01ER1503) within the research program 'long-term studies' in public health research.

Keywords: Active Transportation, Walking, Physical Activity, Socio-Demographic Correlates

Oral Presentation B2.3 Descriptive epidemiology of adolescents' active travel to school in 31 Asian countries

11:20 am - 11:30 am (London, England, Wednesday, October 13, 2021)

Rizka Maulida¹, Erika Ikeda¹, Tolullah Oni², Esther van Sluijs¹¹Centre for Diet and Activity Research (CEDAR) and MRC Epidemiology Unit, University of Cambridge, Cambridge, UK, ²MRC Epidemiology Unit, University of Cambridge, Cambridge, UK

Background: Rapid urbanization and dynamically changing built environments in Asia pose a challenge for their active travel to school (ATS). Little is known about prevalence of ATS in Asia. **Purpose:** To describe the epidemiology of adolescents' ATS in Asia. **Methods:** This cross-sectional study used Global School-based student Health Survey (GSHS) data from 154,920 13-17-year-old adolescents in 31 Asian countries. Country-specific weighted percentages of self-reported ATS (0 vs. 1-7 days) were calculated, and associations of ATS with age, sex and weight category were analysed using logistic regressions. Subsequently, summary prevalence and estimates were calculated using random-effects meta-analyses. **Results:** Prevalence of ATS was 55%, ranging from 18% (United Arab Emirates) to 84% (Myanmar). There was limited sub-regional variation: 47% in the Eastern Mediterranean Region (EMR), 56% in South East Asia Region (SEAR), and 64% in the Western Pacific Region. Being an older adolescent (OR=1.08, 95%CI=1.00-1.16) was positively associated with ATS. This association was strongest in EMR countries. Females (0.79, 0.71-0.89) and adolescents with overweight/obesity (0.92, 0.86-0.99) were less likely to use ATS. Association with sex was strongest in EMR countries and slightly less in SEAR countries. Overall heterogeneity was considerable in all three meta-analyses. **Conclusions:** Prevalence of adolescent ATS in Asia varies substantially. Overall, older and male adolescents, and adolescents with normal and below normal weight category are more likely to actively travel to school. However, the main contributor to the between-country variation remains unknown. **Funding:** Indonesia Endowment Fund for Education, Ministry of Finance, Republic of Indonesia.

Keywords: Active Travel, Adolescent, Asia**Oral Presentation B2.4 Living in a walkable neighbourhood an essential element to support an active ageing intervention**

11:30 am - 11:40 am (London, England, Wednesday, October 13, 2021)

Antoni Colom^{1,2}, Suzanne Mavoa^{3,4}, Maurici Ruiz^{1,5}, Julia Wärnberg^{2,6}, Josep Muncunill⁷, Jadwiga Konieczna^{1,2}, Guillem Vich⁸, Francisco Javier Barón-López^{2,9}, Montserrat Fitó^{2,10}, Jordi Salas-Salvadó^{2,11,12}, Dora Romaguera^{1,2}

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Background: While urban built environments might promote active ageing, an infrequently studied question is how the neighbourhood walkability modulates physical activity changes during a physical activity intervention program in older adults. **Purpose:** We assessed the influence of objectively assessed neighbourhood walkability on the change in physical activity during the intervention program used in the ongoing PREvención con Dieta MEDiterránea (PREDIMED)-Plus trial. PREDIMED-Plus is a parallel-group, randomized trial which tested the effect of an intensive lifestyle intervention on cardiovascular disease prevention, in older overweight and obese participants with the metabolic syndrome. **Methods:** The present study involved 228 PREDIMED-Plus senior participants aged between 55 to 75, recruited in Palma de Mallorca (Spain). Overweight/obese older adults with metabolic syndrome were randomized to an intensive weight-loss lifestyle intervention or a control group (106 intervention and 122 control groups). A home base neighbourhood environment walkability index (residential density, land use mix, intersections density) was calculated using geographic information systems (1 km sausage-network buffer). Physical activity was assessed using the accelerometer for seven days, and a REGICOR validated physical activity questionnaire, at baseline and 2 follow-up visits (six-months and one-year later). Generalized Additive Mixed Models (GAMMs) were fitted to estimate the association between the neighbourhood walkability index and physical activity changes during follow-up. **Results:** Higher neighbourhood walkability (1 z-score increment) was associated with moderate-to-vigorous accelerometer assessed physical activity duration, ($\beta = 3.44$; 95% CI = 0.52;6.36 minutes per day). When analyses were stratified by intervention arm, the association was only observed in the intervention group ($\beta = 6.357$; 95% CI = 2.07;10.64 minutes per day) (p for interaction = 0.055). There were no statistically significant associations between neighbourhood walkability and self-reported physical activity nor brisk walking duration. **Conclusions:** The results indicate that the neighbourhood's walkability could support a physical activity intervention, helping maintain or increase older adults' objectively measured physical activity. This research may modify evidence on whether environmental factors modify habits acquisition during physical activity intervention programs. **Funding:** This work was supported by Instituto de Investigación en Salud Carlos III [grant numbers PI14/00853, PI16/00662 and PI17/00525], and Consejería de Salud de la Junta de Andalucía [grant number PS0358–2016]. Cofounded by FEDER. Institut d'Investigació Sanitària Illes Balears fellowship TalentPlus Tech Construyendo Valor Generando Salud [grant numbers #ITS2018–002] to [A.C.]. AstraZeneca Foundation (Young investigator Award 2017 on obesity and type 2 diabetes to [D.R.]). Australian National Health and Medical Research Council fellowship [grant numbers #1121035] to [S.M.]. [J.S.S.], gratefully acknowledges the financial support by ICREA under the ICREA Academia programme.

Keywords: Older Adults, Physical Activity Intervention, Longitudinal Study, Built Environment, Walkability Index

Oral Presentation B2.5 Identification of existing audit instruments for the assessment of urban and rural physical activity environments

11:40 am - 11:50 pm (London, England, Wednesday, October 13, 2021)

Bruna Domokos¹, Christina Müller¹, Lisa Paulsen², Izabela Bojkowska², Tanja Amersbach², Jens Bucksch², Birgit Wallmann-Sperlich¹

¹Institute of Sport Science, University of Würzburg, ²Department of Prevention and Health Promotion, Heidelberg University of Education

Background: According to a socio-ecological perspective, the neighborhood environment plays a critical role in promoting physical activity across all population groups. A comprehensive assessment of environmental characteristics is a prerequisite to the planning, implementation and evaluation of physical activity interventions. **Purpose:** This work aims to identify and categorize existing audit tools for the assessment of physical activity related environmental features in order to derive relevant categories and items for the German rural and urban context as well as for different population groups. **Methods:** We systematically searched relevant databases (e.g., PubMed) to identify existing audit tools. Based on the current evidence, we critically reviewed the instruments regarding context and relevance for population groups. **Results:** We identified 86 audit tools: 55 community/streetscape audits, 13 audits for parks, trails, or public open spaces, 7 audits for playgrounds or recreation facilities, and 11 digital audits. Most tools were applicable across all age groups (n = 65). In addition, we identified 9 tools for children and adolescents, 9 for seniors, and 3 for people with disabilities/chronic diseases. We found that numerous tools contain items that do not represent the German cultural context (e.g., destinations). We identified few tools developed explicitly for the rural context (n = 3). **Conclusions:** Our work highlights the need for an instrument reflecting urban and specifically rural peculiarities of the German context. **Funding:** This work is funded by the German Federal Ministry of Health and the Federal Centre for Health Education.

Keywords: Audit, Built Environment, Rural, Urban

Oral Presentation B2.6 Objectively measuring the association between the built environment and physical activity-identifying the gaps: a systematic review and reporting framework

11:50 pm - 12:00 pm (London, England, Wednesday, October 13, 2021)

Francesca Pontin^{1,2}, Victoria Jenneson^{1,2}, Nik Lomax^{1,2}, Graham Clarke², Michelle Morris^{1,3}

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Background: We know the environment in which we live and interact plays an important role in our opportunity for and ability to be physically active. However, studies investigating the strength and direction of these objectively measured relationships find conflicting outcomes. Different reporting practices and standards between disciplines and countries cause problems for study comparability, and subsequent difficulty in concluding the level of influence of built environment on physical activity. **Purpose:** To summarise the current body of knowledge and knowledge gaps around the impact of objectively measure built environment metrics on physical activity levels in adults and to devise a reporting framework for the evaluation of current studies and to improve future inter-study comparability. **Methods:** A systematic review was conducted on multiple health, geography, transportation, and social sciences databases. Study characteristics, methods of objectively recording physical activity and built environment were recorded and study outcomes compared. These findings were used to devise a reporting framework. **Results:** Following PRISMA guidelines 100 papers, composed of 66 unique studies, were included in the final review. Studies spanned 17 OECD countries and ranged between 10 to 65,967 participants. The range of built environment metrics and physical activity definitions used across the included studies were visualised to identify reporting gaps. Moreover, each study was scored against the reporting framework criteria to assess reproducibility and comparability. **Conclusions:** The introduction of a framework that allows comparability of studies, whilst also introducing a consistent reporting structure, is highly advantageous in identify key gaps in reporting and improving future comparability. **Funding:** ESRC: Data Analytics and Society Centre for Doctoral Training (ES/R501062/1).

Keywords: Built Environment, Objective Measures, Systematic Review

Oral Presentation B2.7 Improving active ageing and wellbeing in urban environments: laying the groundwork for solution-building through citizen science

12:00 pm - 12:10 pm (London, England, Wednesday, October 13, 2021)

Grace Wood¹, Jessica Pykett², Abby King³, Ann Banchoff⁴, Afroditi Stathi¹

¹School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, ²School of Geography, Earth and Environmental Sciences, University of Birmingham, ³Department of Epidemiology & Population Health, Stanford University School of Medicine, ⁴Stanford Prevention Research Center, Stanford University School of Medicine

Background: Community-engaged citizen science recognises older adults as key stakeholders in designing, implementing, and evaluating initiatives that support age-friendly urban environments. **Purpose:** To engage older adults and other stakeholders in identifying actionable urban characteristics influencing active ageing in Birmingham, UK. **Methods:** Participants aged 60 and over were recruited via local community organisations and services. Experts in urban planning and ageing-well services were recruited via targeted e-mail invitations. Online group discussions were conducted. Data was thematically analysed and checked by interviewees. **Results:** Four older adult (n=17; Mean age= 72 (7.5 SD); 11 women) and two stakeholder (n=11; 7 women) online group discussions identified 13 barrier and 8 facilitator themes. Ageism, winter, and safety were identified as barriers by both groups whereas outdoor spaces and infrastructure, transportation, community facilities, and the Covid-19 pandemic were identified as barriers and/or facilitators. Older adults identified ageing as a key barrier and diversity of the city, health and mobility and

technology as facilitators. For stakeholders, key barriers were: deprivation and poverty, gender differences, and race and ethnicity whereas age inclusive activities were a key facilitator **Conclusion:** The range and interaction of urban characteristics acting as barriers and facilitators highlights the potential importance of community-engaged citizen science in developing place-based changes to promote active ageing. In the context of a global pandemic, employing online discussion groups allowed meaningful first-stage engagement of citizen scientists to begin generating community-driven solutions for improving community health. **Funding:** University of Birmingham.

Keywords: Older Adults, Co-production, Age-Friendly, Urban Health

Oral Presentations Session B3

Oral Presentation B3.1 The relationship between childhood physical activity, motor skill competency and strength in 7–11-year-olds

11:00 am - 11:10 am (London, England, Wednesday, October 13, 2021)

Alice Cline^{1,2}, Rebecca De Filippo¹, Gareth Knox¹, Luciana De Martin Silva¹, Stephen Draper¹

¹Hartpury University, ²University of the West of England

Background: The Health Survey for England (2015) identified 80% of children aged 7–11 were below the World Health Organisation's recommended 60 minutes of moderate to vigorous physical activity (PA) per day. At this age a child's central nervous system develops at an accelerated rate, offering an opportunity to build and develop strength whilst improving motor skill proficiency; both of which are important for participation in PA. **Purpose:** To explore possible associations between PA levels, motor skill competency and strength amongst children aged between 7–11 years. **Methods:** Seven-hundred pupils from 10 primary schools in Gloucestershire were tested over a 12-week period. Isometric strength was measured through an isometric mid-thigh pull using a portable force platform. Movement skill competency was assessed using the Athlete Introductory Movement Screen (AIMS-4). Finally, participants completed PA engagement (PAQ-C), enjoyment (PACES) and self-perception questionnaires (PSP). **Results:** A Spearman's Rho correlation identified a significant association ($p < 0.001$) between movement skill competency and strength ($\rho = 0.26$), PA enjoyment ($\rho = 0.17$), PA engagement ($\rho = 0.21$), self-perception ($\rho = 0.47$), and number of sports played ($\rho = 0.26$). Movement competency groups were determined using 25th, 50th and 75th percentiles taken from the AIMS-4 scores. A Kruskal-Wallis test indicated significant differences between each group, with participants in higher percentiles displaying higher scores for all other variables ($p < 0.001$). **Conclusion:** Interventions aiming to improve children's movement skill competencies have the potential to improve a variety of physical and psychological factors which can positively impact a child's overall wellbeing.

Keywords: Childhood Physical Activity, Motor Skill Competency, Strength

Oral Presentation B3.2 The association between physical activity, motor skills and school readiness in early years children

11:10 am - 11:20 am (London, England, Wednesday, October 13, 2021)

Dan Jones¹, Liane B. Azevedo², Emma L. Giles¹, Alison Innerd¹

¹School of Health and Life Sciences, Teesside University, Middlesbrough, UK, ²School of Human and Health Sciences, University of Huddersfield, Huddersfield, UK

Background: The benefits of being physically active, possessing good motor skills, and being school ready are well documented in early years. Nevertheless, evidence suggests that the majority of early years children do not engage in sufficient amounts of physical activity, have low motor skill competence, and 30% of children in England, do not achieve school readiness. Reception is a key stage in the development of health and educational behaviours. **Purpose:** To explore the association between physical activity, motor skills and school readiness in early years children. **Methods:** An observational study was conducted collecting data on 326 Reception children's physical activity (ActiGraph GT1M accelerometers), motor skills (MABC-2 and the locomotor section of the TGMD-2) and school readiness levels (EYFS profile). **Results:** This study found that on average children were sufficiently physically active according to the UK physical activity guidelines, and engaged in less sedentary behaviour than previously documented. Motor skills scores were in line with previous research on early years motor skills. A higher percentage of children in the sample (80%) achieved school readiness than the average for England. Regression analyses found that motor skills and sedentary behaviour were significantly predictive of school readiness, whereas physical activity was not. **Conclusion:** The promotion of motor skills in parallel with developmentally positive sedentary behaviours, whilst maintaining sufficient physical activity, in early years, may help to increase the number of children achieving school readiness, and may lead to long term benefits in educational, social, and physical development. **Funding:** This project was funded by Teesside University as part of the lead authors PhD project.

Keywords: Physical Activity, Motor Skills, School Readiness

Oral Presentation B3.3 Collective Intelligence for the Collective Effort in improving implementation of fundamental movement skill

11:20 am - 11:30 am (London, England, Wednesday, October 13, 2021)

Jiani Ma^{1,2}, Michael J. Hogan³, Emma L.J. Eyre¹, Natalie Lander^{2,4}, Lisa M. Barnett², Michael J. Duncan¹

¹School of Health and Life Sciences, Coventry University, Coventry, UK, ²School of Health and Social Development, Institute for Physical Activity and Nutrition, Deakin University, Melbourne, Australia, ³School of Psychology, National University of Ireland, Galway, Ireland,

⁴School of Education, Faculty of Arts and Education, Deakin University, Melbourne, Australia

Background: To have population-level impact, physical activity (PA) interventions must be effectively implemented and sustained under real-world conditions. Adequate Fundamental Movement Skill (FMS) is integral to children's PA participation. Yet, few FMS interventions have been implemented at scale due to the insufficient understanding of influences on implementation. **Purpose:** The study used Collective Intelligence (CI) —an applied systems science approach—with stakeholder groups to understand barriers to implementing FMS interventions, interdependencies between these barriers, and options to overcome the system of barriers identified. **Methods:** Three CI sessions were conducted with three separate groups of experienced FMS intervention researchers/practitioners (n=22) in the United Kingdom and Ireland. Participants generated and ranked barriers they perceive most critical in implementing FMS interventions. Each group developed a structural model describing how highly ranked barriers are interrelated in a system. Participants then conducted action mapping to solve the problem based on the logical relations between barriers reflected in the model.

Results: The top ranked barriers (of 76) are those related to policy, Physical Education curriculum, and stakeholders' knowledge and appreciation. As reflected in the structural model, these barriers have influences over stakeholders' efficacy in delivering and evaluating interventions. According to this logical structure, 38 solutions were created as a roadmap to inform policy, practice, and research. The roadmap suggests implementation efforts need to be coordinated, and a policy or local infrastructure that supports these efforts is needed. **Conclusions:** The current study provides a powerful template (CI process) and design framework (roadmap) for researchers, practitioners, and policy makers in the PA field to operationalise future projects in more systemic and relational terms. **Funding:** Jiani Ma is supported by a Cotutelle Doctoral Studentship of Coventry University and Deakin University. The conduct of data collection workshop was supported by Barry Gidden Fund.

Keywords: Motor Competence, Motor Skills, Implementation Science, Systems Science, Physical Education

Oral Presentation B3.4 The impact of a resistance training intervention on fundamental movement skills of inactive and/or overweight/obese youth

11:30 am - 11:40 am (London, England, Wednesday, October 13, 2021)

Helen Collins^{1,2}, Samantha Fawcner¹, Josephine N. Booth¹, Audrey Duncan²

¹University of Edinburgh, UK, ²University of Dundee, UK

Background: Fundamental movement skills (FMS) have been identified as having a strong association with physical activity (PA). To develop FMS, resistance training (RT) may be a favourable intervention strategy. While PA guidelines recommend 'activity to develop movement skills and muscular fitness', there has been limited research to date on the impact of RT on FMS in youth. **Purpose:** This study aimed to explore the impact of a RT intervention on FMS of inactive and/or overweight/obese youth. **Methods:** Following ethics approval, 12 inactive and/or overweight/obese participants were assigned to an experimental (EG; age 8.7±1 years, BMI z-score= 2.54±0.61) or control group (CG; age 9.2±1 years, BMI z-score= 1.50±0.93). Pre- and post-intervention assessments for strength (isometric mid-thigh pull) and FMS (CAMSA) were completed. The EG participated in a 10-week RT programme (45minutes, twice weekly). **Results:** There were significant time x group interactions for FMS (CAMSA total P= 0.016, CAMSA skill score P= 0.036) with EG changes greater than CG. Large effect sizes were evident for CAMSA total score (Hedges' g= 0.830, P= 0.138), CAMSA skill score (Hedges' g= 0.895, P= 0.112) and relative strength (Hedges' g= 0.825, P= 0.140). **Conclusions:** A RT intervention had a positive impact on strength and FMS in this population. Neural adaptations, resulting from RT, may provide a mechanism. Since there is strong evidence of an association between FMS and PA, it could be hypothesised that RT could positively affect PA levels too, however further work is required to substantiate this. **Funding:** None.

Keywords: Strength, Physical-Activity, Obesity, Youth

Oral Presentation B3.5 How are physical literacy interventions conceptualized? A systematic review on theory, design, and content

11:40 am - 11:50 am (London, England, Wednesday, October 13, 2021)

Johannes Carl¹, Jaime Barratt², Clemens Töpfer³, John Cairney², Klaus Pfeifer¹

¹Department of Sport Science and Sport, Friedrich-Alexander University Erlangen-Nürnberg, Germany, ²School of Human Movement and Nutrition Sciences, University of Queensland, Australia, ³Institute for Sports Science, Friedrich Schiller University Jena, Germany

Background: UNESCO (2015) and the World Health Organization (2018) and embrace physical literacy (PL) as an important aspect of quality physical education and lifelong physical activity. However, translating the complex theoretical-philosophical foundations of PL into practical interventions remains a significant challenge. **Purpose:** Therefore, the goal of the present study was to examine to which extent intervention studies (a) recognize the holistic nature of PL, (b) target the different PL domains, and (c) link intervention content to PL theory. **Methods:** In November 2020, we conducted a multi-step literature search (PROSPERO registration: CRD42020188926) in 18 databases. Eligible studies included those that were either based on or inspired by PL theory; published in academic journals or book sections. To explore the link between intervention content and PL theory, we utilized 9/19 Items from the Theory Coding Scheme for behavior change techniques. **Results:** A total of N=39 PL interventions met eligibility criteria and were included in the final analyses. While 76.9% of the studies adopted a holistic understanding of PL, only 15 studies (38.5%) targeted all three PL domains. Combined, physical competence was addressed more frequently (87.2%). Only five studies made explicit links between the PL domains and intervention techniques (12.8%). The requested intertwining of PL domains within intervention techniques should be considered more thoroughly. **Conclusions:** In summary, PL interventions may better harmonize with PL theory and conception if they cultivated a tight interlocking with the three core domains at all stages of the intervention process. **Funding:** No specific funding.

Keywords: Physical Activity, Health, Lifestyle

Oral Presentation B3.6 Screen time and physical-literacy among children in underserved communities – an explorative study

11:50 am - 12:00 pm (London, England, Wednesday, October 13, 2021)

Beatrix Algrén¹, Julia Eriksson²

¹Department of Food and Nutrition, and Sport Science, University of Gothenburg, ²Sahlgrenska Academy, University of Gothenburg

Background: While physical literacy (PL) is seen to have a key role for a physically active lifestyle, explanatory factors of screen-time and the association between screen-time and PL is yet not well understood. **Purpose:** To identify patterns and factors that are associated with screen-time regarding characteristics of PL and socio-demographic characteristics among children in underserved community (UC). **Methods:** A digital survey were distributed among children in grade 4-5 at primary schools in UC in Western Sweden. All children participated in a physical activity project that was complementary resources for the regular physical education lessons. The survey consisted of background and screen-time questions and questions adapted from three different instruments measuring PL; The Basic-Psychological-Needs-in-Exercise-Scale, the Behavioral-Regulation-in-Exercise-Questionnaire-2 and Physical-Literacy-Knowledge-Questionnaire. Univariate and multivariate analysis were used to investigate correlates and differences in subgroups. **Results:** A total of 334 children (52% girls) answered the survey, whereof 27% had immigrated as child to Sweden, most of them were active in one sport (44%); 20% had neither parents nor siblings which were physically active (PA). Most of the children enjoyed being PA (67%), that was significant correlated (fair to moderate) with almost all characteristics of PL. In average, screen-time was 4.3 hours per day per week (boys had significant more screen-time than girls, 5.2 versus 3.8 hours, ($p=0.007$, based on complete screen-time answers from $n=219$ children). Prioritizing reading were significant negative correlated with screen-time ($p<0.05$). Children with less screen time preferred significantly more playing with friends, being PA, and reading ($p<0.05$). Further, children with less screen time more often enjoy their exercise sessions, while those with more screen-time more common take part in exercise because of others say that they should ($p<0.05$). **Conclusions:** Daily screen-time was high despite the fact that three quarter of the children were active in at least one sport and had physically active parents and siblings. Boys and children with newly immigrated background are at higher risk for excessive ST. Having a family with both parents and siblings as physical active, being interested in and comfortable with reading as well as intrinsic motivation to exercise might be able to reduce ST. **Funding:** None.

Keywords: Children, Adolescent, Physical Literacy, Physical Activity, Screen-time, Motivation

Oral Presentation B3.7 A digital assessment tool for promoting physical activity in childcare centers

12:00 pm - 12:10 pm (London, England, Wednesday, October 13, 2021)

Christina Müller¹, Vanessa Kaiser¹, Holger Hassel¹

¹Coburg University of Applied Sciences and Arts, Coburg, Germany

Background: Childcare centers have the potential to promote physical activity (PA) in children and thus contribute to their health. There is an increasing number of evidence-based best-practice guidelines for childcare settings. However, corresponding environments, policies and practices are insufficiently implemented. **Purpose:** The project “QueB 2 – developing quality with and through physical activity” aims at developing and testing strategies and digital tools to support the implementation of PA promoting environments, policies and practices in childcare centers involving stakeholders working with childcare centers. **Methods:** Group discussions were conducted with stakeholders in one model region in Germany. A web-based quick assessment tool building on scientific evidence and existing frameworks was developed in cooperation with stakeholders. The tool was pilot-tested by students of three vocational schools for early childhood educators. Virtual meetings were held with the students to reflect upon their experience with the tool, its utility and feasibility. **Results:** Stakeholders expressed the wish for a quick and simple assessment tool that helps them identify a childcare centers’ need for action. The developed web-based tool consists of 20 items in seven categories. Students mostly perceived the tool as useful, appreciated its clear structure, and expressed an increased awareness of the factors contributing to physical activity in childcare centers. **Conclusions:** The developed digital assessment tool has the potential to support PA promotion in childcare centers. **Funding:** The project is funded by the German Federal Ministry of Education and Research as a part of the research consortium Capital4Health (01EL1821E).

Keywords: Assessment Tool, Childcare Centers, Stakeholders

Oral Presentation B3.8 Co-Created Sports programme for young people permanently excluded from mainstream schools: An Ethnographic Evaluation of the Active Link Sports Programme

12:10 pm - 12:20 pm (London, England, Wednesday, October 13, 2021)

Florence Kinnafick¹, Andrew Brinkley¹, Lauren Sherar¹

¹National Centre for Sport and Exercise Medicine, School of Sport, Exercise and Health Sciences, Loughborough University, UK

Background: UK Pupil referral units (PRUs) educate permanently excluded children from mainstream schools. These pupils face poor mental health, multiple deprivation and crime. Sport could improve health, attainment and lifestyle choices. We evaluated the acceptability, feasibility, efficacy and sustainability of a UK-based co-created *Active Link* sports programme for a PRU. Co-creation provides participants with a voice within the design of a programme. *Active Link* offered mentors-led sport sessions (e.g., football, boxing, climbing, ice skating) to improve health and promote positive relationships. **Methodology:** 45 (42 male:3 female) pupils aged between 13-16 years (mean=15.2), 7 teachers, 7 mentors and 3 stakeholders participated in an ethnographic study (25 observations, 120 hours) involving observations in school, interviews with staff, focus groups with pupils and photography. Data was analysed using an iterative process. **Findings:** Promoting sport within the PRU is complex, and situationally influenced by pupil mood and attitude. Co-creation enhanced the acceptability and feasibility. The programme improved self-esteem and wellbeing. A

key benefit was the bridge that sport provided for mentors and teachers to work with pupils on their complex psychosocial needs. In its current form, the programme had moderate sustainability and was dependent on pathways into clubs and external organisations. **Conclusion:** Our findings indicate the programme is acceptable, feasible and can improve psychosocial health. Stakeholders should consider providing choice through co-creation and working with trusted mentors. Sport is valuable but is unlikely to address complex psychosocial problems alone. Sustainability can be addressed through strong relationships with external partners or fostering inhouse capacity. **Funding:** This evaluation was funded by Sport England through a partnership with Fit4Life, City of Birmingham Schools and Sport Birmingham.

Keywords: Beneficial, Deprivation, Mentors, Trust, Social Support

Oral Presentations Session B4

Oral Presentation B4.1 Children's experiences of their journey between home and school: A qualitative synthesis using meta-ethnography

11:00 am - 11:10 am (London, England, Wednesday, October 13, 2021)

Stephanie Morris¹, Emma R. Lawlor², Louise Foley², Carolyn Summerbell¹, Jenna Panter², Russ Jago³, Jean Adams², Tessa Pollard¹

¹Durham University, ²University of Cambridge, ³Bristol University

Background: Active school travel is associated with higher habitual physical activity levels in children and aids traffic and pollution reduction. However, interventions to promote active school travel have generally had small or trivial effects. **Purpose:** This study aimed to synthesize qualitative and ethnographic literature on children's (aged 5-13) experiences of their usual school journeys to inform future interventions promoting active school travel. **Methods:** This study comprised three stages: systematic searches of the literature, quality appraisal and qualitative synthesis using meta-ethnography. Searches were conducted in 5 databases and limited to a time-period of 2000-present and 21 papers reporting 18 studies were taken forward to the synthesis stage. **Results:** Most studies stemmed from high-income English-speaking countries and used self-report qualitative methods, with some utilising participant observation. Through a process of translating the original primary analyses of the study authors, we produced 11 third order constructs which we present in 5 themes: feeling vulnerable; negotiating journeys and managing risks; enjoying engaging with others; exploring material environments; embodied experiences of travel. **Conclusions:** We argue that the journey to school offers children a process of learning and a site to develop agency within their socio-material environments. Potentially, focusing on the wider benefits of school travel and incorporating informal learning into the journey could be valuable for active school travel interventions. **Funding:** National Institute for Health Research (NIHR) School of Public Health Research (SPHR), project reference: SPHR-PROG-PCBT-CS2.

Keywords: Children, Active School Travel, Meta-Ethnography

Oral Presentation B4.2 Understanding teachers perceived barriers and facilitators to implementing classroom-based physical activity interventions using the COM-B Model and Behaviour Change Wheel

11:10 am - 11:20 am (London, England, Wednesday, October 13, 2021)

Alice Cline^{1,2}, Gareth Knox¹, Luciana De Martin Silva¹, Stephen Draper¹

¹Hartpury University, ²University of the West of England

Background: Interventions aiming to improve physical activity (PA) inside classrooms need to better understand and address the barriers (practical, social, physical and political) to implementation faced by teachers if sustained behavioural change is to be achieved. **Purpose:** To explore teachers perceived barriers and facilitators to implementing classroom-based PA interventions. **Methods:** Semi-structured focus groups were conducted with 24 participants including teachers, teaching assistants, head teachers and governors from 6 schools across Gloucestershire. Themes from the COM-B model and Behaviour Change Wheel (BCW) (Mitchie *et al.*, 2013) were used to help guide the group discussions. Once transcribed, thematic analysis was used to code and theme the data. **Results:** Drawing from the COM-B model, perceived barriers were raised around (a) capability; "there is definitely a fear around...unless they have a sport background there is an element of the unknown that puts people off", (b) opportunity; "with the overloaded curriculum, it's a squash to get everything in as it is", and (c) motivation; "it's a hard choice when you have lots of marking to do, do we do an outside activity or do I get this done instead?". However, as identified by the BCW, functions such as education, incentivisation, enablement and environmental restructuring were identified as possible facilitators. **Conclusion:** Classroom based PA interventions are often faced with problems regarding sustainability. This study highlights the importance of taking multi-level factors, such as lack of capability, confidence and time constraints, into consideration when designing and implementing classroom-based PA interventions.

Keywords: School Aged Children, Behaviour Change Wheel, Implementation Science, Classroom Based PA

Oral Presentation B4.3 Physical activity in children during physical education interventions guided by different pedagogical approaches

11:20 am - 11:30 am (London, England, Wednesday, October 13, 2021)

Matteo Crotti^{1,2}, James Rudd¹, Simon Roberts¹, Katie Davies^{1,2}, Laura O'Callaghan^{1,2}, Lawrence Fowweather²

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Background: Moderate-to-vigorous physical activity (MVPA) in children is an important target for Physical Education (PE) programmes globally. Therefore, an important consideration in the development of new pedagogy based PE curriculums is the maintenance of high levels of MVPA to support children's long-term health and wellbeing. **Purpose:** The aim of this study was to compare MVPA within linear pedagogy and nonlinear pedagogy based PE curriculums and usual practice in PE. **Methods:** Participants ($n = 165$, 53.3% female, 5-6 years) were recruited from nine primary schools within the SAMPLE-PE randomised controlled trial. Schools were randomly-allocated to Nonlinear and linear pedagogy intervention, where schools received a PE curriculum delivered by trained coaches over 15 weeks, and control schools that followed usual practice. Children's MVPA was measured during 3 PE lessons (1 every 5 weeks) using ActiGraph GT9X accelerometers worn on non-dominant wrist. Differences between conditions for children's MVPA were analysed using multilevel model analysis. A binomial regression was performed to evaluate whether the pedagogical approaches predicted spending 50% or more of the lesson in MVPA. **Results:** There were no significant group effect of control, linear and nonlinear pedagogy conditions in the time ($p = 0.744$) and percentage of time ($p = 0.753$) spent in MVPA and in the proportion of children meeting the $\geq 50\%$ MVPA PE lesson guideline ($p = 0.764$). **Conclusions:** Linear and nonlinear pedagogical approaches in PE do not negatively impact on MVPA compared to usual practice. Nevertheless, practitioners may need to refine these pedagogical approaches to improve MVPA.

Keywords: Physical Activity, Children, Physical Education, Pedagogy, Nonlinear Pedagogy

Oral Presentation B4.4 Validation of the SOFIT+: Relating physical activity promoting practices to moderate-to-vigorous physical activity in 5–6-year-old children

11:30 am - 11:40 am (London, England, Wednesday, October 13, 2021)

Matteo Crotti^{1,2}, James Rudd³, Glenn Weaver³, Simon Roberts¹, Katie Davies^{1,2}, Laura O'Callaghan^{1,2}, Lawrence Foweather²

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Background: Teaching behaviours within physical education can affect moderate-to-vigorous physical activity (MVPA) engagement during lessons. However, no tool has been validated to assess teacher practices promoting MVPA in 5-6 years old children. **Purpose:** To validate the modified System for Observing Fitness Instruction Time (SOFIT+) in 5 to 6 years old children. **Methods:** Participants ($n=165$, 53.3% female, 5-6yrs) were recruited from nine primary schools. Video recordings of 45 PE lessons (3 per class) from 9 teachers/coaches were coded using an age-appropriate modified version of the SOFIT+. Inter-rater reliability was assessed on 30% of coded lessons. A SOFIT+ index score was calculated for each 40 second(s) scan. Children's moderate-to-vigorous physical activity (MVPA) was estimated using wrist-worn accelerometers. Multinomial logistic regression assessed the relationship of both the SOFIT+ index score and individual MVPA promoting practices with children's MVPA. **Results:** Percent agreement was $>85.5\%$ for each observed SOFIT+ variable. Compared to engaging in 0-9s of MVPA per 40s scan, a 1 unit increase in the SOFIT+ index score was associated with an increased likelihood for children to engage in 10-19s (OR = 1.43), 20-29s (OR = 1.86) and 30-40s (OR = 2.50) of MVPA. The vast majority of the observed teaching practices were significantly related to children's MVPA. **Conclusions:** SOFIT+ can produce valid and reliable data to examine teaching behaviours related to PA promotion. Furthermore, the relationship between individual teaching behaviours and children's MVPA was generally in line with previous research and could inform practitioners' PA promotion behaviours.

Keywords: Observation Tool, Teacher Behaviours, Physical Education, Physical Activity, Children

Oral Presentation B4.5 How should we choose the most appropriate Epoch-Length for Children's Physical Activity?

11:40 am - 11:50 am (London, England, Wednesday, October 13, 2021)

Claudio R. Nigg¹, Carina Nigg^{1,2}, Mihyun Kim³, Julia L. Sharp³, Xanna Burg⁴, Leslie Cunningham-Sabo⁴

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Background: It is unclear how epoch length (EL) influences children's physical activity prevalence and relationships with health outcomes. **Purpose:** To investigate the impact of different ELs (1-15, 30, and 60 seconds, 2, 5, 10, 30, and 60 minutes) for children on: a) meeting World Health Organization physical activity guidelines; and b) physical activity and BMI relationship. **Methods:** Children ($n=460$, age=9.14 (SD=0.35) years, 50.7% female, 73.0% white, and 26.1% overweight/obese) wore a wrist-mounted GENEActiv accelerometer for one week. **Results:** For 1-, 15-s, and 10-min EL, children accumulated 116.29 (SD=30.56), 21.59 (SD=12.29), and 0.04 (SD=0.56), moderate-to-vigorous physical activity minutes/day, respectively, with no MVPA for 30 and 60 minutes. The shorter the EL, the more children met physical activity guidelines; 85.7%, 32.9%, and 0.4% of children met physical activity guidelines at 1-, 5-, and at 15-s ELs, respectively. For the two shortest ELs, there were no sex differences, whereas from 3- to 13-s EL, boys had higher prevalence than girls. The strongest correlation between moderate-to-vigorous physical activity and BMI z-score was around 6-s EL (for boys between 8-10-s ELs ($r=-0.070$ to $r=-0.072$), for girls between 3-6-s EL ($r=-0.034$ to $r=-0.037$)). **Conclusions:** For this sample, around 5+/-1-s seems the most appropriate EL for physical activity in children. For generalizability, replication with other samples is needed. The very short EL's and the sex difference's impact on morbidity and mortality should be further investigated. **Funding:** National Institute of Food and Agriculture, U.S. Department of Agriculture, award number 2012-68001-19603.

Keywords: Children, Physical Activity, Measurement, Epoch, Bouts

Oral Presentation B4.6 Teachers' perspectives on using data from wearable technologies to inform school-based physical activity

11:50 am - 12:00 pm (London, England, Wednesday, October 13, 2021)

Georgina. K. Wort¹, Gareth Wiltshire², Oliver Peacock¹, Simon Sebire³, Andy Daly-Smith⁴, Dylan Thompson¹

¹Department for Health, University of Bath, ²School of Sport, Exercise and Health Sciences Loughborough University, ³School for Policy Studies, University of Bristol, ⁴Faculty of Health Studies, University of Bradford

Background: Many children are not engaging in sufficient physical activity, with vast between-children inequalities. Schools play a vital role in instilling long-term behaviours. As wearable technologies increase in popularity, data-drive decision making has the potential to inform and develop teachers' practices. **Purpose:** To study teachers' perspectives on the use of physical activity from wearable technologies, and whether the use of devices in schools would be feasible and acceptable to teachers. **Methods:** Secondary data from a commercial wearable technology company was analysed. The data came from 35 schools, 1234 pupils. Graphs were developed to illustrate children's in-school physical activity and used in semi-structured interviews with 26 UK-based primary school teachers, exploring their responses to data and opinions on wearable technologies within schools. Interview transcripts were thematically analysed. **Results:** Most teachers spoke positively about the use of wearable technologies specifically designed for school use, highlighting the potential benefits, as well as considerations. Teachers demonstrated comprehension of the graphs presented and provided explanations for the within-and-between school differences and inequalities in physical activity. Teachers' responses to the data included those that were rationalising, emotional, and which suggested a change in intentionality. **Conclusions:** Device-measured physical activity data can be communicated effectively to teachers. Illustrations elicited strong responses from teachers and thus could be used to inform teachers' behaviours and school practices, with the aim to address in-school physical inactivity and inequalities. **Funding:** GKW is funded by the Economic and Social Research Council (ESRC).

Keywords: Physical Activity, Children, Wearable Technology, Primary School, Teacher's Views

Oral Presentation B4.7 Which activity domain contributes most to (changes in) accelerometer-assessed moderate-to-vigorous physical activity in young people?

12:00 pm - 12:10 pm (London, England, Wednesday, October 13, 2021)

Erika Ikeda¹, Justin Guagliano², Andrew Atkin³, Lauren Sherar⁴, Bjørge Hansen^{5,6}, Ulf Ekelund⁶, Esther van Sluijs¹

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Background: Physical activity (PA) declines during childhood. Important sources of PA are active travel, organized sport and physical education (PE), but it is unclear which domain contributes most to improving and maintaining PA. **Purpose:** To examine cross-sectional and longitudinal associations between domain-specific PA (active travel, organised sport and PE) and daily moderate-to-vigorous PA (MVPA) in children and adolescents. **Methods:** Participants (8.5-18 years at baseline) were drawn from three studies in the International Children's Accelerometry Database (ICAD); n=3871 and n=2302 were included in cross-sectional and longitudinal analyses, respectively. Accelerometer-measured MVPA was regressed on self-reported standardised active travel, organised sport and PE in separate linear regression models, adjusted for study, age, sex, maternal education, season, and monitor wear time. Longitudinal analyses regressed changes in MVPA on baseline PA domain, additionally adjusted for change in season and wear time, follow-up duration, and baseline MVPA. R-squared was used to compare variance explained by each PA domain. **Results:** Cross-sectionally, organised sport showed the strongest magnitude of association (beta coefficient=3.81, p<0.001; R-squared=23.4%), then active travel (3.46, p<0.001; 23.2%) and PE (0.82, p>0.05; 21.5%). Associations followed a similar pattern in longitudinal analyses, albeit all non-significant. **Conclusions:** Childhood participation in organised sport contributed more to MVPA than active travel and PE cross-sectionally, but none of the PA domains predicted change in MVPA. A wide range of PA domains should be promoted to minimise the age-related decline in MVPA during childhood. **Funding:** UK Medical Research Council [MC_UU_00006/5].

Keywords: Active Travel, Organised Sport, Physical Education, Accelerometry, Harmonisation

Oral Presentation B4.8 A systematic review of staff training in school-based interventions targeting student physical activity behaviour

12:10 pm - 12:20 pm (London, England, Wednesday, October 13, 2021)

Mairead Ryan¹, Olivia Alliot¹, Erika Ikeda¹, Riikka Hofmann², Esther van Sluijs¹

¹Medical Research Council Epidemiology Unit, University of Cambridge, UK, ²Faculty of Education, University of Cambridge, UK

Background: Evaluations of school-based physical activity (PA) interventions suggest limited effectiveness on children's device-measured PA, partially due to poor implementation. Teacher-led implementation is common but the training provided to teachers is poorly understood and may affect implementation and effectiveness. **Purpose:** To systematically review the content of teacher training within interventions and examine associations between training characteristics, intervention fidelity and student PA outcomes. **Methods:** We searched seven databases (MEDLINE, ERIC, ASSIA, EMBASE, Scopus, Web of Science, and SPORTDiscus) from Jan2015-May2020 for randomised controlled trials of teacher-led school-based PA interventions. Publications had to report on teacher fidelity or device-based PA outcomes. Pilot, feasibility and small-scale (≤100 students) trials were excluded. Study authors were sent requests for additional information on teacher training following data extraction using the Template for Intervention Description and Replication checklist. Training content was coded using the Behaviour Change Technique (BCT) Taxonomy v1. **Results:** 69 papers describing 52 interventions delivered in 1,052 schools were included. Teacher training incorporated 5.17 (±3.16) BCTs; 'Instruction on how to perform the behaviour' (98%) and 'Social support (unspecified)' (52%) were the only frequently identified BCTs (minimum 50%). Teacher training was poorly reported and not underpinned by professional

development or behavioural science literature. Analysis is on-going. **Conclusions:** Teacher training in school-based PA interventions is generally poorly reported. Data suggests that few BCTs are used to promote behaviour change amongst teachers. Findings may help to explain implementation failures and lack of effect. **Registration:** PROSPERO 2020 CRD42020180624. **Funding:** This work was supported by the *Economic and Social Research Council* [grant number ES/P000738/1]; the NIHR School of Public Health Research [grant number: SJAI/126 RG88936], the University of Cambridge; and the Medical Research Council [grant number: MC_UU_00006/5].

Keywords: School, Physical Activity, Systematic Review, Teacher, Implementation

Oral Presentations Session B5

Oral Presentation B5.1 The association between sleep, physical activity, and cognitive performance among young office workers

11:00 am - 11:10 am (London, England, Wednesday, October 13, 2021)

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Background: Sleep is essential in maintaining a healthy lifestyle, which is primitive in the recovery of the body and brain. Many studies have shown a high prevalence of sleep disturbances among Saudis. However, little is known about the impact of sleep quality and quantity on cognitive functioning along with physical activity among Saudi office workers. **Purpose:** To investigate the association between sleep duration, sleep quality, cognitive performance, and physical activity among office workers. **Method:** Cross-sectional study was utilized to assess the association between study variables. Sleep quality and Physical activity were assessed using the Pittsburgh sleep quality index (PSQI) and the Global Physical Activity Questionnaire (GPAQ). Cognition was evaluated using Montreal cognitive assessment (MOCA) and Reaction time using a smartphone application. Data were analyzed using the Spearman Correlation coefficient. **Results:** 67 healthy office workers (age 28.9±5.4 years, Sex= 51F/16M, BMI= 25.3 ± 5.4). The mean of PSQI, sleep duration, GPAQ, MOCA, and reaction time were 6.5± 2.6, 6.1±2 hours, 2341.2±1968.2 MET, 19.4±9.8, and 344.3±112.8 milliseconds, respectively. There was a significant negative correlation between PSQI and MOCA ($r=-.2$, $p=.05$). There was no significant association among other variables. **Conclusion:** Poor sleep quality was associated with lower cognitive performance in young office workers independent of physical activity level. Thus, in addition to the promotion of physical activity, we might want to promote healthy sleep to increase cognitive performance. **Funding:** Not funded.

Keywords: Sleep, Physical Activity, Cognitive Performance

Oral Presentation B5.2 "Mind the step, step the mind" – conceptualizing a cognitively enriched walking program for older adults

11:10 am - 11:20 am (London, England, Wednesday, October 13, 2021)

Pieter-Jan Marent^{1,2}, Arwen Vangilbergen^{1,2}, Melanie Beeckman², Sebastien Chastin^{2,3}, Greet Cardon², Jannique G. Z. van Uffelen¹

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Background: Simultaneous performance of physical and cognitive activity has a beneficial impact on cognitive function in older adults. However, most studies examined this effect under controlled laboratory conditions. **Purpose:** This translational research aimed to co-create a real-life, cognitively enriched walking program for older adults (65+) by investigating (a) which cognitive tasks are most suited for a walking program, and (b) how to embed these tasks into a feasible, enjoyable and effective program. **Methods:** First, 34 academic experts discussed the key characteristics of the program in a Delphi procedure. Next, 535 end users provided feedback and suggestions by means of a survey. Finally, 163 older adults tried out and evaluated 32 cognitive tasks during a walking session. **Results:** This study resulted in the following recommendations. Provide a range of cognitive tasks primarily targeting executive functioning and higher-order thinking as well as memory and learning. Integrate the tasks in the walk and ensure there is enough variation and differentiation to appropriately adjust cognitive demands for each participant. To be effective, the tasks should be the main component of the walk, accompanied by a warming-up and cooling-down. Minimum session frequency should be twice a week and competition can be occasionally included. Finally, ensure a safe walking environment and keep the walks fun. **Conclusions:** This study co-created a real-life, cognitively enriched walking program for older adults. Clear recommendations are provided to guide the next steps in the program development and evaluation. **Funding:** Research Foundation of Flanders (FWO) (G009819N).

Keywords: Real-Life, Prevention, Cognition, Physical Activity

Oral Presentation B5.3 Associations between device-measured physical activity and incident dementia: a prospective study

11:20 am - 11:30 am (London, England, Wednesday, October 13, 2021)

Fanny Petermann-Rocha^{1,2}, Donald M. Lyall¹, Stuart R Gray², Jason M. R. Gill², Naveed Sattar², Paul Welsh², Terence J. Quinn², William Stewart³, Jill P. Pell¹, Frederick K. Ho¹, Carlos Celis-Morales^{2,4,5}

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Rendimiento Humano, Grupo de Estudio en Educación, Actividad Física y Salud (GEEAFyS), Universidad Católica del Maule, Talca, Chile

Background: Previous cohort studies have investigated the relationship between self-reported physical activity (PA) and dementia. Evidence from objective device-measured PA data is lacking. **Purpose:** To investigate the association of device-measured PA with the risk of dementia incidence using the UK Biobank study. **Methods:** 84,854 participants (55.8% women) were included in this prospective cohort study. Wrist accelerometers were used to measure total, light, moderate, vigorous and moderate-to-vigorous PA (MVPA) in MET/min/week. Nonlinear associations were first investigated using penalised cubic splines fitted in the Cox proportional hazard models. In addition, using MVPA, five categories were created. Associations of these categories with the outcomes were investigated using Cox proportional hazard models. **Results:** After a median follow-up of 6.3 years, 678 individuals were diagnosed with dementia. Evidence of nonlinearity was observed for all PA modes and all-cause dementia. For categories of MVPA, there was a significant trend towards a low risk of overall dementia when higher levels of MVPA were achieved (HR_{trend} : 0.66 [95% CI: 0.62 to 0.70]). Individuals who performed more than 1,200 MET/min/week had 84% (95% CI: 0.12 to 0.21) lower risk of incident dementia compared to those who performed <300 MET/min/week. **Conclusion:** Participants with higher PA levels had a lower risk of incident dementia than those less active, independently of confounding factors. **Funding:** None.

Keywords: Accelerometer, Dementia, Physical Activity

Oral Presentation B5.4 The relation between accelerometer-derived physical activity and brain structure: A population-based study

11:30 am - 11:40 pm (London, England, Wednesday, October 13, 2021)

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Background: Physical activity (PA) promotes neuroplasticity in animals, but human studies examining the relation between PA and brain health are inconclusive. **Purpose:** To assess whether PA is associated with brain structure in a large cohort study. **Methods:** Analyses were based on cross-sectional baseline data of 2,649 participants (57.6% female; mean age: 54.7 years, range: 30–94 years) with valid PA and MRI measurements of the Rhineland Study, a prospective cohort study in Bonn (Germany). Metabolic equivalent (MET)-hours, step counts and minutes as well as sedentary, light-intensity and moderate-to-vigorous activities were recorded over 7 days with accelerometers. Brain volumetric and cortical thickness measures were obtained from 3T MRI scans using FreeSurfer. The relation of PA (predictor) and brain structure (outcome) was examined with multivariable regression, while adjusting for age, sex, education, intracranial volume and smoking. **Results:** MET-hours were associated with greater grey matter volume and precentral thickness. Whereas total brain and grey matter volume increased with more light-intensity activities (Figure 1A), lateral-occipital thickness decreased (Figure 1B). With increasing age, light-intensity activities displayed a stronger effect on total brain volume, but a weaker effect on lateral-occipital volume (Figure 1C&D). In vertex-wise analysis, PA was associated with larger cortical thickness in frontal and temporal areas, but lower thickness in parietal and occipital areas. **Conclusions:** PA showed a non-uniform association with several volumetric and cortical thickness measures. It may particularly benefit motor regions and contribute to preventing age-associated brain atrophy. **Funding:** This study was supported by DZNE institutional funds.

Keywords: Cohort Study, Accelerometry, MRI

Oral Presentation B5.5 Examining the Effects of Exercise and Functional Imagery Training on Quality of Life in POTS: Feasibility study

11:40 am - 11:50 am (London, England, Wednesday, October 13, 2021)

Karol Nedza¹, Jonathan Rhodes¹, Carl Turner², Darren Crocker², Jon May¹

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Background: Postural Orthostatic Tachycardia Syndrome (POTS) is a cardiac condition impacting circulation and it is life-changing for many patients. **Purpose:** This feasibility study evaluates the potential for improving Quality of Life (QOL) in POTS patients with cognitive and motivational imagery combined with exercise. **Methods:** Participants (n=12) diagnosed with POTS were randomised into one of three groups: a wait-list control group; an exercise only group (Exercise), and Functional Imagery Training with exercise (FIT) group with the interventions lasting for six weeks. During an initial interview, participants discussed their POTS symptoms, current exercise, medications, and goals, and were measured for vividness of visual imagery (VVIQ) and QOL on the WHOQOL-BREF. After the intervention, a concluding evaluation exploring goals and again the WHOQOL-BREF was administered. **Results:** The scores at baseline were similar between conditions for VVIQ and each of the QOL domains. After six weeks, the control did not change across any QOL scores, but both intervention conditions did. Both experimental conditions; Exercise and FIT, improved on physical health. Uniquely, the FIT group improved on psychological health and furthermore during evaluations reported higher adherence to exercise and lower reliance on medication. **Conclusions:** We suggest that goal centred motivational imagery coupled with other interdisciplinary methods including exercise is an effective method to improve the QOL in POTS. We propose that this interdisciplinary method should be investigated in long-term clinical trials. **Funding:** The authors received no financial support for the research, authorship, and/or publication of this article.

Keywords: POTS, Postural Orthostatic Tachycardia Syndrome, Functional Imagery Training, Quality of Life, Exercise

Oral Presentation B5.6 The impact of Functional Imagery Training on adherence to treatment, completion of rehabilitation exercise plan and confidence in recovery in sports therapy patients: pilot study

11:50 am - 12:00 pm (London, England, Wednesday, October 13, 2021)

Karol Nedza¹, Jon May¹

¹University of Plymouth, UK

Background: Patients' adherence to physical therapy can be as low as 50% (Silva, 2010); with many reasons why patients decide to drop out. Imagery use has been linked with rehabilitation adherence during the therapy process. **Purpose:** This study aims to test whether Functional Imagery Training (a novel method combining elements of motivational interviewing with goal-oriented imagery) can improve adherence to the treatment, patients' confidence of recovery and completion of the exercise plan, in comparison to treatment-as-usual (control). **Methods:** Twenty participants (Mage= 41.3, SD = 13.7) were randomly allocated (single-blind) to either FIT or control conditions. FIT condition received a 30-minute session at their first visit to the physical therapy clinic. All participants completed questionnaires on adherence, confidence, percentage of the weekly exercise plan completed and whether they returned for further treatment, 2 and 4 weeks after their first visit. **Results:** The groups differed in percentage of exercise plans completed and confidence of recovery, but there was no interaction with time. The rehabilitation adherence scale was approaching significance with the groups differing at 4 weeks. At 4 weeks more of the FIT group returned for treatment. **Conclusions:** FIT can be utilised as an effective method in supporting the psychological aspects of physical therapy, such as adherence to treatment, confidence of recovery and completion of the exercise plan. We also theorise that the elements of imagery and personalised goal are key in promoting the adherence to exercise plans and completing essential exercises; further support comes from other trials of FIT. **Funding:** The authors received no financial support for the research, authorship, and/or publication of this article.

Keywords: Imagery, Intervention, FIT, Rehabilitation, Physical Therapy

Oral Presentations Session B6

Oral Presentation B6.1 Cardiorespiratory fitness in occupational groups — trends over 20 years and forecasting of future trends

11:00 am - 11:10 am (London, England, Wednesday, October 13, 2021)

Daniel Väisänen¹, Lena V. Kallings¹, Gunnar Andersson², Peter Wallin², Erik Hemmingsson¹, Elin Ekblom-Bak¹

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Background: Low cardiorespiratory fitness (CRF) is a strong, independent predictor for chronic disease risk as well as lower work capacity. However, trend analyses of CRF in relation to different occupational groups are missing. **Purpose:** To study trends in CRF during the last 20 years and forecast possible future trends in different occupational groups of the Swedish working population. **Methods:** Data from 516,122 health profile assessments performed in occupational health screening between 2001 to 2020 was included. CRF was assessed as maximal oxygen consumption and estimated from a submaximal cycling test. Analyses include CRF as a weighted average per five-year period in 12 different occupational groups, and standardized proportions with low CRF (<32 ml/kg/min) in four aggregated occupational categories (white- and blue-collar, as well as low- and high-skilled). Also, adjusted annual change in CRF in the total population as well as by sex and age-group, also a forecast of future trends in CRF until 2040, are presented. **Results:** The largest decrease in both absolute and relative CRF were seen for *Admin and customer service* (-10.1% and -9.4%), *Mechanical manufacturing* (-6.5% and -7.8%) and *Education* (-4.8% and -7.3%) occupations. The greatest annual decrease was seen in *Transport* occupations (-1.62 ml/kg/min, 95% CI -0.190 to -0.134). Men and younger individuals (18-34 years) had in general a more pronounced decrease in CRF. All aggregated groups had an increase in the proportion with low CRF, with the greatest increase in blue-collar and low-skilled occupations, 16% to 21% relative change. Forecast analyses predict a continued downward trend of CRF, especially in low-skilled occupations of both white- and blue-collar occupational groups. **Conclusion:** There was a general trend of a decreasing CRF in all occupational groups, however the trend was more pronounced in blue-collar and low-skilled occupational groups. Structural changes at the workplaces and in society are needed to stop the downward trend in CRF. **Funding:** This work was supported by The Swedish Research Council for Health, Working Life and Welfare <https://forte.se/en/> (Grant no 2018-00384) and The Swedish Heart-Lung Foundation <https://www.hjartlungfonden.se/HLF/Om-Hjart-lungfonden/About-HLF/> (Grant no 20180636).

Keywords: Trends, Cardiorespiratory Fitness, Forecast, Occupational Groups, Occupation

Oral Presentation B6.2 Sitting behaviour whilst working from home: how much sitting, and how can we reduce it?

11:10 am - 11:20 am (London, England, Wednesday, October 13, 2021)

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Background: There is strong evidence that sedentary behaviour has adverse health consequences, and occupational sitting makes a large contribution to daily sedentary time. In the UK, Covid-19 restrictions have meant that significant proportions of the working population have been required to work from home. It is probable that working from home will have resulted in an increase in the occupational sitting of many workers, as they may sit at screens for longer; have more on-line meetings; no longer commute to and

from work and meetings; and have fewer occupational reasons for leaving their workspace. To date, there is a dearth of research focusing on occupational sitting in the home environment. **Purpose:** To assess occupational sitting behaviour whilst working at home, and use the Capability Opportunity Motivation- Behaviour (COM-B) theory to identify the factors that are perceived to be most influential on worker's ability to reduce the time they spend sitting. These findings will be used to inform intervention strategies. **Methods:** University staff (n=332; 73% female) who were predominantly working from home (M=95.6; SD=14.6 % of working week) completed an online questionnaire that included the Occupational Sitting and Physical Activity Questionnaire (OSPAQ), and a 7-item COM-B questionnaire to assess perceived influences on ability and willingness to reduce time spent sitting whilst working from home on a 10-point scale (strongly disagree-strongly agree). OSPAQ data were analysed descriptively, and a repeated measures ANOVA with post-hoc paired sample t-tests (with Bonferroni correction) and Cohen's d calculations were undertaken to determine differences between the scores on the COM-B items. **Results:** Staff spent on average 89% (395 minutes/day) of their time sitting whilst working at home. There were significant and meaningful differences in the perceived influences on worker's ability and willingness to reduce their sitting behaviour ($p < .01$; $\eta^2 = .38$). Specifically, participants perceived that they were least able to automatically reduce their sitting behaviour (M=3.19; SD=2.8), and that they had limited social (M=5.14; SD=3.1) and physical opportunity (M=5.66; SD=3.2) to reduce their sitting. Participants scored highest on perceived physical capability (M=8.71; SD=1.98) and knowledge (M=7.16; SD=2.5). **Conclusions:** University staff have high levels of occupational sitting whilst working from home, which may lead to detrimental health consequences. The findings from this study provide an indication of the factors that influence worker's ability to reduce their sitting time, and it would be appropriate to develop strategies focusing on these factors. For example, encouraging habit formation/reversal to increase automaticity of the behaviour, creating physical opportunities through restructuring the physical environment (e.g., provision of standing desk), and generating opportunities for social opportunities through restructuring the social environment (e.g., senior colleagues demonstrating the behaviour). **Funding:** The research was unfunded.

Keywords: Adults, Sedentary Behaviour, Behaviour Change, Psychology

Oral Presentation B6.3 Co-production at work: The process of breaking up sitting time

11:20 am - 11:30 am (London, England, Wednesday, October 13, 2021)

Thomas Griffiths¹, Diane Crone¹, Mike Stembridge¹, Rachel Lord¹

¹Cardiff Metropolitan University

Background: Prolonged sitting has harmful effects on cardiovascular disease biomarkers, independent of physical activity (PA). Current workplace PA interventions to overcome this have poor uptake and adherence. Co-production attempts to improve the translation of evidence to practice through engaging the participants within the intervention design, improving context sensitivity and acceptability of the intervention. **Purpose:** Co-produce a contextually sensitive PA workplace intervention focused on breaking up sitting time. **Methods:** Initial 'needs analysis' was conducted to gather a scope on current PA and sitting engagement as well as attitudes on PA to break up sitting time in office-based workers (n=157). A development group (n=11) were presented with the findings and a feasible intervention was co-produced through consultations in focus groups and reflective practices, before being piloted. The development group met following the pilot, to feedback and refine the intervention. **Results:** 1.8% reported engaging in occupational PA, and 68.7% reported sitting for 6+ hours during their working day. An intervention encompassing breaking up sitting time hourly with five-minute walking breaks was co-produced, resulting in the frequency of breaks from being sedentary increasing from 2 to 11 in week two. **Conclusions:** 'Needs analysis' highlighted cultural and pragmatic issues regarding the impact on "work flow" and frequency of the PA breaks. A co-production approach enabled the opportunity for a unique research and stakeholder guided compromise. Subsequent work is required before conclusions on feasibility and effectiveness can be made. **Funding:** First author is a KESS 2 funded PhD student.

Keywords: Co-production, Workplace, Physical Activity, Sitting Time

Oral Presentation B6.4 Effects on Activity Outcomes of an e-Health Smartphone Intervention to Reduce Office Workers' Sitting Time

11:30 am - 11:40 am (London, England, Wednesday, October 13, 2021)

Abigail S. Morris^{1,2}, Kelly Mackintosh¹, David Dunstan³, Neville Owen³, Paddy Dempsey^{3,4,5}, Thomas Pennington¹, Melitta A. McNarry¹

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Background: Occupational sedentary time is the largest contributor to total weekday sitting time among office workers. **Purpose:** This feasibility study evaluated the effects of an individual-level intervention to target office workers total and prolonged sedentary behaviour during working hours, using an e-health smartphone application. **Methods:** A three-arm (Prompt-30 or 60 min Intervention arm and a No-Prompt Comparison arm), quasi-randomised intervention was conducted over 12 weeks. Behavioural outcomes (worktime sitting, standing, stepping, prolonged sitting, and physical activity) were monitored using accelerometers and anthropometrics measured at baseline, 6 weeks and 12 weeks. Cardiometabolic measures were taken at baseline and 12 weeks. **Results:** Fifty-six office workers (64% female) completed baseline assessments. The Prompt-60 arm was associated with a reduction in occupational sitting time at 6 (-46.8 min/8 h workday [95% confidence interval = -86.4, -6.6], $p < 0.05$) and 12 weeks (-69.6 min/8 h workday [-111.0, -28.2], $p < 0.05$) relative to the No-Prompt Comparison arm. Sitting was primarily replaced with standing in both arms ($p > 0.05$). Both Intervention arms reduced time in prolonged sitting bouts at 12 weeks (Prompt-30: -27.0 [-99.0, 45.0]; Prompt-60: -25.8 [-98.4, 47.4] min/8 h workday; both $p > 0.05$). There were no changes in steps or cardiometabolic risk. **Conclusions:** Findings highlight the potential of a smartphone e-health application, suggesting 60

min prompts may present an optimal frequency to reduce total occupational sedentary behaviour. **Funding:** Get a Move On Network+, EPSRC, Grant Number EP/N027799/1.

Keywords: Physical Activity, Sedentary Behaviour, Workplace, Intervention, Feasibility

Oral Presentation B6.5 Sit Less and Move More: A pilot multi-component randomised controlled trial among UK call agents

11:40 am - 11:50 am (London, England, Wednesday, October 13, 2021)

Abigail S. Morris¹, Rebecca C. Murphy², Nicola D. Hopkins², Paula M. Watson², David Low², Genevieve N. Healy^{3,4,5}, Charlotte L. Edwardson^{6,7}, Brendan Collins⁸, Hannah Timpson⁹, Sam O. Shepherd², Madeleine Cochrane¹⁰, David Gavin², Lee E. F. Graves²

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Background: Call centres workers spend up to 90% of their workday seated, often in prolonged periods (≥ 30 minutes) which can be detrimental to health, wellbeing and productivity. **Purpose:** To pilot a multicomponent intervention to sit less and move more, with (SLAMM+) and without (SLAMM) height-adjustable workstations, in contact centre call agents. **Methods:** Agents were individually randomized to SLAMM or SLAMM+ in this 10-month pilot trial. A mixed-methods evaluation assessed response, recruitment, retention, attrition and completion rates, adverse effects, trial feasibility and acceptability, preliminary effectiveness on worktime sitting, and secondary (cardiometabolic, wellbeing and work-related) outcomes. Intervention components were informed by formative research and underpinned by the COM-B model. **Results:** Intervention phases were mostly acceptable, though fluctuating call volumes impacted fidelity. Fifty-nine agents (68% female, 30.9 ± 11.6 years) completed baseline. High staff turnover negatively impacted retention and completion rates. Agents ranked individual feedback, education sessions, and emails as the most important components for sitting less and moving more. The multicomponent intervention with height-adjustable workstations has potential to reduce total and prolonged sitting time at work over 3 and 10-months. More strategies are warranted to promote physical activity. **Conclusions:** Both interventions were mostly acceptable and feasible for promoting a reduction in total workday sitting time. The demonstrated findings will help prepare for a future randomized controlled trial designed to assess the effect of the interventions. **Funding:** Liverpool John Moores University, Research Institute of Sport and Exercise Sciences.

Keywords: Physical Activity, Sedentary Behaviour, Workplace, Intervention, Pilot

Oral Presentation B6.6 A process evaluation of co-produced “Sit Less at Work” interventions in three diverse organisational settings

11:50 am - 12:00 pm (London, England, Wednesday, October 13, 2021)

Kelly Mackenzie¹, Elizabeth Such¹, Paul Norman², Elizabeth Goyder¹

¹School of Health and Related Research, University of Sheffield, UK, ²Department of Psychology, University of Sheffield, UK

Background: Prolonged workplace sitting is associated with increased risks of morbidity and mortality. Interventions to reduce workplace sitting time have demonstrated mixed results, suggesting context may play an important role. **Purpose:** To conduct a process evaluation to determine the intervention fidelity of three co-produced “Sit Less at Work” interventions implemented in diverse organisations with minimal researcher involvement to replicate the real-world context. **Methods:** A mixed methods “before and after” study design was used. Convenience samples of staff were recruited from three UK-based organisations (a small private sector business, a charity and a local authority) to complete pre- and post-intervention questionnaires and measures of workplace sitting time (using activPAL3™ devices) and participate in post-intervention focus groups. Intervention implementers and key personnel were recruited to participate in post-intervention focus groups/interviews. **Results:** None of the interventions were implemented as intended and no reductions in workplace sitting time were observed. Barriers to intervention implementation related to context and organisational culture and included workload pressures, the social norms of sitting, competing organisational priorities, and lack of management support. **Conclusions:** Shifts in organisational culture and ingrained social norms are required to support the effective implementation of future workplace sit less interventions. Such changes could be achieved with buy-in from all levels of management, by developing and implementing local policies and by ensuring adequate time and human resource investment. **Funding:** This project was funded by the National Institute for Health Research Doctoral Research Fellowship Programme (individual grant, DRF-2016-09-023).

Keywords: Sedentary Behaviour, Sitting Time, Occupational, Workplace, Process Evaluation

Oral Presentation B6.7 The effect of combined exercise program to emergency service workers on physical activity level

12:00 pm - 12:10 pm (London, England, Wednesday, October 13, 2021)

Gunseli Usgu¹, Ibrahim Halil Özdemir²

¹Faculty of Health Science Department of Physical Therapy and Rehabilitation, Hasan Kalyoncu University, ²Tosya State Hospital

Background: Physical fitness parameters of emergency service workers are closely related to their work performance. In these services, where the workload is excessive, the exercise habits of the workers are limited. **Purpose:** The study aimed to investigate the effect of the supervised combined exercise program applied to emergency service workers on physical activity and weekly step

counts. **Methods:** Individuals working in the emergency service were divided into two groups as control group (CG) (n=29) and exercise group (EG) (n=25) by simple random method. Supervised combined exercise training (45 min a day/ 3 days a week/ 8 weeks) was given to the EG, no exercise program was given to the CG. Physical activity level (PAL) was assessed by self-administered International Physical Activity Questionnaire short form (IPAQ-S), daily step count evaluated by the pedometer program on individual smartphones at baseline and after the 8 weeks training. **Results:** IPAQ-S score was higher in the EG than the CG after 8 weeks of training ($p<0.01$). In the comparison of the weekly number of steps in the EG, there was an increment between the 2nd-1st week ($p=0.019$) and 6th-5th week ($p=0.041$), no changes were observed in the other weeks ($p>0.05$). The weekly step counts were higher in the EG ($p<0.05$). **Conclusions:** Combined exercise training was effective on PAL in emergency service workers. Group-based exercise programs should be implemented to work hours for aiming the improvement overall health of healthcare professionals. **Funding:** No financial funding was received for the study.

Keywords: Emergency Service Workers, Exercise Therapy, Physical Activity

Oral Presentation B6.8 Investing in musculoskeletal health brought significant savings to Oulu University Hospital

12:10 pm - 12:20 pm (London, England, Wednesday, October 13, 2021)

Miia Malvela¹, Minna Keskitalo², Oili Ojala², Jyrki Komulainen¹

¹Adults on the Move Programme, LIKES Research Centre for Physical Activity and Health, Jyväskylä, Finland, ²Oulu University Hospital, Oulu, Finland

Background: Adults on The Move Programme (AMP) is aiming to influence structures and operational cultures to ensure that the working-age population is physically active. The careers of Finns are most often cut short by musculoskeletal disorders (31%) as well as mental health problems (33%). Oulu University Hospital (OYS) implemented a four-year project to promote musculoskeletal health in co-operation with AMP. In OYS, the main reason for sick leave were musculoskeletal disorders (39%). **Purpose:** The aim was to manage work ability risks and reduce sick leaves by strengthening musculoskeletal health. To achieve the level of physical condition required for work, to cope well at work and to have resources left for free time. **Methods:** Supervisors work ability management skills were developed. Based on workload measurements and work ability risks, employees were given a advise and support how to improve physical condition and lifestyle or reduce workload through restorative exercise. **Results:** Employees increased exercise, lost weight, reduced stress and improved recovery. Absences from musculoskeletal disorders decreased by more than 2900 days. In money this means a saving of 872 400 euros (300 euros/day). **Conclusion:** Health and work ability management is included in strategy and financial planning. The employees' motivation and responsibility for physical activity and healthy lifestyle has increased. The well-established activities and good practices have been continued since the end of the project. **Funding:** Funded by AMP (formerly Fit for Life Program).

Keywords: Work Ability, Work Ability Management, Physical Condition, Musculoskeletal Health

Oral Presentations Session B7

Oral Presentation B7.1 Objectively assessed physical activity in the context of pacing behaviour in adults with multiple sclerosis

11:00 am - 11:10 am (London, England, Wednesday, October 13, 2021)

Ulric S. Abonie^{1,2}, John Saxton³, Katherine Baker³, Florentina J. Hettinga^{2,3}

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Background: Activity pacing has the potential to change physical activity (PA) behaviour, and reduce the high prevalence of physical inactivity in people with multiple sclerosis (MS). However, little is known about the association between PA behaviour and naturalistic pacing in this population. **Purpose:** To explore association between PA behaviour and naturalistic pacing in adults with MS. **Methods:** 21 people with MS (mean age= 59 ± 9 years) wore an accelerometer that measured free-living PA behaviour for 7 days and filled in questionnaires on their activity pacing, fatigue, and health-related quality of life (HRQoL). PA behaviour was assessed by examining activity level and activity variability (an index of activity pattern). Associations between the variables were examined using hierarchical regression. **Results:** Activity level, activity variability, engagement in pacing, fatigue and HRQoL were 241.07 (144.68), 3.96 ± .72, 3.25 ± .74, 4.75 ± 1.62 and 42.66 ± 8.13 respectively. Lower activity level was negatively associated with higher engagement in pacing ($\beta = -.438$, $t = -2.66$, $p = .024$), whereas there was no association between activity variability and engagement in pacing ($\beta = -.225$, $t = -.96$, $p = .361$). **Conclusion:** The negative association between activity level and activity pacing suggests that those with lower activity levels could be inappropriately using activity pacing as a reactionary response to their symptoms. As PA can help to prevent physical deconditioning and improve MS symptoms, further research into activity pacing as a potential strategy for increasing PA levels in people with MS is warranted. **Funding:** None.

Keywords: Activity Pacing, Multiple Sclerosis, Accelerometry

Oral Presentation B7.2 Physical activity and sleep of patients treated for Anorexia Nervosa

11:10 am - 11:20 am (London, England, Wednesday, October 13, 2021)

Billy Langlet¹, Fannie Vestermark¹, Modjtaba Zandian¹, Josefin Solt², Cecilia Bergh^{1,2}, Per Södersten¹

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Background: Methods for studying physical activity and sleep in anorexia nervosa vary, preventing comparison. However, most studies suggest physical activity and sleep behaviour influence treatment outcomes in anorexia nervosa. **Purpose:** Transparent reporting of physical activity and sleep behaviour in anorexic patients at the beginning of treatment. **Methods:** 43 female anorexia nervosa patients at an in-patient ward were recruited. Within eight days of admission participants wore a three-axis accelerometer (Axivity) for a week. The first and last day were omitted. Data was analysed with the R package GGIR, with acceleration expressed in Euclidean norm minus one (ENMO). **Results:** After exclusion due to low compliance and corrupt data 28 participants remained. Their mean (SD) age was 17.8 (7.0) years and age adjusted BMI was 15.9 (3.8) kg/m². Mean sleep duration was 7.1 (0.8) h and sleep efficiency was 90 (4) %. Twenty-three participants did not reach sleep duration recommendations, with the largest discrepancy seen in young patients ($p < 0.001$). Daytime ENMO was 16.5 (3.7) mg and the highest coherent 30-minute ENMO bout was 47.3 (11.3) mg. There was no significant correlation across the five days in duration and efficiency of sleep, daytime ENMO or highest coherent 30-minute ENMO bout. **Conclusion:** Physical activity can be kept low and sleep quality high in an in-patient ward for anorexic patients. Sleep duration might be a problem, especially for younger individuals, where treatment need to account for their increased sleep requirements. There appears to be no habituation effect during treatment. **Funding:** The Mandometer clinics.

Keywords: Anorexia Nervosa, Physical Activity, Eating Disorder, Sleep, Treatment

Oral Presentation B7.3 Exploring exercise adherence in phase III cardiovascular rehabilitation post myocardial infarction

11:20 am - 11:30 am (London, England, Wednesday, October 13, 2021)

Alyx Taylor¹, Harvey Mormen²

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Background: Research evidence supports the use of exercise as an effective part of cardiovascular rehabilitation (CR), and for long-term reduction of risk factors for cardiovascular incidents. Research shows those who engage fully in CR exercise programmes build up stamina for activities they had previously enjoyed. The increased freedom and confidence can raise the overall quality of life. However, despite evidence of the efficacy of CR, only 15 – 30% of eligible patients attend and 50% of those discontinue the exercise by 12 months. **Purpose:** The study explored the experience of exercise prior to and during phase III CR to inform strategies to encourage maintenance of regular exercise as a lifestyle change. **Methods:** Qualitative data was collected from six volunteers (35–75 years), who had recently undertaken exercise prescribed in phase III CR, through one-to-one semi-structured interviews. Interpretive phenomenological analysis from a critical realist perspective was undertaken independently by two researchers. **Results:** Themes included potential keys to address the aim of the study. First, “incidental exercise”, revealed physical fitness was previously incidental to motivations for taking exercise, for example: to engage competitively; to engage in social interactions; or to relax through leisure activity. The themes “normality” captured the desire to regain former capabilities and “self-evaluation” the desire to regularly measure change in physical fitness, or compare oneself with others. **Conclusions:** Qualitative analysis revealed possible target areas for enhancing positive experience of exercise in phase III CR programmes and potentially encouraging lifestyle change. **Funding:** None.

Keywords: Cardiovascular Rehabilitation, Myocardial Infarction, Exercise Prescription, Exercise Referral

Oral Presentation B7.4 Exploring lived experience of sedentary behavior during cancer treatment - a phenomenological study

11:30 am - 11:40 am (London, England, Wednesday, October 13, 2021)

Anna Henriksson¹, Magnus Elfström¹, Anne Söderlund¹, Karin Nordin², Petra von Heideken Wägert¹

¹School of Health, Care and Social Welfare, Mälardalen University, Västerås, Sweden, ²Public Health and Caring Sciences, Uppsala University, Uppsala, Sweden

Background: Sedentary behavior (SB) increases during cancer treatment, which may have deteriorating effects on long-term health. Few studies exploring patients' experience of SB during neo- or adjuvant cancer treatment have been conducted, and this information may be crucial in developing effective support for patients to reduce SB. **Purpose:** To explore the lived experiences of SB in patients undergoing neo- or adjuvant cancer treatment and to explore the impact of the COVID-19 pandemic. **Methods:** Individual interviews were conducted with patients undergoing treatment for breast, prostate and colorectal cancer recruited from the oncological department of a university hospital in Sweden. Interviews were analyzed phenomenologically and results presented as descriptions of the phenomenon SB. **Results:** Preliminary results are that patients describe SB by depicting physical activity and awareness of its health benefits. Also, being inactive or sedentary is stigmatized. The type and phase of treatment, life circumstances (COVID-19 pandemic, sick leave) as well as motivation, social support, and self-image can impact SB during treatment. **Conclusions:** The results indicate that SB is difficult for patients to discern. This suggests that SB is an unimplemented concept in the cancer context and needs to be addressed in a way that does not stigmatize patients. The COVID-19 pandemic had both negative and positive impacts on SB for these patients. Furthermore, developing support that targets periods with more side-effects and helping patients reduce SB throughout changed life circumstances may be helpful. **Funding:** The Swedish cancer society.

Keywords: COVID-19, Experience, Oncology, Phenomenology, Sedentary Behavior

Oral Presentation B7.5 Effect of behavioural interventions in people with multimorbidity: a systematic review of randomised controlled trials

11:40 am - 11:50 am (London, England, Wednesday, October 13, 2021)

Alessio Bricca^{1,2}, Madalina Jäger^{1,2}, Marie Johnston³, Graziella Zangger^{1,2}, Lasse K. Harris^{1,2}, Julie Midtgaard^{4,5}, Søren T. Skou^{1,2}

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Southern Denmark, Denmark, ²The Research Unit PROgrez, Department of Physiotherapy and Occupational Therapy, Næstved-Slagelse-Ringsted Hospitals, Region Zealand, Denmark, ³Health Psychology Group, Institute of Applied Health Sciences, University of Aberdeen, ⁴University Hospitals Centre for Health Care Research (UCSF), Copenhagen University Hospital Rigshospitalet, ⁵Department of Public Health, Faculty of Health and Medical Sciences, University of Copenhagen

Background: More than half of the elderly population lives with multiple chronic conditions (i.e. multimorbidity). Physical activity is low in people with multimorbidity, although being a key behaviour for survival and overall health, alongside other lifestyle behaviours. However, the effect of behavioural interventions on behavioural, physical and psychosocial outcomes have not been summarised systematically in people with multimorbidity. **Purpose:** To investigate the effect of behavioural interventions targeting lifestyle behaviours on physical activity, weight loss, physical function, health-related quality of life and depression in people with multimorbidity and to investigate which Behaviour Change Techniques (BCTs) are associated with better outcomes. **Methods:** Systematic review of randomised controlled trials targeting lifestyle behaviours in people with multimorbidity defined as two or more of the following conditions: osteoarthritis (of the knee or hip), hypertension, type 2 diabetes, depression, heart failure, ischemic heart disease, and chronic obstructive pulmonary disease. Data sources included MEDLINE, EMBASE, CENTRAL and CINAHL up to June 19th, 2020 and screening reference list of Cochrane reviews including people with multimorbidity, ongoing systematic reviews of the MOBILIZE project, the WHO registry and citation tracking of included studies. Meta-analyses using random-effects model to assess the effect of behavioural interventions on physical activity, weight loss, physical function and health-related quality of life and depression. Meta-regression analyses and effectiveness ratios to investigate the impact of pre-specified mediators of effect estimates. Cochrane 'Risk of Bias Tool' 2.0 and the GRADE assessment to evaluate the overall quality of evidence. **Results:** Fourteen papers involving 1,378 people. Behavioural interventions had little to no effect on physical activity (standardised mean difference 0.38, 95%CI -0.12 to 0.87 – very low certainty) and the effect on weight loss was uncertain (BMI mean difference -0.17, 95%CI -1.17 to 0.83 – very low certainty) at the end-treatment follow-up (mean duration 23 weeks, SD 15). Small improvements were seen in health-related quality of life (SMD 0.29, 95% CI 0.17 to 0.42 – moderate certainty) and physical function (SMD 0.42, 95% CI 0.12 to 0.73 – low certainty), and moderate improvements were seen for depression symptoms (SMD -0.70, 95%CI -0.98 to -0.42 – moderate certainty) (Figure 1). Studies using the BCTs 'action planning' and 'social support (practical)' reported greater physical activity and weight loss. The effects of behavioural interventions diminished for all the outcomes at long-term follow-ups (mean duration of 36 weeks, SD 15). **Conclusions:** Behavioural interventions targeting lifestyle behaviours improve health-related quality of life and physical function, and reduce depression symptoms, whereas little to no effect was achieved on physical activity and weight loss in people with multimorbidity. However, the evidence for physical activity and weight loss were of low quality and the end-treatment benefits diminished over time. **Systematic review protocol:** Open Science Framework: <https://osf.io/r7pm5/>. **Funding:** European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (MOBILIZE, grant agreement No 801790), Næstved, Slagelse and Ringsted Hospitals' Research Fund and The Association of Danish Physiotherapists Research Fund. The funding source was not involved in any aspect of this systematic review protocol.

Keywords: Physical Activity, Behavioural Interventions, Multimorbidity

Oral Presentation B7.6 Impact of different training modalities/intensities on cardiorespiratory fitness and anthropometry of women living with obesity

11:50 am - 12:00 pm (London, England, Wednesday, October 13, 2021)

Mary E. Davis¹, Catherine Blake¹, Carla Perrotta¹, Caitriona Cunningham¹, Gráinne O'Donoghue¹

¹School of Public Health, Physiotherapy and Sports Science, University College Dublin, Belfield, Ireland

Background: Growing evidence suggests that improved cardiorespiratory fitness (CRF) can largely attenuate the adverse effects of excessive adiposity. However, the most effective exercise prescription to improve CRF, anthropometry and other metabolic risk factors in women living with obesity remains unknown. **Purpose:** To assess the efficacy of different exercise interventions on these outcomes and determine the optimal exercise prescription to improve the metabolic health of this population. **Methods:** A systematic review of randomised controlled trials (RCTs) published between January 1988 to October 2020 was conducted. The RCTs were screened using the inclusion criteria: 1) participants: women, aged 18 -65 years, with a BMI>30kg.m⁻² without co-morbidities; 2) intervention: exercise; 3) comparison: non-intervention control; 4) outcomes: measures: CRF (VO_{2max}), anthropometry (i.e. body weight, percentage body fat) and/or metabolic measures (i.e. blood pressure, cholesterol). **Results:** 20 RCTs with a total of 2062 participants were included. While the results show that any form of exercise is more effective than control, improvements in fitness and anthropometry are modest. Aerobic exercise (vigorous and moderate intensity) appeared most promising for improving fitness and body weight, while low-load resistance training resulted in the largest improvements in body fatness. **Conclusions:** In women living with obesity, aerobic exercise was consistently effective in improving fitness and anthropometrics. Though both resistance training and combined exercise interventions appear promising, more research is needed to evaluate their efficacy and determine an optimal exercise prescription for this population. **Funding:** Research funded by University College Dublin Centre for Translational Pain.

Keywords: Obesity, Women, Exercise Training, Fitness, Anthropometry

Oral Presentation B7.7 Association between selected psychosocial factors and physical activity amongst Stroke survivors in Ibadan, Nigeria

12:00 pm - 12:10 pm (London, England, Wednesday, October 13, 2021)

Ayodeji A. Fabunmi¹, Gabriel O. Oni¹

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Background: Stroke survivors are at risk of physical activity decline and psychosocial factors have been linked with

this. **Purpose:** Aim of this study was to determine association between selected psychosocial factors and physical activity among stroke survivors in Ibadan, Nigeria. **Methods:** This was a cross-sectional survey. Fifty-five stroke survivors were recruited from Physiotherapy clinics in three hospitals in Ibadan, Oyo State, Nigeria. Physical Activity Scale for Individuals with Physical Disabilities (PASIPD) was used to obtain information about physical activity of stroke survivors. Fatigue severity scale and Hospital anxiety and depression scale were used to collect data on level of fatigue, anxiety and depression respectively. Descriptive statistics of mean, standard deviation and percentages were used to summarize socio-demographic data. Spearman rank-order correlation was used to determine association between psychosocial factors and physical activity among stroke survivors. **Results:** Participants' mean age was 61.18 ± 11.73 years. Thirty-eight (69.1%) participants were males and 26 (47.3%) participants had tertiary education qualification. A significant negative association was observed between age, depression, fatigue and physical activity among stroke survivors ($r = -0.379, p = 0.008$; $r = -0.370, p = 0.006$; $p = -0.277, p = 0.049$) respectively. **Conclusions:** There is a significant negative association between age, depression, fatigue and physical activity of stroke survivors. A holistic approach should be adopted in the management of stroke survivors and special attention should be paid to onset of depression and fatigue. **Funding:** The fund for this research work was provided by the researchers.

Keywords: Adults, Stroke, Physical Activity, Fatigue, Anxiety, Depression

Oral Presentations Session B8

Oral Presentation B8.1 Moderating role of activity on body composition in hypertensive South African children in disadvantaged areas

4:35 pm - 4:45 pm (London, England, Wednesday, October 13, 2021)

Nandi Joubert^{1,2,3}, Cheryl Walter⁴, Rosa du Randt⁴, Ann Aerts⁵, Larissa Adams⁴, Jan Degen³, Stefanie Gall³, Ivan Müller³, Madeleine Nienaber⁴, Siphesihle Nqweniso⁴, Sarah des Rosiers⁵, Harald Seelig³, Danielle Smith⁴, Peter Steinmann^{1,2}, Nicole Probst-Hensch^{1,2}, Jürg Utzinger^{1,2}, Uwe Pühse³, Markus Gerber³

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Background: Childhood hypertension drives hypertension in later life; hence, assessing blood pressure in children is an important measure to determine current and future cardiovascular health. There is, however, a paucity of childhood blood pressure data, particularly for sub-Saharan Africa. **Purpose:** This study explores blood pressure and associations with age, sex, socioeconomic status, physical activity, fitness, and cardiovascular risk markers. **Methods:** In the 'Disease, Activity and Schoolchildren's Health' (DASH) study, a cross-sectional analysis was conducted in disadvantaged neighbourhoods in the Eastern Cape province of South Africa. Assessments included blood pressure, accelerometer-measured physical activity, physical fitness, and cardiovascular risk markers. **Results:** The study consisted of 785 children (383 boys, 402 girls, $M = 12.4 \pm 0.9$ years). Overall, 18% of the children were classified as hypertensive, while 20% were either overweight/obese, and almost four out of ten children did not meet global daily physical activity recommendations. Hypertensive children were more likely to be overweight/obese, $X^2(2,785) = 14.42, p < 0.01$, but only if they did not meet physical activity recommendations, $X^2(2,295) = 11.93, p < 0.01$ (Figure 1). **Conclusion:** Considering the moderating effect which sufficient activity has on the relationship between hypertension and body weight, more emphasis should be placed on holistic early primary health intervention and education strategies. **Funding:** This work was conducted within the scope of the Swiss-South African Joint Research Programme, jointly funded by the Swiss National Science Foundation and the National Research Foundation of South Africa. The cross-sectional study was further supported by the Novartis Foundation (Basel, Switzerland).

Keywords: Cardiovascular Risk Markers, Hypertension, Physical Activity, Physical Fitness, Schoolchildren, South Africa

Oral Presentation B8.2 Promoting physical activity among children from poor families: four case studies in the Netherlands

4:45 pm - 4:55 pm (London, England, Wednesday, October 13, 2021)

Linda Ooms¹, Vicky Dellas¹, Kirsten Gutter¹, Caroline van Lindert¹

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Background: Children from low-income families participate less often in physical activity than children from high-income families. In the Netherlands, cross-sectoral interventions were implemented to stimulate physical activity among children from poor families. **Purpose:** To get insight into the implementation and successfulness of these interventions with regard to increasing physical activity among the target group. **Methods:** Four interventions were studied during the two-year funded period. Group interviews were conducted one and two years after the start of the intervention with: 1) project coordinators and collaborating partners; 2) participating children; and 3) parents. The group interviews focused on implementation and reach of the intervention, involvement of parents, and factors influencing physical activity participation among the target group. **Results:** Interventions were often adapted to the local context. Furthermore, there was little collaboration with key figures in the neighborhood that were close to the target group. The target group was predominantly reached through providing physical activities at schools in low-income neighborhoods. Providing different physical activities and personal guidance, stimulated children's participation. However, a lack of follow-up activities and a lack of parent involvement, hindered structural physical activity participation. **Conclusions:** The target group can be reached with physical activity interventions. To enhance intervention effectiveness, it is important to involve parents and to ensure suited follow-up activities are available. Also, collaborations with key figures in the neighborhood could help in attracting more participants. Finally, adaptations in interventions should be thoroughly monitored. **Funding:** This study was funded by ZonMw, The Netherlands.

Keywords: Children, Low-Income, Physical Activity, Intervention

Oral Presentation B8.3 Evaluating implementation of a community-based men's health programme "Sheds for Life" in Irish Men's Sheds

4:55 pm - 5:05 pm (London, England, Wednesday, October 13, 2021)

Aisling McGrath¹, Niamh Murphy¹, Noel Richardson²

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Background: Men's Sheds are effective in engaging vulnerable or "hard-to-reach" subpopulations of men. However, attempts to engage Sheds in structured health promotion programs must respect the ethos of Sheds as highly variable, autonomous, non-structured spaces. "Sheds for Life" is a ten-week initiative that delivers targeted and tailored health promotion in the Sheds setting, positioning Men's Shed members as central decision makers in its design and implementation. Physical activity is a core component of the intervention consisting of a weekly walking program or strength and mobility classes. **Purpose:** To evaluate SFL using an implementation science approach to assess program impact and implementation effectiveness with a view to enhancing its sustainability while informing gender-specific strategies that engage hard-to-reach men with health. **Methods:** This study uses hybrid typology "effectiveness-implementation" through the application of established implementation frameworks. A community-based participatory research, and mixed methods approach has been adopted to; measure the effects of the SFL intervention on Sheddors across implementation phases and identify and monitor implementation barriers and facilitators that can inform sustainability of SFL. This research engages key stakeholders (at individual, provider and organizational levels), prioritizes implementation outcomes and assesses the generalizability of intervention effects. Purposive sampling is used to recruit a diverse sample of participants (Sheddors n=420 and Stakeholders n=20) **Results:** Preliminary physical activity outcome results from phase one across four regions (baseline to ten weeks) suggest days active per week increased from 3.07 to 4.32 days ($P=.00$) days walking increased from 4.29 to 5.28 days ($P=.00$) minutes walking per day increased from 33.31 to 38.15 ($P=.005$). **Conclusions:** The Sheds offer a unique opportunity to engage a typically hard to reach group of men with health. They are an effective way of engaging inactive men with physical activity through utilizing gender-specific strategies alongside the social support and camaraderie offered within these settings. **Funding:** This study is an employment-based PhD scholarship funded by the Irish Research Council (ID: EBPPG/2018/256)

Keywords: Men's Health, Implementation Science, Evaluation, Public Health Interventions

Oral Presentation B8.4 Assessing active transportation among socio-economically disadvantaged adults through participatory Geographic Information Systems: Individual Map Creation

5:05 pm - 5:15 pm (London, England, Wednesday, October 13, 2021)

Yasemin Inaç^{1,2,3}, Nico Van de Weghe², Eva M. De Clercq¹, Suzannah D'Hooghe^{1,3,4}, Benedicte Deforche⁴, Delfien Van Dyck⁴, Sarah Dury³, Stefanie Vandevijvere¹, Karin De Ridder¹

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Background: The prevalence of obesity worldwide has been steadily increasing. Active transportation has been considered to be one of the key factors in obesity prevention. **Purpose:** To utilize a novel online participatory Geographic Information Systems methodology to assess active transportation among socio-economically disadvantaged adults (25-65 y/o) in Flanders. **Methods:** Individual Map Creation uses an online platform which has been developed by the Network for Sustainable Mobility Research from University of Ghent. It consists of mapping software that enables socio-economically disadvantaged adults to map the routes that they use on a regular basis using active transportation under the guidance of a researcher. The mapping takes place in an one-to-one session during which a semi-structured interview also is conducted to gain deeper knowledge of the perceptions of the participants on their environment. **Results:** Through the Individual Map Creation, we expect to gain insight into the utilization and perceptions of active transportation among socio-economically disadvantaged adults in their local environment. Preliminary results might be available in the upcoming months. **Conclusions:** The construction of an instrument to assess active transportation among socio-economically disadvantaged adults and the inclusion of their perceptions on their environment can increase our knowledge of determinants of that might facilitate or impede the use of active transportation. **Funding:** Study is founded by internally by Sciensano.

Keywords: Active Transportation, Socio-Economic Status, Geographic Information Systems, Local Environment, Obesity

Oral Presentation B8.5 "With enthusiasm and energy throughout the day": promoting physical activity in people with intellectual disabilities

5:15 pm - 5:25 pm (London, England, Wednesday, October 13, 2021)

Dirk Bruland¹, Antonia Mauro¹, Anne-Dörte Latteck¹

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Background: People with intellectual disabilities show significantly lower levels of physical activity compared to the general population. Also, a lack of awareness about unhealthy lifestyles is associated with this group. Concepts addressing the needs of people with intellectual disability and promoting physical activity in their everyday life are rare. An intervention was developed that strengthens physical activity-related health competencies taking into account people's resources, skills, and

experiences. **Purpose:** Presenting results of real-life test (June - October 2020) and communicative validation. **Methods:** 33 users (five dropouts) with mild to moderate intellectual disabilities and self-selected buddies tested the intervention. After each of the ten sessions a questionnaire with six open questions was filled out together. Answers were analyzed via qualitative content analysis. Results were validated in one group of users and two groups of buddies. **Results:** Overall, promoting a physically active lifestyle and self-management was achieved well by target-oriented means of an easy-access step-by-step program, addressing users' knowledge and abilities, applying motivational and volitional strategies, establishing social support systems in the living environment and considering organizational structures. Indications to partially refine the concept were discussed, mainly in order to better address the heterogeneity of users. Based thereon, different language levels were offered and more exercises to experience physical activity were included. **Conclusions:** So far, the intervention was adopted well. Facilitators were the consideration of the individual's perceptions, social contexts and living environments. **Funding:** The project was funded by Stiftung Wohlfahrtspflege NRW.

Keywords: People With Intellectual Disability, Physical Activity Promotion, Participatory Approach

Oral Presentation B8.6 National-level physical activity data to understand place-based inequalities: a case study in County Durham, UK

5:25 pm - 5:35 pm (London, England, Wednesday, October 13, 2021)

Caroline Dodd-Reynolds^{1,2}, Bilal Ashraf², Adetayo Kasim^{2,3}, Sophie Phillips¹

¹Department of Sport and Exercise Sciences, University of Durham, ²Durham Research Methods Centre, University of Durham,

³Department of Anthropology, University of Durham

Background: Inferential evidence is scarce regarding UK-based community-level physical activity (PA) inequalities. **Purpose:** We explored the impact of sociodemographic factors on PA threshold-achievement, within County Durham, UK. **Methods:** Four years' Active Lives data (2015/16-2018/19) were accessed (UK Data Service) and cleaned (n= 421-727). Multinomial baseline logit models were conducted: total PA, walking-leisure, walking-travel, gardening. Outcomes: active ≥ 150 , fairly active 30-149 and inactive <30 moderate-intensity-equivalent-minutes (MIEMs) per week. Odds ratios were computed for gender, ethnicity, disability, deprivation, work status, NS-SEC, education, urban/rural, coastal/non-coastal, BMI. **Results:** 70-80% most deprived less likely to be active than least deprived: 2 years [OR 0.34 (0.19, 0.61); OR 0.4 (0.18-0.91)]. GCSE-equivalent less likely to be active than those with HE qualifications: 3 years [OR 0.39 (0.26, 0.59); OR 0.4 (0.27, 0.59); OR 0.57 (0.33, 0.96); OR 0.31 (0.18, 0.51)], similar for walking for leisure [OR 0.65 (0.45, 0.93), OR 0.5 (0.35, 0.7); OR 0.42 (0.26, 0.69)] and walking for travel: 2 years [OR 0.49 (0.28, 0.85); OR 0.34 (0.15, 0.8)]. NS-SEC 6-8 less likely to be active than NS-SEC 1-2: 3 years [OR 0.53 (0.33,0.85); OR 0.51 (0.3, 0.86); OR 0.43 (0.23, 0.8)]. Urban dwellers less likely to be active through walking-leisure than rural: 2 years [OR 1.75 (1.27, 2.43); OR 1.42 (1.05, 1.92)]. BMI ≥ 30 kg/m² less likely to be active than those <25 kg/m²: 3 years [OR 0.39 (0.25,0.63); OR 0.52 (0.33, 0.82); OR 0.43 (0.24, 0.77)]. **Conclusions:** Bespoke consideration of national-level data elucidated some persistent county-level inequalities, relevant to local policy. **Funding:** We gratefully acknowledge funding from the UKRI Strategic Priorities Fund awarded through Durham University. Sophie Phillips is a Fuse & NIHR School for Public Health Research (SPHR) funded PhD Researcher.

Keywords: Physical Activity, Inequalities, Place-Based, Communities, Modelling

Oral Presentation B8.7 What are the determinants of physical activity among adults and older adults from the Somali Community in Bristol, United Kingdom?

5:35 pm - 5:45 pm (London, England, Wednesday, October 13, 2021)

Janet Ige-Elegbede¹, Jane Powell¹, Selena Gray¹, Paul Pilkington¹

¹Centre for Public Health and Wellbeing (CPHWB), University of the West of England (UWE), Bristol, United Kingdom

Backgrounds: Adults and older-adults from BME communities in the UK are less likely than their non-BME counterparts to meet the physical-activity recommendations Purpose: To investigate the factors associated with physical-activity among adults and older-adults from the Somali Community in Bristol, United Kingdom. **Methods:** A sequential exploratory mixed methods design initiated by a systematic review of barriers and facilitators of physical-activity among adults and older-adults from BME groups in the UK, followed by a cross-sectional survey of factors associated with physical-activity among adults and older-adults from the Somali community. Studies were included in the review if they reported on the experiences, barriers and facilitators of physical-activity among adults aged 40 and above. Ten studies conducted between 2007 and 2017 met the inclusion criteria. The survey was underpinned by the Capability-Opportunity-Motivations and Behaviour (COM-B) framework and was completed by 148 participants. Levels of physical-activity was measured using the short-form of International-Physical-activity-Questionnaire (IPAQ) while other validated questionnaires including the Health-Survey-for-England informed the survey design. **Result:** Findings from the systematic review suggests a substantial gap in research among Black African groups. Over three-quarters of respondents (78%) reported low physical-activity levels while 19% of respondents reported moderate physical-activity levels and only 3% met the requirement for high IPAQ physical-activity levels. The findings show a significant association between IPAQ score of respondents and gender, age, employment status and level of education (p<0.05). **Conclusion:** Urgent actions are required to address the barriers of physical-activity among BME communities in the UK. Funding: Funded by CPHWB and Well-being, UWE

Keywords: BME Community, Older-Adults, Physical-Activity, United Kingdom

Oral Presentations Session B9

Oral Presentation B9.1: The formative evaluation of The HERizon Project randomised controlled trial - a home-based physical activity intervention for adolescent girls

4:35 pm - 4:45 pm (London, England, Wednesday, October 13, 2021)

Emma S. Cowley¹, Paula M. Watson¹, Lawrence Foweather¹, Sarahjane Belton², Chiara Mansfield¹, Gabriella Whitcomb-Khan¹, Isabella Cacciatore¹, Andrew Thompson³, Dick Thijssen^{1,4}, Anton J. M. Wagenmakers¹

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Purpose: The HERizon Project is a home-based multi-component physical activity (PA) intervention for adolescent girls in the UK and Ireland. This study was a formative evaluation of its implementation during the initial COVID-19 lockdown restrictions. **Methods:** 42 female participants aged 13 to 16 years old (mean = 14.2, SD = 1.1), were randomly allocated to: (i) the HERizon intervention group (n = 22) or (ii) a wait-list control group (n = 20). Participants in the six-week intervention group were asked to complete three PA sessions of their choice each week, engage in weekly need-supportive videocalls with an Activity Mentor, and had access to live workouts and a private social media group. The primary outcome was self-reported habitual PA. Secondary outcomes included cardiorespiratory fitness (20 m shuttle run), muscular strength (standing long jump), muscular endurance (push up test), and psychosocial outcomes (Perceived Competence Scale, Body Appreciation Scale, Self-Esteem Questionnaire, Behavioural Regulation in Exercise Questionnaire). Outcome measures were assessed at baseline and after the six-week intervention. Quantitative and qualitative process evaluation data were also collected which included online interviews (n = 10). Linear mixed modelling and reflexive thematic analysis were used to analyse the data. **Results:** There was no significant change in habitual PA between groups (p = 0.767). The intervention group had significantly increased cardiorespiratory fitness (p = 0.001), muscular endurance (p = 0.022), intrinsic motivation (p = 0.037), and body appreciation (p < 0.003) in comparison to the wait-list control group. All participants in the intervention group completed the intervention and compliance to the intervention was high (participants completed 18 ± 2 sessions). The live workouts, behaviour change support and routine were identified as key facilitators to adhering to the programme. Benefits of the programme reported during interviews included increased enjoyment of exercise, increased confidence and improved performance. **Conclusions:** Although no change in PA was observed, HERizon resulted in improved physical fitness and psychosocial outcomes. These preliminary findings, alongside positive findings for feasibility and acceptability, highlight potential benefits from the home-based intervention, thus further investigation is warranted. Future trials should include accelerometers for a more accurate measurement of habitual PA. **Funding:** Study funded by the Marie Skłodowska-Curie Action Cofund (DTA3) (grant agreement number: 801604).

Keywords: Adolescents, Physical Activity, COVID-19, Girls, Behaviour Change

Oral Presentation B9.2 The 'MED-WELL' programme: an exercise intervention to educate and promote well-being among medical students

4:45 pm - 4:55 pm (London, England, Wednesday, October 13, 2021)

Aubree Worobetz¹, Petrus J. Retief¹, Sinead Loughran¹, Jane Walsh², Monica Casey^{1,3}, Peter Hayes^{1,3}, Enrique García Bengoechea^{3,4}, Andrew O'Regan^{1,3}, Catherine Woods^{3,4}, Dervla Kelly^{1,3}, Raymond O'Connor^{1,3}, Deirdre McGrath^{1,3}, Liam G. Glynn^{1,3}

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Background: Medical school programme workloads challenge the physical and mental health of students particularly in graduate entry programmes. There is evidence that physical activity (PA) can improve wellness among medical students. **Purpose:** To test the feasibility of introducing an exercise programme into the medical school curriculum which would promote health and well-being among its students and educate on the use of exercise as medicine in clinical practice. **Methods:** The 'MED-WELL' programme is a six-week programme of one hour-long weekly sessions, each involving a different type of PA and an educational session on incorporating exercise theory into daily medical practice. Three parameters were used to test feasibility: 1. Recruitment and retention of participants, 2. Acceptability of the programme and 3. Efficacy in terms of health and well-being. The questionnaires were administered pre- and post-intervention and collected data using six distinct validated measurement scales. Free text boxes also encouraged participants to discuss the merits of the programme. **Results:** It is feasible to introduce this programme into the medical school curriculum. After completing the programme, significant improvements were seen in participant scores in the WHO-5 Well-Being Index, Sleep Quality Scale, Loneliness Scale, and levels of PA during a typical week. **Conclusions:** This study has shown it is feasible to deliver the 'MED-WELL' programme in a medical school curriculum. The programme seems to be of benefit and is acceptable to students. **Funding:** Funding was provided by the School of Medicine, University of Limerick.

Keywords: Feasibility Study, Physical Activity, Medical Education

Oral Presentation B9.3 The potential of an e-cycling intervention to positively impact physical activity and health in individuals with type 2 diabetes mellitus

4:55 pm - 5:05 pm (London, England, Wednesday, October 13, 2021)

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Background: Research suggests that e-cycling can positively impact physical activity (PA) behaviour and lead to improvements in fitness in healthy adults. Little is known about the impact of e-cycling in clinical populations for whom PA engagement is low. **Purpose:** Examine the association between an e-cycling intervention and PA and health in adults with type 2 diabetes mellitus (T2DM) to determine intervention promise. **Methods:** A parallel-group two-arm randomized waitlist-controlled pilot study was conducted. Forty eligible individuals were randomized into either the e-cycling intervention ($M_{age}=58$, 40%Female) or waitlist control ($M_{age}=56$, 35%Female). Participants in the e-cycling condition received e-bike training prior to a 12-week e-bike loan. Health outcomes, assessed at pretesting and immediately after the loan, included fasting glucose, HOMA-IR, cardiorespiratory fitness and health related quality of life (HRQoL). Overall PA was measured using the GT3X+ Actigraph accelerometer and PA intensity during e-cycling was measured using the Actiheart. **Results:** There was a favourable effect of the intervention on fasting glucose (difference in change scores between conditions: 0.67, 95%CI: -0.77, 2.11 mmol/L) and HOMA-IR (0.58, 95%CI: -.033, 1.50). The intervention showed promise to improve HRQoL and cardiorespiratory fitness in comparison to the control group. E-cycling was performed at a moderate intensity (median $_{HR_{max}}=72\%$, IQR: 67, 80). There was an 18-minute increase in PA per week in the intervention group (95%CI: -84.72, 120.15), not seen in the control group (-27.64, 95%CI: -170.33, 79.61). **Conclusions:** E-cycling shows promise to positively impact health and PA in adults with T2DM and a fully-powered definitive trial is warranted. **Funding:** This study is funded by the National Institute for Health Research NIHR Bristol Biomedical Research Centre (Nutrition theme) at University Hospitals Bristol NHS Foundation Trust and The University of Bristol.

Keywords: E-Cycling, Physical Activity, Behaviour Change, Type 2 Diabetes Mellitus

Oral Presentation B9.4 A realist, participatory, developmental evaluation of Greater Manchester Moving: a whole-of-systems approach to physical activity

5:05 pm - 5:15 pm (London, England, Wednesday, October 13, 2021)

Katie Shearn¹, Emily Woodward-Esseen², Richard Davis-Boreham², Hayley Lever², Tim Crabbe³

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Background: Whole-of-systems approaches (WSA) to physical activity are advocated in international and UK policy. Greater Manchester Moving (GM Moving) is a social movement for enabling active lives across a population of 2.8 million people. It is the city region's response to tackling inequalities in physical activity, intended to lead to better physical and mental health and stronger communities. **Program Delivery:** GM Moving supports multiple stakeholders to take action to influence culture, policy, practice, the physical environment, social norms and individual opportunities, motivations, and capabilities to make it easy and usual to be active. **Evaluation:** GM Moving is evaluated using a realist, developmental, participatory approach. This is appropriate to match the inherent complexity in the WSA, embracing its dynamic, open, interrelated, and emergent nature. The findings explain progress towards system change, both before and during the COVID 19 pandemic. This includes work to challenge dominant ways of working that are not constructive for tackling inequalities in physical activity, promoting collective leadership, working across organisational boundaries, involving local people and communities, adapting strategies based on learning in real time and transforming governance processes. Limitations to progress are also outlined. **Conclusions:** This study illustrates the operationalisation of a WSA highlighting what may or may not work to create the conditions for population level change in physical activity. **Funding:** Greater Manchester Combined Authority (GMCA), the NHS in Greater Manchester and Sport England.

Keywords: Public Health, Whole-of-Systems-Approaches, Inequality, Physical Activity

Oral Presentation B9.5 Public Health with 'Moving Medicine' - a physical activity healthcare education programme in East London

5:15 pm - 5:25 pm (London, England, Wednesday, October 13, 2021)

Farhan Shahid¹, William Wynter Bee², Catherine Lester³

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Background: One of ISPAH's eight investments for physical activity is healthcare promotion and education. However, it has been suggested there is a lack of confidence and knowledge on physical activity within the healthcare profession. **Purpose:** To study the impact in confidence of evidence-based educational delivery on physical activity and motivational interviewing for healthcare professionals. **Methods:** Educational sessions were delivered to medical professionals based in East London via webinar sessions. The topics introduced physical activity guidance and the positive impact on medical conditions. Teaching was also given regarding 'Moving Medicine' (<https://movingmedicine.ac.uk/>) which is an evidence based interactive toolkit to support conversations around of physical activity based on motivational interviewing. Webinar themes included Mental Health, Diabetes and Musculoskeletal conditions. Qualitative data was collated during the session and follow up survey, including data on clinician confidence with government guidance, and exercise prescription, as well as website datametrics. **Results:** 72% of participants felt confident in prescribing physical activity to patients after the educational sessions, compared with 32% beforehand (44% felt low in confidence). 86% of participants were confident with the government guidance for physical activity after the sessions, compared with 15% pre-webinars. **Conclusions:** The webinars demonstrated an improvement in knowledge around government guidelines and an improvement in clinician confidence in prescribing physical activity. Clinicians were more likely to utilise resources such as 'Moving Medicine'. It is suggested that webinar-based educational delivery may contribute to behaviour change within healthcare professionals in engaging patients with physical activity. **Funding:** N/A.

Keywords: Physical Activity, Health, Education, Behaviour Change

Oral Presentation B9.6 Tailor-made cardiac rehabilitation for patients with obesity: Results on physical activity, sedentary

behaviour and weight

5:25 pm - 5:35 pm (London, England, Wednesday, October 13, 2021)

Iris den Uijl¹, Rita J. G. van den Berg-Emons¹, Madoka Sunamura², Mattie J. Lenzen³, Henk J. Stam¹, Eric Boersma³, Hareld M. C. Kemps⁴, Rutger W. M. Brouwers⁴, Nicole C. C. W. Tenbült-van Limpt⁴, Nienke ter Hoeve^{1,2}

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Background: Improving physical activity and sedentary behaviour are important goals of cardiac rehabilitation (CR). However, in patients with obesity, standard CR is not effective in achieving the recommended physical activity and sedentary behaviour levels, and results achieved in weight loss are unsatisfactory. **Purpose:** To describe the effectiveness of a new CR program, OPTICARE XL, for patients with obesity on physical activity, sedentary behaviour and weight. **Methods:** Patients with BMI \geq 30 were randomized to standard CR (n=99) or OPTICARE XL (n=102). Standard CR consists of a 10-week aerobic exercise program, supplemented with cardiovascular lifestyle education. OPTICARE XL is a one-year tailor-made group intervention including aerobic and strength exercise, behavioural coaching and an after-care program. Physical activity and sedentary behaviour were measured with an Actigraph GT3X+ and weight was measured with a calibrated weight scale. **Results:** Physical activity and sedentary behaviour improved within both groups, however, these improvements were not significantly different between groups. Patients in the OPTICARE XL group showed on average greater weight loss three months after the start of CR (mean change -3.6 kg versus -1.8 kg, respectively, $p=0.002$). Six months post CR, changes in body weight were equal (mean change -2.5 kg in both groups, $p=0.959$). **Conclusions:** OPTICARE XL had added value on the short-term, but this did not sustain on the long-term. We suggest to re-evaluate the after-care phase of the OPTICARE XL program to expand short-term effects. **Funding:** The Dutch Organization for Health Research and Development (843001792) and Capri Cardiac Rehabilitation.

Keywords: Cardiac Rehabilitation, Obesity, Weight, Physical Activity, Sedentary Behaviour

Oral Presentation B9.7 Using dance to increase physical activity and modify risk factors for falls in older people

5:35 pm - 5:45 pm (London, England, Wednesday, October 13, 2021)

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Background: Physical activity is a modifiable factor for preventing falls in older people. Engaging in dance, has the potential to modify risk factors such as levels of physical activity that are associated with falling. **Purpose:** To determine if a community-based dance programme; 'Dance on' can modify risk factors associated with falling including levels of physical activity. **Methods:** Older people, aged 55 years and over enrolled on the Dance On programme (June 2019-March 2020). Physical Activity (SALQ), Fear of Falling (FES-I), mobility and balance (Timed up and Go), life satisfaction, happiness, and perceived health state were collected and compared at baseline, 3 months and 6 months follow-up using inferential analyses. A health economic evaluation was also undertaken. **Results:** 114 adults (F=103; 76.73 \pm 9.21 yrs) enrolled on the programme (baseline) with data collected from N=86 at 3m and N=21 at 6 months. Adherence was 76.6 \pm 17.50 and 76.5 \pm 19.04% at 3 and 6m respectively. Fear of falling, timed-up-and-go, life satisfaction, happiness, perceived health state did not improve. However total minutes of physical activity increased from baseline 104.34 (\pm 27.62) to 3 and 6 months 186.84 (\pm 24.77) (F(1.10, 78.98)=4.58, $p=0.032$). The program was considered cost effective at 3 and 6m. **Conclusions:** Dance can increase levels of physical activity and this persists while engaged in the dance programme. Adherence to the programme was high but frequency and duration of sessions, and initial physical activity levels need to be considered to maximise benefits.

Keywords: Older Adults, Dance, Falls, Physical Activity

Oral Presentation B9.8 Digital Wellness Services for Young Elderly (DigitalWells) Program

5:45 pm - 5:55 pm (London, England, Wednesday, October 13, 2021)

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Background: DigitalWells (<https://www.digitalwells.fi>) research and development program is carried out during 2019–2021 in Finland. DigitalWells aims to recruit over 1000 participants from the young elderly age group (60–75 years) during 2019–2021 and then expand and continue as a national multi-year program. The main purpose is to promote the formation of sustainable everyday PA routines. **Program Delivery:** DigitalWells cooperates with the Finnish associations for retired people, through which local groups of 20–50 volunteers are formed. The groups are guided into the program either via meetings or remotely. A free DigitalWells mobile application is provided to the participants; the central features are related to logging PA and receiving reports about PA. Another key feature is the ability to transfer the logged personal PA data to My Kanta Personal Health Record (Kanta PHR), a Finnish national repository for personal wellness records. Participants carry out PA according to their own preferences. **Evaluation:** Efficiency is evaluated by examining the changes in PA levels. First published studies show that the participants have, on average, increased their PA during the participation despite Covid-19 restrictions, which in Finland caused temporal closure of exercise facilities and paused most group activities. 93% of the 610 participants (situation 2/2021) had integrated the application to Kanta PHR repository. **Conclusions:** DigitalWells seems effective in promoting free-living PA among young elderly. The use of Kanta PHR repository is widely accepted. **Funding:** Program funded by the Social Insurance Institution of Finland.

Keywords: Physical Activity, Young Elderly, Mobile Application, National Health Repository

Oral Presentations Session B10

Oral Presentation B10.1 Good physical activity practices among young elderly

4:35 pm - 4:45 pm (London, England, Wednesday, October 13, 2021)

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Background: The global population is aging and at the same time life expectancy at older ages is improving. Physical activity (PA) can ward off age-related illness and frailty. PA also aids in upkeeping the ability to function and contributes to better quality of life during senior years. However, insufficient PA is a global problem. In Finland, where our study was conducted, only one fourth of the people over 60 years meet national PA recommendations. However, many would like to be more physically active. Thus, it seems they lack good PA practices. **Purpose:** To find and study good practices among young elderly (age group 60–75 years), which support being physically active. **Methods:** We collected good PA practices from 142 participants in our DigitalWells (<https://www.digitalwells.fi/>) research program (35.4% male; 64.6% female; mean age 68.8 years) by using printed forms containing both open-ended and multiple-choice questions. The data was analyzed qualitatively using thematic analysis. **Results:** Five good PA practices and their features were identified: 1) A specific schedule for PA; 2) Multiple physical activities to choose from; 3) PA before noon; 4) PA with a friend or in a group; and 5) If PA feels unappealing, think about the resulting good feeling. **Conclusions:** The identified good PA practices have been presented to all the 600+ participants in our research program and have been well received. **Funding:** Study funded by the Social Insurance Institution of Finland.

Keywords: Physical Activity, Young Elderly, Digital Wellness Services, Mobile Application, Good Practices

Oral Presentation B10.2 Implementing the German National Recommendations for Physical Activity and Physical Activity Promotion: Results Phase-1

4:45 pm - 4:55 pm (London, England, Wednesday, October 13, 2021)

Simone Kohler¹, Natalie Helsper¹, Lea Dippon¹, Karim Abu-Omar¹, Alfred Rütten¹, Klaus Pfeifer¹, Jana Semrau¹

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Background: German National Recommendations for Physical Activity (PA) and PA Promotion recommend community-based physical activity promotion (cPA) at the local level with a focus on health equity. However, the implementation in the local context remains a challenge. The aim of KOMBINE phase 1 (Community-based PA promotion to implement the National Recommendations) is to co-produce an action-oriented framework for cPA focusing on health equity. **Program Delivery:** (1) In a series of workshops, key stakeholders and researchers discussed facilitators, barriers, and needs of cPA focusing on health equity. (2) The research team used an inductive approach to cluster all findings and to identify key components and then (3) compared the key components with updated literature. (4) Key components were discussed and incorporated into a gradually co-produced framework by the participants. **Evaluation:** The first result of the co-production process was a catalogue of nine key components regarding cPA in German communities. The comparison of key components with scientific evidence showed a high overlap. Finally, a six-phase action-oriented framework including key components for cPA was co-produced. **Conclusion:** The six-phase action-oriented framework integrates practice-based and scientific evidence on cPA with a focus on health equity. It represents a shared vision for the implementation of National Recommendations for PA and PA Promotion in Germany. **Funding:** Federal Centre for Health Education (BZgA) on behalf of and with funds from the statutory health insurances in accordance with Para.20a.SGB V within the GKV Alliance for Health (Number: Z2/1.01G/18).

Keywords: Participatory Approach, Health Equity, Community-Based Physical Activity, Communities

Oral Presentation B10.3 Implementing the German National Recommendations for Physical Activity and Physical Activity Promotion: First Results Phase-2

4:55 pm - 5:05 pm (London, England, Wednesday, October 13, 2021)

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Background: The aim of KOMBINE phase 2 (Community-based PA promotion to implement the National Recommendations) is to implement a co-produced action-oriented framework for community-based physical activity promotion (cPA) with a focus on health equity in six pilot communities using a participatory approach. **Program Delivery:** Steps of the co-produced action-oriented framework, developed in phase 1 of KOMBINE, include (1) preparation, (2) assessment, (3) setting up cooperative planning groups including steering committees, (4) organizing the planning process, (5) development and (6) implementation of measures. These steps are participatively delivered in three rural communities, two urban communities, and one metropolis. **Evaluation:** A participatory case study design is used. The process evaluation shows that the involvement of political stakeholders (n=2–15), basic experts (n=2–12), administration (n=8–25), multipliers (n=5–16), and citizens (n=0–6) in the cooperative planning groups varies across all six communities. The output evaluation shows a broad range of developed measures across all six pilot communities to promote personal skills (n=48), infrastructures (n=17), policy actions (n=9), and community action (n=7). **Conclusions:** The co-produced action-oriented framework proved to be partially suitable to promote cPA in the communities. However, adaptations are needed to

accommodate the measures to the community-specific context. Involving individuals from a socially disadvantaged background remains a challenge. **Funding:** Federal Centre for Health Education (BZgA) on behalf of and with funds from the statutory health insurances in accordance with Para.20a.SGB V within the GKV Alliance for Health (Number: Z2/1.01G/18).

Keywords: Participatory Approach, Health Equity, Community-Based Physical Activity, Cooperative Planning, Communities

Oral Presentation B10.4 Benchmarking physical activity in Europe: lessons from the CO-CREATE project

5:05 pm - 5:15 pm (London, England, Wednesday, October 13, 2021)

Margarita Kokkorou¹, Kate Oldridge-Turner¹, Ioana Vlad¹, Diva Fanian¹, Knut-Inge Klepp², Arnfinn Helleve², Anne-Siri Fisman², Sonia Malczyk³, Gaironeesa Hendricks³, Janetta Harbron³, Kate Allen¹

¹World Cancer Research Fund International, London, United Kingdom, ²Norwegian Institute for Public Health, Oslo, Norway, ³University of Cape Town, Cape Town, South Africa

Background: Global research shows a strong link between physical activity levels and the risk of developing non-communicable diseases. To increase physical activity, governments must design and implement a comprehensive set of policy actions. The MOVING benchmarking tool was developed to assess the strength of policies across three domains that make up a comprehensive approach to physical activity policy. **Purpose:** To assess the status of physical activity policy in five European countries participating in the CO-CREATE project: Netherlands, Norway, Poland, Portugal and the UK. **Methods:** The MOVING benchmarking tool values the strength of policy design, based on evidence-informed and aspirational policy attributes. Physical activity policies in each participating country were identified based on a comprehensive scan, with a set methodology, and were benchmarked using this tool. **Results:** The benchmarks assessed the design of policies across the six policy areas of MOVING and identified where there was scope for improvement within each area. For example, all countries developed physical activity guidelines and community initiatives promoting physical activity. The benchmarking process evaluated the design of these policies and allowed a cross-country comparison of their strengths. When comparing the overall policy environment, we found a lack of policies promoting access to green spaces and weaknesses in designing effective physical education. **Conclusions:** The MOVING benchmarking tool can be used by policymakers, researchers and civil society to inform the development and implementation of policies promoting physical activity. **Funding:** Funded by the European Union's Horizon 2020 research and innovation programme.

Keywords: Physical Activity, Policy Design, Non-Communicable Diseases

Oral Presentation B10.5 Gaelic Games coaches' awareness and knowledge of physical activity guidelines

5:15 pm - 5:25 pm (London, England, Wednesday, October 13, 2021)

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Background: Sport is highlighted as one of the "eight investments that work" for increasing physical activity (PA) and the coach has an important influence on the PA levels attained during sport. It remains unclear whether coaches are aware of their role in PA provision, with skill and game development typically the primary focus of practice sessions. Consequently, it is appropriate to investigate coaches' knowledge of PA guidelines (PAGL) and PA provision in sport settings. **Purpose:** To evaluate youth Gaelic games (GG) coaches' awareness, knowledge, and perceptions of PA and PAGL. **Methods:** An online survey was completed by 1660 youth GG coaches (398 females), which included items on awareness and knowledge of youth PAGL, and their perceptions of PA in coaching. **Results:** A majority of coaches (45.1%) were not aware of the PAGL, with 15.5% of coaches correctly identifying the MVPA guideline. A majority of coaches agree that GG participation should make a significant contribution to players' PA levels (90.4%), they support players to be physically active during practices (93.2%), and they perceive themselves as role models for players in terms of PA (80.9%). **Conclusions:** Coaches appreciate the importance of their players accumulating PA, yet a low proportion are aware of or can accurately identify the PAGL. The development of formal coach education modules on PAGL and approaches to increase the PA attained during GG practices may be useful strategies to ensure sport makes a positive contribution to PA. **Funding:** AIT President's Doctoral Scholarship.

Keywords: Sport, Physical Activity, Youth

Oral Presentation B10.6 Associations of meeting different combinations of 24-h movement guidelines with stress and self-rated health

5:25 pm - 5:35 pm (London, England, Wednesday, October 13, 2021)

Kaja Kastelic^{1,2}, Željko Pedišić³, Dean Lipovac^{1,2}, Nika Kastelic⁴, Si-Tong Chen³, Nejc Šarabon^{2,5}

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Background: Physical activity, sedentary behaviour (SB) and sleep collectively affect health. Several countries have recently issued integrated 24-h movement guidelines. **Purpose:** The aim of this study was to explore the associations of meeting different combinations of 24-h movement guidelines with stress and self-rated health among adults. **Methods:** A total of 2333 adult participants provided data on their self-rated health, frequency of stress, and time spent in moderate-to-vigorous physical activity (MVPA), SB and sleep. The associations of meeting the movement guidelines with stress and self-rated health were analysed using an ordinal logistic regression model adjusted for sociodemographic and lifestyle characteristics. **Results:** Significantly lower odds of higher frequency of stress were found for those who met the combined 24-h movement guidelines (adjusted odds ratio [OR] = 0.45; 95% confidence interval [CI]: 0.32, 0.63; $p < 0.001$), any combination of two guidelines (OR range: 0.48 – 0.63; $p < 0.05$ for all)

and sleep guideline only (OR = 0.51; 95% CI: 0.35, 0.75; $p = 0.001$). Significantly higher odds of better self-rated health were found for those who met the combined 24-hour movement guidelines (OR = 2.94; 95% CI: 2.07, 4.19; $p < 0.001$) and the MVPA alone or in combination with any other movement behaviour guideline (OR range: 1.78 – 2.33; $p < 0.01$ for all). Meeting more guidelines was associated with greater odds of favourable outcomes (p for linear trend < 0.001). **Conclusions:** Our findings highlight the public health importance of encouraging adults to meet as many movement behaviour guidelines as possible.

Funding: None. **Acknowledgment:** The authors gratefully acknowledge the European Commission for funding the InnoRenew CoE project (Grant Agreement #739574) under the Horizon2020 Widespread-Teaming program and the Republic of Slovenia (Investment funding of the Republic of Slovenia and the European Union of the European Regional Development Fund).

Keywords: Subjective Health, Well-Being, Time-Use Epidemiology, Daily Activity Behaviours Questionnaire

Oral Presentation B10.7 Ethiopia's physical activity policy, research and surveillance deficits

5:35 pm - 5:45 pm (London, England, Wednesday, October 13, 2021)

Chalchisa Abdeta¹, Alem Deksis², Debrework Tesfaye³, Andrea Ramirez Varela⁴, Michael Pratt⁵, Pedro C. Hallal⁶

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Background: Physical inactivity is riding peoples towards the higher risk of non-communicable diseases. However, policy, research and surveillance deficits are affecting the public health action to curb this threat in Ethiopia. **Purpose:** This aimed to explore the existing gap on physical activity policy, research and surveillance through Country Card for a timely action. **Methods:** Data were collected from Oct 2020 to Dec 2020 through harmonized methodology of the Global Observatory for Physical Activity-GoPA! A rigorous review was made on physical activity and sedentary behaviour policy, research and surveillance among adults 18+ years in Ethiopia. Then, the data was verified and synthesized by the GoPAI in collaboration with the country representative. **Results:** Our review confirmed that a little change has made since the release of the first Ethiopia's Card in 2016. For instance, the prevalence of activity was raised to 85% (Male: 89%, female: 82%). As a result, inactivity related deaths were reduced to 4.0%. Also, the country improved global contribution to physical activity research and ranked in 52nd position worldwide. Sadly, the national physical activity recommendation is still not in place. The country has no monitoring system for physical activity and sedentary behaviour. Despite of those gaps, this second Country Card is more comprehensive and included sedentary behaviour data for the first time. **Conclusion:** The findings indicated that there is a huge gap on physical activity policy, research and surveillance in Ethiopia. Thus, government, policy makers and researchers should use this Country Card to improve the current policy, research and surveillance deficits. **Funding:** None of funds was received to conduct this study.

Keywords: Physical Activity, Policy, Research, Surveillance, Ethiopia

Oral Presentations Session B11

Oral Presentation B11.1 Implementation evaluation of a secondary level whole school programme: A qualitative inquiry

4:35 pm - 4:45 pm (London, England, Wednesday, October 13, 2021)

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Purpose: To identify the implementation barriers and facilitators of the SLASF programme. Furthermore, to identify implementation strategies for extended roll out of the programme. **Methods:** Process evaluation focus groups (N=22) and interviews (N=27) were conducted in three schools with programme implementers i.e. school management, SLASF coordinator, student-leaders class, staff committee and were transcribed verbatim. Transcripts were analysed using reflexive thematic analysis and were guided by the Consolidated Framework for Implementation Research. **Results:** Implementation barriers were; 'limited capacity and knowledge of implementers', and 'poor optimisation of the school as a systems approach'. Facilitators identified were; 'optimisation of the school as a systems approach', 'change and progress requires patience and time' and 'acceptability of the intervention'. **Conclusions:** Identified barriers and facilitators assisted with the identification of implementation strategies including (not limited to) a shared leadership programme for student leaders, a more flexible timeline for completion and a student leadership transferee each year. This study has identified drivers of implementation success or failure for future impact and extended roll out of SLASF. **Funding:** The University of Limerick, Mayo Education Centre, Healthy Ireland and St. Vincent's Charity.

Keywords: Whole-School Approach, Physical Activity, Adolescents, Implementation Strategies

Oral Presentation B11.2 Determinants of physical activity and sedentary behaviour in Flemish caregiving grandparents: A qualitative study

4:45 pm - 4:55 pm (London, England, Wednesday, October 13, 2021)

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Background: Evidence on the factors influencing caregiving grandparents' energy-expenditure related behaviours is limited, although this knowledge seems imperative in the broader context of healthy aging. **Purpose:** This explorative qualitative study aimed to identify the determinants of physical activity and sedentary behaviour levels among Flemish caregiving grandparents, both in absence and especially in the presence of their grandchild(ren) aged between 0-5 years. **Methods:** Six focus group discussions were conducted consisting of 9 grandfathers and 28 grandmothers (60.4±4.0 years). Based on grounded theory, an inductive approach was used to derive subcategories, main categories and themes from the verbatim transcribed data using NVivo R1. **Results:** Caregiving grandparents' levels of PA were reported to be influenced by individual factors (e.g. physical health, habits, attitudes), interpersonal factors (e.g. characteristics of the grandchild (such as age, motor development, mood, interests), support of the partner) and physical environmental factors (e.g. weather, duration and timing of care, caregiving environment). Although the caregiving grandparents reported to spend limited time in SB while providing care, the determinants specifying their SB levels during childcare largely overlapped with those of PA. **Conclusions:** This study showed that for caregiving grandparents the interplay of the abovementioned types of factors facilitates PA while providing care. However, having grandchildren within the 0-5-year age range who are still developing their motor competences result in more inactive moments for the grandparent. **Funding:** Study funded by ³Research Foundation - Flanders (FWO) (individual Fellowship; Fellowship number: FWOTM974).

Keywords: Grandparents, Physical Activity, Sedentary Behaviour, Grandchild Care, Determinants

Oral Presentation B11.3 Menopausal women and physical activity

4:55 pm - 5:05 pm (London, England, Wednesday, October 13, 2021)

Anne Elliott¹, Margaret Volante¹

¹Middlesex University

Background: Physical inactivity is well documented as being a key component in many non-communicable diseases of middle age and when combined with menopausal effects, finding approaches to encourage healthy lifestyle choices can be difficult. **Purpose:** To explore underlying factors for activity and inactivity in middle age women. **Methods:** This study explored the attitudes and perceptions of nine women aged 40-54 in London UK, who self-reported as exercisers or non-exercisers, to exercise participation at this life transition. The study used a grounded theory approach with theoretical sampling and semi-structured interviews. The study followed O'Brien et al.'s Standards for reporting qualitative research. **Results:** Four themes emerged: 'Being middle-aged', 'perceptions of physical activity levels', 'being an exerciser' and 'health messaging'. Findings show that: Personal physical activity identities are relative to an individual's previous levels of activity and measured through internal judgements of fitness improvement; participants who tried to participate in physical activity found it difficult to find appropriately targeted fitness classes and the reductive nature of health messaging meant all participants thought campaigns were not meant for them but for others. **Conclusions:** The mismatch of physical activity identities offers a wider understanding than objective measures alone for personal activity improvement; age-appropriate classes and population specific health messaging may improve adherence. These findings have relevance to bodies concerned with improving health outcomes in this population. **Funding:** N/A.

Keywords: Behaviour Change, Menopause, Life Course, Qualitative

Oral Presentation B11.4 Identifying physical activity behaviours and population characteristics from secondary smartphone fitness apps

5:05 pm - 5:15 pm (London, England, Wednesday, October 13, 2021)

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Background: Commercial fitness and activity tracking smartphone apps are becoming ever more ubiquitous and generating a large volume of physical activity data. Utilisation of this secondary data has the potential to provide new insights into patterns of activity behaviour. **Purpose:** To use commercial app data to identify temporal physical activity behaviour patterns and patterns of app usage, characterising the sociodemographic features of these behaviours. **Methods:** Daily activity data from 30,804 app users with 7 or more days of recorded activity over the course of 2016 were used. Sociodemographic variations in physical activity behaviour and probability of meeting physical activity guidelines were investigated. Moreover, unsupervised clustering methods were applied to activity behaviours to identify temporal patterns in activity behaviour over annual and weekly timescales. **Results:** We ascertain longer-term patterns of app usage with increasing age and more male users reaching physical activity guideline recommendations despite longer daily activity duration recorded by female users. Key seasonal and weekly patterns of activity behaviour were identified within the app user's data. Daylight saving was shown to play a key role in influencing activity behaviour across the clusters, with increased activity in summer months. Investigation into weekly behaviours identified varied roles of weekday versus weekend on activity levels. With some users being more active in the week and some on weekends. **Conclusions:** Fitness and activity tracking apps are valuable as data sources of activity over long temporal periods, allowing identification of patterns and characteristic of different socioeconomic groups, not often seen in shorter duration studies. **Funding:** ESRC: Data Analytics and Society Centre for Doctoral Training (ES/R501062/1).

Keywords: Big Data, Smartphone App, Measurement and Surveillance, Technology

Oral Presentation B11.5 Construction and testing: Research on the model of influencing factors of Chinese adolescents' sedentary behavior

5:15 pm - 5:25 pm (London, England, Wednesday, October 13, 2021)

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Background: Lack of exercise, sedentary behavior, and long-time glaring at a screen have been globally urgent public health problems. These are also the main risk factors for adolescents' health. However, the influencing factors of the sedentary behavior and the mechanism need to be further investigated, due to the specificity, contingency, and difficulty of the sedentary behavior. **Purpose:** To explore the influencing factors of the sedentary behavior in adolescents, construct and test the model of influencing factors of Chinese adolescents' sedentary behavior. **Methods:** To investigate the influencing factors of adolescents' sedentary behavior, and construct the model of adolescents' sedentary behavior by interviewing 27 adolescents using grounded theory, depth interview, focus group, and a survey on 104 adolescents; to test the model by investigating 2100 adolescents using a self-report inventory. **Results:** the information in English in the original version. **Conclusions:** It has been tested that the influencing factors of adolescents' sedentary behavior mainly include 4 categories. Future research can conduct intervention study within China to further test the efficiency of the model. **Funding:** East China Normal University 2020 "Outstanding Doctoral Academy Innovation Improvement Program" (YBNLTS2020-008).

Keywords: Adolescents, Sedentary Behavior, Influencing Factors Model

Oral Presentation B11.6 Building health promoting sports clubs: A participative concept mapping approach

5:25 pm - 5:35 pm (London, England, Wednesday, October 13, 2021)

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Background: Sports clubs (SCs) offer a unique position to increase physical activity levels and offer additional health promotion opportunities. **Purpose:** To gather French stakeholder ideas on support SCs need to increase health promotion efforts and prioritize them. **Methods:** This concept mapping study included 4-steps: 1) drafting a key issue focus prompt, 2) brainstorming ideas in response to the focus prompt, 3) sorting ideas into themed piles and 4) rating ideas (1-6) based on two indicators. French sports and health stakeholders (45) were invited to respond using web-based groupwisdom™ software. Based on multi-dimensional scaling and hierarchical cluster analysis, visual cluster maps of piles and Go-Zone graphs displaying ideas rated as important and feasible were produced. **Results:** Participants generated 62 ideas from the focus prompt: 'What assistance would benefit SCs to become a health-promoting setting?'. Final idea sorting formed 9 clusters: Tools for health promotion, Communication tools, Stakeholder training courses, Diagnostic and Financing, Awareness and Mobilization, Advocacy, Policies and Methods, Sharing and Networking and Communication and Dissemination. Ratings produced Go-Zones with 34 ideas above the mean for both indicators. Priority areas include increasing awareness of health promotion benefits, mobilizing actors, advocating for support and educating club actors. **Conclusions:** Generating and organizing stakeholder ideas gives insight into perceptions of what support is needed to develop and implement health promotion interventions in the sports club context which increases the possibility of acceptance and integration into policies. **Funding:** Study was funded by a grant from Santé publique France.

Keywords: Sports Clubs, Health Promotion, Concept Mapping

Oral Presentation B11.7 Baby steps: Using Intervention Mapping to develop a sustainable perinatal physical activity healthcare intervention

5:35 pm - 5:45 pm (London, England, Wednesday, October 13, 2021)

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Background: While benefits of physical activity (PA) during and after pregnancy have been established, many women do not reach recommended PA levels during that time. A major barrier is limited counselling by healthcare providers (HCPs), partly caused by limited knowledge on the topic. **Purpose:** We used Intervention Mapping (IM), a theory-based framework, to develop the intervention "Baby steps" to improve PA promotion by HCPs in a high-income (Austria) and a low-to-middle income country (South Africa). **Methods:** We applied the following IM steps: 1) A needs assessment to determine barriers and enablers of PA promotion by HCPs, consisting of a scoping literature review and qualitative community needs assessments with midwives, obstetricians and community health workers to determine desired outcomes of the intervention. 2) Performance and change objectives were formulated, describing which behaviours need to change for the intervention to succeed. 3) Based on the change objectives, theory-based behaviour change techniques were selected and practical applications developed. 4) Practical applications were combined into two evidence-based interventions tailored to each country's needs. Step 5) and 6) consist of an implementation and evaluation plan. **Results:** The intervention "Baby Steps" is aimed at HCPs, consisting of a two-day training with practical resources, combining didactic and interactive education. It addresses knowledge on PA as well as skills to transfer knowledge and facilitate behaviour changes. **Conclusions:** We used IM to develop a training for HCPs to improve PA promotion during and after pregnancy. In future, the intervention's effect on women's perinatal activity levels needs to be studied. **Funding:** Funded in Austria by the Centre for International Cooperation & Mobility (ICM) of the Austrian Agency for International Cooperation in Education and Research (OeAD-GmbH): Projectnr ZA 17/2019 and in South Africa by the NRF programme for Scientific & Technological Cooperation. AMD was funded by the Austrian Science Fund FWF (DOC 31-B26) and the Medical University Graz through the PhD Programme Inflammatory Disorders in Pregnancy (DP-iDP).

Keywords: Physical Activity, Pregnancy, Intervention Mapping, Behaviour Change Techniques

Oral Presentation B11.8 Influences on uptake of and engagement with health and wellbeing smartphone apps: A systematic review

5:45 pm - 5:55 pm (London, England, Wednesday, October 13, 2021)

Dorothy Szinay¹, Andy Jones¹, Tim Chadborn², Jamie Brown³, Felix Naughton¹

¹University of East Anglia, United Kingdom, ²Public Health England, United Kingdom, ³University College London, United Kingdom

Background: The public health impact of digital behaviour change interventions is dependent upon sufficient real-world uptake and engagement. **Purpose:** To synthesise influences on the uptake and engagement with health apps, to inform new approaches that promote effective use. **Methods:** Studies of all designs involving adults were included if they focused on health apps reporting on uptake and engagement behaviour. Relevant electronic libraries were searched, with a proportion of studies screened independently by two authors. Data synthesis and interpretation were undertaken using a deductive iterative process. A narrative synthesis of the findings was structured around the components of the COM-B model and the Theoretical Domains Framework. **Results:** Out of 7640 identified studies, 41 were included in the review. Under 'Capability', the main factors identified were app literacy skills, user knowledge, app awareness, user guidance, health information, statistical information, well-designed reminders, features to reduce cognitive load, and self-monitoring features. Availability at low cost, positive tone and personalisation were identified as physical 'Opportunity' factors, while recommendations for health apps, embedded health professional support together with social networking possibilities were social 'Opportunity' factors. Finally, 'Motivation' factors included positive feedback, available rewards, goal setting and the perceived utility of the app. **Conclusions:** The twenty-six factors identified have clear implications for improving population health and targeting health inequalities. A list of recommendations was produced to guide app developers and policy makers when commissioning, developing and optimising health apps. **Funding:** Study funded by DS's PhD studentship (funded by Public Health England and the University of East Anglia).

Keywords: mHealth, Health Apps, Behaviour Change, Smartphone Apps, COM-B Model, Engagement Uptake

Oral Presentations Session B12

Oral Presentation B12.1 Sedentary behavior and physical activity are associated with endothelial dysfunction and low-grade inflammation

4:35 pm - 4:45 pm (London, England, Wednesday, October 13, 2021)

Evelien J. Vandercappellen^{1,2,3}, Annemarie Koster^{3,4}, Hans H. C. M. Savelberg^{5,6}, Simone J. P. M. Eussen^{2,7}, Pieter C. Dagnelie^{1,2}, Nicolaas C. Schaper^{1,2,3}, Miranda T. Schram^{1,2,9,10}, Carla J. H. van der Kallen^{1,2}, Marleen M. J. van Greevenbroek^{1,2}, Anke Wesselius^{6,8}, Casper G. Schalkwijk^{1,2}, Abraham A. Kroon^{1,2,10}, Ronald M. A. Henry^{1,2,10}, Coen D. A. Stehouwer^{1,2}

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Background: Endothelial dysfunction and low-grade inflammation are important in the pathogenesis of cardiovascular disease and can potentially be modified by physical activity and sedentary behavior and may be especially prominent in type 2 diabetes. **Purpose:** To study the relationship between physical activity and sedentary behavior on the one hand and endothelial dysfunction and low-grade inflammation on the other. Specifically, the influence of prediabetes and type 2 diabetes. **Methods:** In the population-based Maastricht Study (n=2363, 28.3% type 2 diabetes) we determined biomarkers of endothelial dysfunction and low-grade inflammation and combined z-score were calculated. Physical activity and sedentary behavior were measured by activPAL. Linear regression analyses were used with adjustment for demographic, lifestyle and cardiovascular risk factors. **Results:** The association between total, light, moderate-to-vigorous and vigorous physical activity and sedentary time on the one hand and endothelial dysfunction on the other were generally significant and were consistently stronger in prediabetes and type 2 diabetes as compared to normal glucose metabolism status (p-interaction<0.05). Associations between physical activity and sedentary behavior on the one hand and low-grade inflammation on the other were also significant and were similar in individuals with and without (pre)diabetes (p-interaction>0.05). **Conclusions:** Physical activity and sedentary behavior are associated with endothelial dysfunction and low-grade inflammation. For endothelial dysfunction, associations between physical activity and sedentary behavior were consistently stronger in (pre)diabetes than in normal glucose metabolism. **Funding Sources:** ERDF, PoL, SDW, P.SID, CVC, CARIM, CAPHRI, NUTRIM, SA, HFL, JCBV, NNF, SAN, EFS/AstraZeneca.

Keywords: Physical Activity, Sedentary Behavior, Endothelial Dysfunction, Low-Grade Inflammation

Oral Presentation B12.2 Sitting less does not improve insulin sensitivity in adults with metabolic syndrome - a randomized controlled trial

4:45 pm - 4:55 pm (London, England, Wednesday, October 13, 2021)

Tanja Sjöros¹, Saara Laine¹, Taru Garthwaite¹, Mikko Koivumäki¹, Henri Vähä-Ypyä², Eliisa Löyttyniemi³, Noora Houttu⁴, Kirsi Laitinen⁴, Harri Sievänen², Tommi Vasankari², Kari K. Kalliokoski¹, Juhani Knuuti¹, Ilkka H. A. Heinonen¹

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Background: Sedentary time has been identified as a risk factor for metabolic disorders such as Type 2 Diabetes. However, there are only few published intervention studies concerning the health effects of reducing sedentary time. **Purpose:** To investigate whether reduced daily sitting, without adding moderate to vigorous physical activity (MVPA) improves insulin sensitivity in 6 months. **Methods:** Sixty-four sedentary inactive adults with metabolic syndrome (age 58 yrs SD 7; 27 men) were randomized to intervention and control groups. The 6-month individualized behavioral intervention supported by interactive accelerometers aimed at reducing daily sitting time for 1h compared to baseline. Insulin sensitivity by hyperinsulinemic euglycemic clamp and body composition were measured and fasting blood samples drawn at baseline and 6 at months. Mean change differences over time were tested with linear mixed models. **Results:** Plasma insulin decreased by 1.1 mU/l in average in the intervention group, while the change in the control group was non-significant. Insulin sensitivity did not change during the intervention. Body mass and BMI decreased and HbA1c increased during the intervention while group change differences reached near significance. Body adiposity decreased but not differently between groups. **Conclusions:** Intervention aiming to reduce daily sedentary time slightly decreased fasting insulin, but had no effects on insulin sensitivity or body adiposity. Therefore, multifaceted interventions targeting both to reduce sedentary time and increase MVPA are likely to be more beneficial. **Funding:** Study founded by The Finnish Cultural Foundation, Juho Vainio Foundation, The Finnish Diabetes Research Foundation, Yrjö Jahnsson Foundation, Hospital District of Southwest Finland, Turku University Foundation and Finnish Sports Institute Foundation.

Keywords: Sedentary Behavior, Insulin Resistance, Metabolic Health, Accelerometry

Oral Presentation B12.3 Standing is associated with insulin sensitivity in adults with metabolic syndrome

4:55 pm - 5:05 pm (London, England, Wednesday, October 13, 2021)

Taru Garthwaite¹, Tanja Sjöros¹, Mikko Koivumäki¹, Saara Laine¹, Henri Vähä-Ypyä², Maria Saarehovi³, Petri Kallio^{3,4}, Eliisa Löyttyniemi⁵, Harri Sievänen², Noora Houttu⁶, Kirsi Laitinen⁶, Kari Kalliokoski¹, Tommi Vasankari^{2,7}, Juhani Knuuti¹, Ilkka Heinonen^{1,8}

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Background: Physical activity (PA) is a determinant of insulin sensitivity. It is more unclear how sedentary behavior (SB) and patterns of SB associate with insulin sensitivity. **Purpose:** To determine how SB, breaks in sitting, standing, PA, and fitness are associated with insulin sensitivity in adults with metabolic syndrome. **Methods:** Sixty-four sedentary adults with metabolic syndrome (mean age 58 years; 37 women) were included. SB, breaks in sitting, standing, and PA were measured for four weeks with accelerometers. VO₂max was measured with maximal cycle ergometry. Insulin sensitivity was determined by hyperinsulinaemic-euglycaemic clamp (M-value) and fasting blood sampling (HOMA-IR, insulin). Multivariable regression was used for analyses. **Results:** Sedentary time, standing, steps, and VO₂max were associated with M-value, HOMA-IR, and insulin, while breaks in sitting associated only with M-value. When adjusted for body fat %, only standing remained significantly associated with HOMA-IR and insulin, and significance was maintained even when further adjusted for PA, SB, and fitness (all p-values <0.05). Light and moderate-to-vigorous PA were not associated with insulin sensitivity. **Conclusions:** Standing is associated with insulin sensitivity markers in sedentary adults. The associations of standing with HOMA-IR and insulin are independent of adiposity, PA, SB, and fitness. Further studies are warranted, but these findings encourage replacing sitting with standing for potential improvements in insulin sensitivity in adults at increased type 2 diabetes risk. **Funding:** Academy of Finland, Finnish Cultural Foundation, Finnish Diabetes Research Foundation, Hospital District of Southwest Finland, Juho Vainio Foundation.

Keywords: Sedentary Behavior, Physical Activity, Cardiorespiratory Fitness, Insulin Resistance, Metabolic Syndrome

Oral Presentation B12.4 Reallocations of movement behaviors and body composition in middle aged and elderly

5:05 pm - 5:15 pm (London, England, Wednesday, October 13, 2021)

Marlou Limpens¹, Amy Hofman¹, Trudy Voortman^{1,2}

¹Erasmus MC University Medical Center Rotterdam, the Netherlands, ²Wageningen University & Research, Wageningen, the Netherlands

Background: Aging is associated with changes in body composition, with increasing risk for obesity, sarcopenia or sarcopenic obesity. Previous studies suggested that body composition can be affected by physical activity and sedentary behavior, however, they did not account for the dependency of these activity domains and sleep, being bound within the 24-hour day. **Purpose:** This study aimed to investigate the associations between reallocations of time among time-use movement behaviors and detailed body composition measurements in middle-aged and older adults. **Methods:** We included 1,874 participants (mean age 71.5±9.3 years, 50.2% women) from the large prospective population-based Rotterdam Study. We collected up to 7 days 24-hour accelerometer data (GeneActiv) to estimate sleep, sedentary behavior (SB), light physical activity (LPA) and moderate-to-vigorous physical activity (MVPA). Body composition was measured using dual-energy X-ray absorptiometry (DXA) from which we calculated: body mass index (BMI), total body fat percentage (%BF), fat mass index (FMI) and fat-free mass index (FFMI). **Results:** MVPA was associated with lower BMI, mainly explained by a lower FMI, irrespective of whether it was replaced with 30 minutes of sleep (B:-0.72, 95%-

confidence interval (CI) -0.98;-0.46), sedentary (B:-0.82, 95%-CI -1.08;-0.56), or LPA (B:-0.76, 95%-CI -1.27;-0.25). More MVPA was to a smaller extent also associated with a lower FFM, but overall with a lower %BF. **Conclusions:** The composition of movement behaviors is associated with body composition in middle-aged and elderly. Increased MVPA at the expense of other physical behavior measures was associated with lower BMI, which was explained mainly by less body fat. **Funding:** Horizon2020.

Keywords: Body Composition, Compositional Isotemporal Substitution Analyses, Movement Behaviors

Oral Presentation B12.5 Associations of accelerometer-measured physical activity volume and intensity with Incident Cardiovascular Disease: UK Biobank Study

5:15 pm - 5:25 pm (London, England, Wednesday, October 13, 2021)

Paddy C. Dempsey^{1,2}, Alex Rowlands¹, Tessa Strain², Katrien Wijndaele², Soren Brage², Francesco Zaccardi¹, Nathan Dawkins¹, Cameron Razieh¹, Melanie Davies¹, Kamlesh Khunti¹, Tom Yates¹

¹Diabetes Research Centre, University of Leicester, ²MRC Epidemiology Unit, University of Cambridge

Background: The role of physical activity (PA) intensity over and above volume on cardiovascular disease (CVD) risk is insufficiently understood. **Purpose:** To investigate integrated associations of PA volume/intensity with incident CVD. **Methods:** Data were from 88,431 adults from UK Biobank (56.3% women) who wore accelerometers on their dominant wrist for 7 days. Cox proportional hazards regression modelled associations between PA volume/day (mg) and the intensity gradient (IG: distribution of intensity: higher/less-negative values indicate proportionately more time at higher intensities) with incident CVD, adjusted for potential confounders. **Results:** During a median follow-up period of 6.1 years 3,469 CVD events occurred. Both higher PA volume and IG were associated with a lower hazard of incident CVD by 21% (12-29%) and 14% (8-20%), when comparing the 25th (20mg and -2.7) to the 10th percentiles (reference; 14mg and -2.9) of either exposure. In interaction analyses, at a PA volume of 14mg and IG values corresponding to the 25th, 50th and 95th percentiles, hazards were 11% (7-15%), 21% (14-28%), and 30% (20-39%) lower for incident CVD compared to the reference (10th percentile). In stratified analyses, a higher IG was equally beneficial across tertiles of PA volume (HR: ~13-32%, relative to a lower IG). **Conclusions:** Findings suggest reductions in CVD risk may be achievable through either increasing PA volume or increasing the proportion of time spent at higher PA intensities, with both conferring additive benefits. This supports multiple approaches/strategies to reducing CVD risk, some of which may be more practical or appealing to different individuals. **Funding:** Research conducted using the UK Biobank Resource under Application Number 33266. TY and accelerometer data processing were supported by the Lifestyle Theme of the Leicester NHR Leicester BRC. TS, SB, and KW are supported by the UK Medical Research Council [grant numbers MC_UU_00006/4 and MC_UU_12015/3].

Keywords: Physical Activity, Intensity, Accelerometer, Cardiovascular Disease

Oral Presentation B12.6 The association of accelerometer-measured sedentary accumulation patterns with Incident Cardiovascular Disease, cancer, and all-cause mortality

5:25 pm - 5:35 pm (London, England, Wednesday, October 13, 2021)

Paddy C. Dempsey^{1,2}, Tessa Strain¹, Elisabeth E. Winkler³, Kate Westgate¹, Kirsten Rennie¹, Nicholas J. Wareham¹, Soren Brage¹, Katrien Wijndaele¹

¹MRC Epidemiology Unit, University of Cambridge, ²Diabetes Research Centre, University of Leicester, ³School of Public Health, University of Queensland

Background: Emerging evidence suggests accruing sedentary behaviour (SB) in relatively more prolonged periods may convey additional cardiometabolic risks. **Purpose:** To examine the association of SB accumulation patterns with incident cardiovascular disease (CVD), all-cause mortality (ACM), and incident cancer. **Methods:** Data were from 7,671 UK middle-to-older-aged adults who wore accelerometers on the right hip for 4-7 days. Cox proportional hazards regression modelled non-linear (spline) associations between two measures of SB accumulation (usual bout duration and alpha [hybrid measure of bout frequency/duration]) and incident CVD, cancer and ACM. Models were adjusted for potential confounders and 24-hour time-use compositions. **Results:** During mean follow-up time of 6.4 years, 339 ACM, 1,106 CVD, and 516 cancer events occurred. Elevated risk of incident cancer and ACM was seen with more prolonged SB accumulation (lower alpha, higher usual bout duration), but not CVD. For alpha and usual SB bout duration, respectively, the confounder-adjusted hazard ratio (HR: [95% CI]) for 90th vs. 10th percentiles were 0.72 (0.54-0.96) and 1.32 (0.97-1.81) with incident cancer and 0.70 (0.53-0.93) and 1.16 (0.86-1.56) with ACM. Further adjustment for 24-hour time-use weakened associations with ACM for usual bout duration (0.95 [0.68-1.34]) and partially for alpha (0.78 [0.57-1.08]). **Conclusions:** Accruing SB in longer bout durations was associated non-linearly manner with significant additional increases in risk of cancer and ACM, but not CVD, with some evidence of direct SB accumulation effects independent of 24-hour time-use. Findings provide some support for considering SB accumulation as an adjunct target of messaging to "sit less and move more". **Funding:** The European Prospective Investigation into Cancer and Nutrition-Norfolk cohort study (DOI 10.22025/2019.10.105.00004) has received funding from the Medical Research Council (MR/N003284/1 and MC_UU_12015/1) and Cancer Research UK (C864/A14136). TS, KWe, KR, SB, and KW are supported by the UK Medical Research Council [grant numbers MC_UU_00006/4 and MC_UU_12015/3] and/or the NIHR Cambridge Biomedical Research Centre (IS-BRC-1215-20014).

Keywords: Sedentary, Patterns, Cardiovascular Disease, Cancer, Compositional

Oral Presentation B12.7 Joint associations of accelerometer-measured physical activity and BMI with mortality: harmonized meta-analysis of cohort studies

5:35 pm - 5:45 pm (London, England, Wednesday, October 13, 2021)

Jakob Tarp¹, Morten W. Fagerland^{1,2}, Knut Eirik Dalene¹, Jostein Steene-Johannessen¹, Bjørge H. Hansen^{1,3}, Barbara J. Jefferis⁴, Peter Whincup⁵, Keith M. Diaz⁶, Steven P. Hooker⁷, Virginia J. Howard⁸, Ariel Chernofsky⁹, Martin G. Larson⁹, Nicole L. Spartano¹⁰,

Ramachandran S. Vasan^{2,10}, Ing-Mari Dohrn¹¹, Maria Hagströmer^{11,12}, Charlotte Edwardson^{13,14}, Thomas Yates^{13,14}, Eric J. Shiroma¹⁵, Paddy C. Dempsey^{13,16,17}, Katrien Wijndaele¹⁶, Sigmund A. Anderssen¹, I-Min Lee^{18,19}, Ulf Ekelund^{1,20}

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Background: What are the joint associations of physical activity/sedentary time and adiposity with mortality risk? **Purpose:** Determine the joint associations of total, light intensity physical activity (LPA), moderate-to-vigorous physical activity (MVPA), and sedentary time with BMI in relation to all-cause mortality risk. **Methods:** Harmonized meta-analysis of 34,492 participants (2034 deaths) with a median age of 62.1 years from 8 population-based prospective cohort studies with device-measured physical activity and sedentary time. Follow-up ranged from 6.0 to 14.5 years. Standard BMI-based categories of weight-status were combined with tertiles of total, LPA, MVPA and sedentary time, yielding 9 combinations of weight status and physical activity for each activity exposure. All studies used multivariable-adjustment and excluded individuals with prevalent cardiovascular disease or cancer. **Results:** There was an inverse dose-response relationship between higher levels of total and intensity-specific physical activity and lower mortality within the normal- and overweight categories, but a clear dose-response relationship within the obese category was only observed for total physical activity. Sedentary time was not associated with mortality risk in individuals with obesity. Compared with the obese-low total activity reference, the HRs (95%CI) were 0.67 (0.48 to 0.94), 0.56 (0.40 to 0.79), and 0.59 (0.44 to 0.79) for the obese-high total activity, overweight-high total activity, and normal weight-high total activity groups. There was no difference in mortality risk between normal weight-low active and obese-low active individuals. **Conclusions:** Higher physical activity was associated with lower risk of mortality irrespective of weight status. **Funding:** No funding directly supported this work. Jakob Tarp was funded by the Research Council of Norway (249932/F20).

Keywords: Exercise, Active, Device, Survival, Adults

Oral Presentation B12.8 Reducing sitting time with standing and light activity in free-living conditions on glycemia post-myocardial infarction

12:10 pm - 12:20 pm (London, England, Wednesday, October 13, 2021)

Abbie C. Bell¹, Julia K. Zakrzewski-Fruer¹, Lindsey Smith¹, Daniel P. Bailey^{2,3}, Jo Richards¹

¹Institute for Sport and Physical Activity Research, University of Bedfordshire, ²Sedentary Behaviour, Health and Disease Research Group, Brunel University London, ³Brunel University, London

Background: Prolonged sitting is an independent risk factor for cardiovascular disease (Tremblay, et al., 2017). Breaking up sitting with light-intensity activity improves cardiometabolic risk markers in healthy and diabetic populations within a free-living environment (Dempsey et al., 2016; Duvivier et al., 2017). Yet, the effects in cardiac patients, a highly relevant population, are unknown. The aim of this study, therefore, is to determine the effects of reducing and breaking up sitting time on glycemia under free-living conditions in participants following a myocardial infarction. **Method:** A repeated measures, randomised cross over study design will be used, under free-living conditions. Cardiac patients (n=20) will take part in two experimental conditions across 11 days: (i) uninterrupted sitting; (ii) sitting with 5 minutes of standing and light intensity physical activity every 30 minutes (3 hours light activity; 2 hours standing each day). Outcomes are interstitial glucose, blood pressure and mood and wellbeing. **Current Status of Project:** This study has received approval from the Health Research Authority and data collection has commenced; n=15 will be available to present at the ISPAH Congress. **Implication of the findings:** The findings will identify whether reducing and breaking up sitting could be effective for improving cardiometabolic health in cardiac patients. It will also inform a feasibility study for a chronic intervention to reduce sitting in this population. **Funding Sources:** Study funded by the Institute for Physical Activity and Research, University of Bedfordshire as part of a larger PhD project.

Keywords: Cardiac Rehabilitation, Sitting Time, Glycemia, Light Intensity Activity

Oral Presentations Session B13

Oral Presentation B13.1 Physical activity levels of 4–5-year-old children in the Northeast of England: An epidemiological study

4:35 pm - 4:45 pm (London, England, Wednesday, October 13, 2021)

Dan Jones¹, Liane B. Azevedo², Emma L. Giles¹, Alison Innerd¹

¹School of Health and Life Sciences, Teesside University, Middlesbrough, UK, ²School of Human and Health Sciences, University of Huddersfield, Huddersfield, UK

Background: Children's early years are a key time for development, with research suggesting that engaging in physical activity (PA) can have positive health effects in the short and long term. Despite this, studies reporting the prevalence of PA in young children are limited. **Purpose:** To provide preliminary epidemiology of accelerometer measured physical activity data in 4–5-year-

old children living in the Northeast of England. As well as report variations according to sex, sociodemographics, BMI-z, day of the week, time of the day and season. **Methods:** Physical activity levels were assessed over 8 days in 4–5-year-old children using ActiGraph GT1M accelerometers. PA data was recorded and processed according to time spent in sedentary behaviour (SB), light moderate, moderate and vigorous PA, and statistical analysis, were performed according to individual and environmental variations. **Results:** This study found that on average children in the Northeast of England surpassed the recommendations of the UK PA (2019) guidelines for under 5's and 5-18-year-olds. However, the major proportion of activity was spent at light intensity. Children were least active in autumn, whereas MVPA was consistent across other seasons. Also, children were more sedentary during weekdays, but performed equal amounts of MVPA on week and weekend days. Differences in PA levels were also found according to sex, socioeconomic status, age, and body mass index-z (BMI-z). **Conclusions:** This study found that on average, young children living in the Northeast of England, met the recommended UK levels of physical activity. However, there is still a need to reduce sex and socioeconomic inequalities in PA, and potentially promote more PA within the school day. Funding: This study was funded by Teesside University as part of the lead authors PhD project.

Keywords: Physical Activity, Sedentary Behaviour, Accelerometer

Oral Presentation B13.2 Level of agreement between physical activity levels determined by accelerometry (ActiGraph) and PAQ-C in 8-year-old children from a black South African population: BC-IT study

4:45 pm - 4:55 pm (London, England, Wednesday, October 13, 2021)

Caroline Molete Sedumedi¹, Makama Andries Monyeki¹, Xanne Janssen², John J. Reilly²

¹Physical Activity, Sport and Recreation Research Focus Area (PhASRec), Faculty of Health Sciences, North-West University, Potchefstroom, South Africa, ²Physical Activity for Health Group, School of Psychological Sciences and Health, University of Strathclyde, Glasgow, Scotland

Background: Misclassification of physical activity (PA) levels in children due the use of invalid methods may heighten related adverse health risks. Objective methods for assessing PA are preferable but are not always feasible due to costs and related logistics, and questionnaires may be more suitable for national surveillance purposes. However, their validity and reliability vary in different populations. **Purpose:** To determine the level of agreement between PA levels measured by accelerometry (ActiGraph Model GT3X-BT) and the Physical Activity Questionnaire for Older Children (PAQ-C) in 8-year-old children from a black South African population. **Methods:** Eight-year-old children (8.37 ± 0.73 years) from a larger study were participants. PA was determined using the objective and subjective methods of accelerometer (ActiGraph) and PAQ-C, respectively. Bland–Altman plots were used to assess the level of agreement between ActiGraph and PAQ-C. **Results:** No significant gender difference in PA score determined by PAQ-C was found. When ActiGraph was used, boys reported significantly ($p < 0.05$) higher moderate PA, vigorous PA and moderate-to-vigorous PA than girls. The results show a significant ($p < 0.001$) mean bias of -0.50, and equivalent (r^2) of -0.01%, with limits of agreement ranges from -0.23 to -0.68, SEE of 0.14, equivalent (r^2) to -0.1% for total sample. Furthermore Bland–Altman plots showed poor level of agreement between PA levels by ActiGraph and PAQ-C ($p > 0.05$). The results further reveal that PAQ-C underestimated the PA of the sample population. **Conclusion:** Poor level of agreement existed between the two methods used to assess PA. PAQ-C underestimated PA levels in a sample of South Africa black children. PAQ-C, when used as a lone method for assessment of PA levels, should be approached with caution and where possible, the use of both objective measures and self-report is recommended. **Funding:** Research supported by the South African Medical Research Council (MRC) under the Self-Initiated Research Grants Programme. Additionally, funds received from the NRF for rated researchers are acknowledged. Financial support received from North-West University in the establishment of the stable isotope laboratory for the determination of body composition within the PhASRec research entity is greatly appreciated. Additionally, we would like to thank the IAEA for financial support (TC project SAF6020).

Keywords: Physical Activity, Objective, Subjective, Deuterium Dilution Method, South African Children

Oral Presentation B13.3 Development and validation of bioelectrical impedance analysis in predicting total body water and adiposity in 6- to 8-year-old South African school children

4:55 pm - 5:05 pm (London, England, Wednesday, October 13, 2021)

Lynn Moeng-Mahlangu¹, Makama A. Monyeki¹, John J. Reilly², Herculina S. Kruger³

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Background: Limited information is available on studies validating prediction equations against criterion methods, determining total body water (TBW) and fat-free mass (FFM) in children from low to middle-income countries like South Africa. **Purpose:** To develop and validate bioelectrical impedance analysis (BIA) to predict TBW and FFM in 6- to 8-year-old South African school children. **Methods:** A cross-sectional study with 299 (149 development and 150 validation groups) 6- to 8-year children (mean age of 7.63 ± 0.84) was used. TBW and FFM were determined with Deuterium Oxide Dilution, the reference method and predicted using BIA (Bodystat 1500®) with 50 kHz frequency. Paired t-tests compared the mean differences between BIA and Deuterium Dilution using the Statistical Package for Social Sciences (SPSS V26®). The new BIA equation was determined by multiple regression, and the accuracy of prediction equations for both TBW and FFM was assessed using Bland Altman plots. The level of significance was set at $p \leq 0.05$. **Results:** Some of the published TBW and FFM equations for BIA validated in the study demonstrated under- or over-estimations. The newly developed South African equation had higher accuracy for both TBW and FFM prediction. Significant associations ($p < 0.001$) were found between TBW and impedance index for both development group ($R^2 = 74.3\%$) and cross-validation group ($R^2 = 82.6\%$). The newly developed BIA prediction equation for the estimation of TBW was $1.472 + 0.257*(Ht^2/R) + 0.225*(weight) - 0.769*(sex) + 0.333*(age)$ with a regression coefficient $R = 0.935$ and $SEE = 0.801$; and FFM $= 1.466 + 0.333 (Ht^2/R) + 0.292*(weight) - 0.997*(sex) + 0.491* (age)$, with a regression coefficient $R = 0.934$ and $SEE = 1.055$.

No significant differences ($p > 0.05$) were found between measured and predicted values for the validation group. Bland Altman plots showed a good level of agreement between TBW and FFM predicted by the new equations against reference measures of TBW and FFM. The bias expressed as the mean difference in TBW or FFM measured by isotope dilution and BIA was 0.0 ± 0.69 l [95% CI: -1.352; 1.352] for TBW and 0.00 ± 0.90 kg FFM [95% CI: -1.764; 1.764]. The limits of agreement were respectively; -1.352; 1.352 and -1.764; 1.764 kg for TBW and FFM. The concordance correlation coefficients for the criterion values against the newly developed predicted BIA equations for TBW and FFM respectively were high (both $r = 0.91$). **Conclusion:** It was evident that the published equations used for comparison in the current study are invalid to predict TBW and FFM in South African children. The newly developed equation demonstrates the potential for practical and accurate estimation of TBW and FFM for use in comparable groups of South African children aged 6 to 8 years. **Funding:** Research supported by the South African Medical Research Council (MRC) under the Self-Initiated Research Grants Programme. Additionally, funds received from the NRF for rated researchers are acknowledged. Financial support received from North-West University in the establishment of the stable isotope laboratory for the determination of body composition within the PhASRec research entity is greatly appreciated. Additionally, we would like to thank the IAEA for financial support (TC project SAF6020).

Keywords: Deuterium Dilution Technique, Bioelectrical Impedance Analysis, Body Composition, Obesity, Fat Mass, South African Children

Oral Presentation B13.4 The prevalence and changes of postural deformities during the course of adolescence in a cohort of South African adolescents: The PAHL study

5:05am - 5:15am (London, England, Wednesday October 13, 2021)

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Background: Evidence exists that postural disorders may occur during growth and development in children. Research regarding posture changes during adolescents, especially in black children is limited. Purpose: To determine the prevalence and changes of postural deformities during the course of adolescence among black South African adolescents. Methods: A total of 100 black South African adolescents, aged 14 years in 2010 and 18 years in 2014, were part of the Physical Activity and Health Longitudinal Study (PAHLS). Participants' stature, body mass, and the New-York Posture Test of postural deformities were measured. Each test item was scored on a 5-3-1 basis and the score of each item was based on the criteria and drawings located on the score sheet The Adam's Test was used to evaluate for scoliosis. Additionally, an inkpad (The Harris Mat Impression system, Step Forward Foot Correctors®) was used to obtain a walking footprint of each participant. The footprints were scored as follows: 5 = high arches, 3 = arches lower and feet slightly flat and 1 = arches low and feet markedly flat. **Results:** The results show that in all 13 variables of postures, the prevalence of abnormal posture ranged from 0-35% and slightly abnormal ranged from 16-73% for the total group across the measured points. The observed findings in the present study for the total group, showed a high prevalence for forward head, forward shoulders, hip sway, lordosis, and uneven shoulders in the abnormal and slightly abnormal category in 2014. Out of the 13 posture variables, boys showed more abnormal posture (forward head, $p \leq 0.001$; forward shoulders, $p \leq 0.001$ kyphosis, $p = 0.007$ and hip sway, $p = 0.048$) than the girls who were presented with three categories of significant changes in abnormal posture (forward head, $p \leq 0.001$; uneven shoulders, $p = 0.049$ and lordosis, $p = 0.004$) over the period of study. **Conclusion:** The prevalence of posture abnormality indicated that boys were more affected than the girls. The prevalence of the postural deviations increased over the course of adolescence. Implementing intervention programmes in schools to address these postural deviations at an early stage should be encouraged. **Funding:** Research supported by the South African Medical Research Council (MRC) under the Self-Initiated Research Grants Programme. Additionally, funds received from the NRF for rated researchers are acknowledged.

Keywords: Body Postural Deformities, Adolescence, Postural Changes, Postural Adaptations, South African Adolescent

Oral Presentation B13.5 Perceived key influencers to promote physical activity among Irish adolescents during first COVID-19 lockdown

5:15 pm - 5:25 pm (London, England, Wednesday, October 13, 2021)

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Background: Adolescents undergo vast bodily changes with a decline in physical activity (PA) with age, yet less is known about how information sources change during this transition. **Purpose:** To investigate how adolescents rate key influencers to promote PA among Irish adolescents during the first COVID-19 lockdown. **Methods:** Adolescents aged between 12-17y old ($n = 3204$, 63% females) in seven schools involved in the Active School Flag feasibility study completed an online survey in November 2020 about the first COVID-19 lockdown. Responses to perceived influence different people (i.e. family, friends, coach, teacher, celebrities, bloggers) had to promote PA (5-point agreement scale), with acceptable face validity. Multivariate linear regression analyses on age were stratified by gender and self-reported moderate-to-vigorous PA (MVPA) levels. **Results:** Females were less physically active than males ($p < .001$) and PA declined with age ($p < .001$). Sport coaches were the strongest influence irrespective of gender, age or PA levels. Bloggers had lowest influence for males, although increased with age for females, particular those who were reported 5-6 days of MVPA ($p = .002$). Family influence declined with age irrespective of gender or PA levels. Influence of friends increased with age among males ($p < .001$) and females ($p < .001$) who reported 3-4 days of MVPA. **Conclusions:** Sport coaches remain highly influential for all Irish adolescents, even during COVID-19 lockdown, yet family influence waned with age. Friends play an important role among aging adolescents with low PA. Strategies to promote PA outside of school need to take into

consideration age of adolescents. **Funding:** The University of Limerick, Mayo Education Centre, Healthy Ireland and St. Vincent's Charity.

Keywords: Transitions, Health Promotion, Epidemiology

Oral Presentation B13.6 Adolescents with disabilities and physical activity during first COVID-19 lockdown

5:25 pm - 5:35 pm (London, England, Wednesday, October 13, 2021)

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Background: It has been suggested that adolescents with disabilities have been worse off during the first COVID-19 lockdown. **Purpose:** To study the perceived changes in moderate to vigorous physical activity (MVPA) among Finnish late adolescents during the COVID-19 lockdown. **Methods:** National representative data from high school students (n= 2408, mean age = 17.4y, 64% females) completed online self-report survey about MVPA and changes in PA during lockdown during spring 2020. Disability was measured by the self-reported version of the Washington Group Child Functioning Module, and grouped into sensory (see, hear, speak), cognitive (learn, remember, concentrate) and behavioural (routine changes, control behaviour, making friends) disabilities. Multinomial regression analyses (reference 0-2 days of MVPA) with different disability types were performed, with gender and age as covariates. **Results:** PA levels were not different between males and females, or between adolescents with and without sensory difficulties. Adolescents without cognitive difficulties (OR = 1.6, CI=1.1-2.5; OR = 1.9, CI=1.2-2.9) or without behavioural difficulties (OR = 1.8, CI=1.3-2.5; OR = 2.6, CI=1.7-3.9) were more likely to report 3-4 or 5-6 days of MVPA than 0-2 days with cognitive or behavioural difficulties, respectively. Adolescents without behavioural difficulties (OR = 2.4, CI=1.4-4.2) were more likely to report daily MVPA than without difficulties. There were no associations with change in PA (39% less, 39% more) during lockdown and disabilities. **Conclusions:** Improvements in strategies to promote PA amount adolescents with behavioural or cognitive difficulties. Moreover, changes in PA during lockdown was not different for adolescents with and without disabilities. **Funding:** This work was supported by the Ministry of Education and Culture (OKM/130/626/2018) and the Strategic Research Council (SRC) at Academy of Finland for the project Healthy Lifestyles to Boost Sustainable Growth (STYLE, project number 320403 and 320400).

Keywords: Teenagers, Functional Difficulties, Surveys, Epidemiology, Surveillance

Oral Presentations Session B14

Oral Presentation B14.1 Movement behaviours and sleep locked within the 24-hour day: Compositional associations with mental health

4:35 pm - 4:45 pm (London, England, Wednesday, October 13, 2021)

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Background: Physical activity, sedentary behaviour and sleep are suggested risk factors for poor mental health, also in middle-aged and elderly. Durations of these behaviors are bound within the 24h-day, yet this relative nature of the data has often not been taken into account. **Purpose:** To investigate the associations of reallocations of time among physical activity, sedentary behaviour and sleep with depressive and anxiety symptoms. **Methods:** Between 2011 and 2016, accelerometer data (mean duration 5.8±0.4 days) were collected to estimate physical activity, sedentary behaviour and sleep, and validated questionnaires were used to assess depressive (Center for Epidemiologic Studies-Depression) and anxiety (Hospital Anxiety Depression Scale) symptoms among 1,943 participants (mean age 71±9 years, 52% women) from the population-based Rotterdam Study. Compositional isotemporal substitution analyses were performed. **Results:** In confounder adjusted models, a reallocation of 30 minutes more moderate-to-vigorous physical activity was associated with a -0.55 (95%-confidence interval (CI): -1.04;-0.06) points lower depressive symptoms score when replacing sleep, a -0.59 (95%CI: -1.06;-0.12) points lower score when replacing sedentary behaviour and a -0.70 (95%CI: -1.63;0.24) points lower score when replacing light physical activity. No associations were found for anxiety. **Conclusions:** More moderate-to-vigorous physical activity is associated with less depressive symptoms when it replaces either sleep, sedentary behaviour or light physical activity. Although the design of our study is cross-sectional, we speculate that mainly intensive types of physical activity are important in this age group in relation to depressive symptoms.

Keywords: Physical Activity, Sedentary Behaviour, Sleep, Accelerometry, Mental Health

Oral Presentation B14.2 Physical activity and mental health among adolescents in Norway; A longitudinal study

4:45 pm - 4:55 pm (London, England, Wednesday, October 13, 2021)

Ingeborg Barth Vedøy^{1,2}, Knut Skulberg¹, Hege Eikeland Tjømsland¹, Sigmund Alfred Anderssen², Miranda Thurston¹

¹Inland Norway University of Applied Sciences, Norway, ²Norwegian School of Sport Sciences, Norway

Background: Recent data suggest that the mental health (MH) of many adolescents is less than optimal in Norway as elsewhere.

Physical activity (PA) has been proposed as a possible modifiable factor that could influence MH in a positive way. Previous studies have mainly used a cross-sectional design to explore these associations and used a single measure of MH. **Purpose:** Explore whether changes in objectively assessed PA [Total PA and moderate to vigorous PA (MVPA)] are associated with changes in mental health problems and mental well-being among adolescents. **Methods:** Longitudinal data were collected in three waves between 2016-2018. Baseline participation comprised 599 adolescents (54.4% girls; mean age 13.3 years). Total PA and MVPA were measured by ActiGraph GT3X+/BT. Mental health problems were measured by the Strengths and Difficulties Questionnaire (SDQ) and mental well-being by the Warwick-Edinburgh Mental Wellbeing scale (WEMWBS). Partial correlation analysis was used to model the associations between changes in PA and MH. **Results:** Neither main analysis, nor gender specific sub-analysis showed any evidence for changes in PA [Total PA and MVPA] being associated with changes in mental health problems ($p>0.05$) or mental well-being ($p>0.05$). **Conclusion:** Our data suggest that changes in Total PA and MVPA are unrelated to changes in mental health problems and mental wellbeing among adolescents during lower secondary school. The pattern was similar among boys and girls, indicating that gender differences in PA-level and measures of MH did not explain the results of the main analysis. **Funding:** Study funded by the Norwegian Research Council (238212/F60).

Keywords: Adolescents, Physical Activity, Accelerometry, Mental Health

Oral Presentation B14.3 Depressive and anxiety symptoms differ based on doses of physical activity and screen-time among adolescents

4:55 pm - 5:05 pm (London, England, Wednesday, October 13, 2021)

Chloe Forte^{1,2}, Darragh O'Sullivan¹, Cillian McDowell^{1,2,3}, Ciaran MacDonncha^{1,2}, Matthew P. Herring^{1,2}

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Background: Higher levels of screen-time (ST) and physical activity (PA) are associated with better and worse mental health outcomes in adolescents, respectively. The concurrent dose-response relationship between ST and PA with mental health is not yet known. **Purpose:** This study examined associations of ST and PA with depressive and anxiety symptoms among 1756 adolescents (15.2 ± 1.6 y; 995 female) in Ireland. **Methods:** Participants completed the Quick Inventory of Depressive Symptomatology, State-Trait Anxiety Inventory and self-reported weekly ST and PA level (low, moderate and high; TV, computer and phone use). One-way ANOVA examined differences in anxiety and depressive symptoms between dose categories of each ST mode, PA level and their interactions. **Results:** Depressive symptoms were significantly higher for high levels of TV, computer and phone use compared to lower levels (all $p<0.05$, $d=0.17$ to 0.84), the same was observed for anxiety in phone and computer use (all $p<0.05$, $d=0.22$ to 0.61). Depressive and anxiety symptoms were significantly lower for higher PA levels (all $p<0.001$, $d=-0.86$ to -0.21). When considered together, significant differences in depressive and anxiety symptoms were observed across ST, PA interaction categories for ST modalities (all $p<0.001$ $d=-2.01$ to 1.53). **Conclusions:** As PA dose increases in all ST categories, mental health outcomes were progressively better. The opposite was observed for ST, illustrating a bidirectional, dose-response relationship. These findings show the dose-response relationship between ST and PA levels with mental health, separately and concurrently, and demonstrate the importance of considering movements jointly in adolescents. **Funding:** N/A.

Keywords: Dose-Response, Sedentary Behaviour, Cross-Sectional Study

Oral Presentation B14.4 Cardiometabolic risk factors and mental health status among truck drivers: A systematic review

5:05 pm - 5:15 pm (London, England, Wednesday, October 13, 2021)

Amber Guest¹, Yu-Ling Chen¹, Natalie Pearson¹, James King^{1,2}, Nicola Paine¹, Stacy Clemes^{1,2},

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Background: The poor health status of truck drivers is of public concern given the links between poor health and risk of a collision. **Purpose:** This study aimed to systematically review and summarise the literature on cardiometabolic risk factors, lifestyle-health behaviours and mental health status of truck drivers globally to ascertain the scale of these health concerns. **Methods:** A systematic review was performed between January 2019-January 2020. Papers were included if they were 1) in English, 2) reported data on truck drivers, 3) included outcomes related to cardiometabolic markers of health, mental health and/or health behaviours and 4) published in a peer-reviewed journal. Methodological quality was assessed. Due to heterogeneity of the outcomes, results were narratively presented. **Results:** Seventy-three studies met the inclusion criteria. Strong evidence was observed globally for truck drivers to exhibit high levels of cardiometabolic risk factors such as high BMI, hypertension, adverse blood profiles, mental ill-health and smoking status. However, insufficient evidence related truck driving to disease status. **Conclusions:** The findings demonstrate that the health of truck drivers is of global concern. Truck driving is associated with enforced sedentarism, long and irregular working hours, lack of healthy foods, social isolation and chronic time pressures. Improving truck driver health is vital for the longevity of the trucking industry, and for the safety of all road users. The workplace plays a vital role in truck driver health; policies, regulations and procedures are required to change to address this health crisis. **Funding:** None.

Keywords: Systematic Review, Workplace Health, Physical Activity

Oral Presentation B14.5 Device-measured physical activity and mental disorders: A UK Biobank prospective cohort study

5:15 pm - 5:25 pm (London, England, Wednesday, October 13, 2021)

Frederick K. Ho¹, Fanny Petermann-Rocha^{1,2}, Solange Parra-Soto^{1,2}, Jirapitcha Boonpor², Stuart R. Gray², Jill P. Pell¹, Carlos Celis-Morales^{2,3}

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Background: Evidence on associations of device-based physical activity (PA) with mental disorders is limited. **Purpose:** This study aims to investigate the association between device-measured PA and mental disorders. **Methods:** 43,043 participants from UK Biobank were included in this prospective cohort study. Wrist-worn accelerometers were used to measure total, moderate-to-vigorous (MVPA), moderate (MPA), and vigorous (VPA) PA. Associations between PA domains and mental disorders (including depression and anxiety) were analysed using penalised splines in Cox proportional hazard models. Analyses were adjusted for sociodemographic and lifestyle factors. Sensitivity analyses were conducted adjusting for body-mass index and longstanding illnesses as well as excluding events in the first two years of follow-up. Population attributable fractions for insufficient MPA and VPA were estimated. **Results:** After a median follow-up of 6.1 years, 1,672 (4.2%) individuals were diagnosed with mental disorders. Compared with participants who had no MVPA at all, those who performed 150-300 minutes of MPA/week (HR 0.58, 95% CI 0.50-0.67) and 75-150 minutes of VPA/week (HR 0.66, 95% CI 0.53-0.83) were at lower risk of overall mental disorders after mutual adjustment. However, owing to the high prevalence of sufficient MPA, only 1.93% of mental disorders was attributed to MPA <150 minutes/week, while 18.88% was attributed to VPA <75 minutes/week, assuming causality. Results were consistent in sensitivity analyses. **Conclusions:** Device-measured PA was associated with lower risk of mental disorders. A significant proportion of mental health burden may be avoidable through increased VPA. **Funding:** None.

Keywords: Accelerometry, Mental Health, Physical Activity, Public Health

Oral Presentation B14.6 Understanding the experience of initiating community-based group physical activity by people with serious mental illness: A systematic review using a meta-ethnographic approach

5:25 pm - 5:35 pm (London, England, Wednesday, October 13, 2021)

Helen Quirk¹, Emma Hock¹, Deborah Harrop², Helen Crank², Emily Peckham³, Gemma Traviss-Turner⁴, Katarzyna Machaczek², Brendon Stubbs⁵, Michelle Horspool⁶, Scott Weich¹, Robert Copeland²

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Background: Regular physical activity (PA) may bring symptomatic improvements and enhance wellbeing among people living with serious mental illness (SMI), especially when undertaken in community-based group settings. Initiating PA can be difficult for people with SMI and so PA engagement is commonly low. **Purpose:** To use a meta-ethnography approach to review qualitative studies exploring the experience of PA initiation in community, group settings among adults with SMI. **Methods:** Eligible studies used qualitative methodology; involved adults (≥18 years) with schizophrenia, bipolar affective disorder, major depressive disorder, or psychosis; reported community-based group PA; and captured the experience of PA initiation. Study selection and quality assessment were performed by four reviewers. **Results:** Sixteen qualitative studies were included for review. We identified a 'journey' of PA initiation, including thought processes, expectations, barriers and support needs. Support from a trusted source was particularly important for getting people to the activity, both physically and emotionally. **Conclusions:** The journey illustrated that initiation of PA for people with SMI is a long complex transition. This complex process needs to be understood before ongoing participation in PA can be addressed. We provide recommendations for the design and delivery of supportive PA programmes for people with SMI. **Funding:** This review was funded by Sheffield Health and Social Care NHS Foundation Trust.

Keywords: Adults, Physical Activity, Serious Mental Health, Systematic Review

Oral Presentation B14.7 When mind-body-spirit is built in: Holistic Movement Practices as an emerging category of physical activity

5:35 pm - 5:45 pm (London, England, Wednesday, October 13, 2021)

Ineke Vergeer¹

¹University of Southern Queensland

Background: The landscape of physical activities in Western countries increasingly includes physical practices that are embedded in holistic philosophies of well-being. As such, they go beyond what is typically offered in physical activity contexts to deliberately include mental, social and/or spiritual elements. Yoga, t'ai chi and qigong are prime examples; however, there also exist a range of other, lesser known, practices that would fit this description (e.g., 5Rhythms®, Biodanza). Such holistic movement practices (HMPs) are complex and multicomponent practices whose position within the field of physical activity has thus far received limited research attention, in particular with respect to their potential contributions to mind-body-spirit well-being. **Purpose:** To introduce the notion of HMPs as a category of practices that deserve attention in the field of physical activity and health. **Methods:** A conceptualization of HMPs as a category of physical activity will be presented, along with considerations for research and policy. **Results:** Considerations include potential additional effects due to the holistic components, the challenge of the multicomponent nature of these practices for outcome research, the difficulty of capturing the smaller HMPs in surveillance research, issues around teacher training, accreditation and consequences for provision and spread, possible genderedness of these practices, and relationship with healthcare systems. **Conclusions:** Because of their deliberate inclusion of holistic elements beyond the physical, HMPs may play unique roles in addressing mind-body-spirit well-being. They deserve increased attention in the field of physical activity research and policy. **Funding:** N/A.

Keywords: Mind-Body-Spirit, Holistic Wellbeing, Yoga, Tai Chi, Conscious Dance

Mini-Oral Presentations Session B1

Mini-Oral Presentation B1.1 Effects of COVID-19 in physical activity and sedentary behaviour in Catalan adults

11:00 am - 11:02 am (London, England, Wednesday, October 13, 2021)

Lena Reislöf¹, Angelina Gonzalez-Viana¹, Conxa Castell¹, Eva Jané-Llopi², Joan Colom², Carmen Cabezas¹

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Background: The COVID-19 pandemic and the social measures have had an enormous impact on people's lifestyles. Health services have oriented their agendas to COVID-19 to tackle it. **Purpose:** To study the impact of lockdown on PA levels. **Methods:** The ad hoc questionnaire "Health during coronavirus lockdown" was designed (130 questions) and sent through social networks between April 21st and May 20th. PA and sedentary behaviour were registered with the IPAQ – International Physical Activity Questionnaire – and compared with pre-lockdown data of the Catalan Health Survey (CHS). **Results:** 37,810 Catalan residents, older than 15 years, participated: 74.1% women, 57.3% of which had a university degree, and 60.9% were actively working. During the lockdown period, 50.2% of the population had been sitting for more than 6 hours a day, which means a significant increase in sedentary lifestyle compared to 35.3% before lockdown. During lockdown 34.8% of people reported having a low level of PA compared to 17.9% observed in the 2018 CHS. 19.4% of Catalans performed intense PA during lockdown vs. 26.5% before the pandemic. Moderate levels of PA decreased to 45.7% during lockdown in comparison to the previous of 55.7%. Trends are similar for men and women, and among different age groups. **Conclusions:** Lockdown is related to a deterioration of healthy lifestyles. It is significantly associated with sedentarism and physical inactivity. It should be important to reinforce physical activity programmes through health resources. **Funding:** This study is funded by the Public Health Agency of the Ministry of Health of the Government of Catalonia together with IDIAP Jordi Gol and ESADE.

Keywords: COVID-19, Health Promotion, Physical Activity, Sedentary Behaviour

Mini-Oral Presentation B1.2 Physical activity patterns of young adults during the COVID-19 pandemic

11:02 am - 11:04 am (London, England, Wednesday, October 13, 2021)

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Background: The coronavirus disease (COVID-19) pandemic led many countries to implement restrictive measures, including lockdowns, in order to reduce the spread of the infection. Hence, populations worldwide are at high risk of physical inactivity. **Purpose:** We aimed to study the patterns of physical activity (PA) among young adults during COVID-19 lockdown. **Methods:** This cross-sectional study comprised 560 Moroccan young adults recruited during COVID-19 lockdown. PA was measured using the French version of the Global Physical Activity Questionnaire (GPAQ). **Results:** The mean age of respondents was 21.9 ± 3.6 years and 66.1 % were women. 40.9 % showed high level of PA, 25 % and 34.1 % showed moderate level and low level of PA, respectively. The median time (median [Q1 – Q3]) of total PA was 38.57 [12.86 – 110.89] min/day. As for amounts of PA by domains, the median time of work related PA was 0.00 [0 – 18.75] min/day, and 10.71 [0.00 – 28.93] and 12.86 [0.00 – 38.57] of work- and recreation related PA, respectively. The time spent in sitting was 8.00 [6.00 – 12.00] hours/day. A significant gender difference was observed with women having lower physical activity ($p = 0.006$). **Conclusions:** This study provides information about physical activity levels and patterns of young adults during the COVID-19 outbreak. Reporting this information is important during stressful periods like the ongoing COVID-19 pandemic to evaluate population's behaviors in times of crises, and importantly to help establish and develop recommendations promoting physical activity. **Funding:** None.

Keywords: Physical Activity, Young Adults, COVID-19

Mini-Oral Presentation B1.3 "When You Move You Have Fun". Perceived barriers, and facilitators of physical activity from a child's perspective

11:04 am - 11:06 am (London, England, Wednesday, October 13, 2021)

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Background: In Northern Ireland (NI), many children do not meet the recommended levels of physical activity (PA). To reduce the prevalence of physical inactivity and associated conditions, it is important that the influences on children's PA are better understood. **Purpose:** To examine the current views, barriers, facilitators, experiences, and perceptions of children in relation to PA in the classroom, school, and home environment. **Methods:** Focus groups ($n=10$) and write and draw tasks were conducted with 7- to 9-year-old children ($n=50$) in six primary schools across NI. Groups were semi-structured using photo-based activities to initiate discussion. All were recorded, transcribed, and analyzed thematically. Mixed-method analysis was used using pen profiles and the use of verbatim quotations. Pen profiles were constructed from the transcripts in a deductive manner and represent key emergent themes. **Results:** Results indicated that children's perception of PA was mainly structured and sport-based, several referred to fun,

play and health. Children focused on the activity and sport they like as to why they like activity. Barriers included peer influence, limited space, lack of time, and school policies. Facilitators identified were incentives, structured activities, technology, and teacher influence. **Conclusions:** Findings contribute to a more detailed understanding of children's perceptions of context specific physical activity, the participation barriers they face, in addition to factors that support them to lead a physically active lifestyle may inform future PA promotion strategies. **Funding:** This work was funded by Northern Ireland Chest, Heart and Stroke, Belfast, UK.

Keywords: Children, Health, Physical Activity, Qualitative, School

Mini-Oral Presentation B1.4 Where are tweens active in school playgrounds? A hot-spot analysis using GPS, accelerometer, and GIS data

11:06 am - 11:08 am (London, England, Wednesday, October 13, 2021)

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Background: Children's physical activity (PA) decreases with age and declines rapidly during tween years (9 and 12 years). Despite the known potential of school playgrounds for facilitating physical activity (PA), little is known about school playground use of tweens. **Purpose:** To map PA hot and cold spots of tweens on school playgrounds. **Methods:** The sample included four school playgrounds, 376 tweens, and 1056 valid days of playground use. Children were monitored using GPS and accelerometry during five school days. The children wore the devices in an elastic belt around the waist and were instructed to go about their day as usual. **Results:** Several types of school playground areas and play equipment were used by tweens. Soccer fields and remote areas were hot spots for both boys and girls and hot spots on climbing equipment were found for girls. Combinations of a hot spot for one gender and a cold spot for the other gender were found on all four playgrounds indicating areas where one gender was active and the other was onlooker. **Conclusions:** We concluded that school playgrounds are used by tweens and thereby have potential for enhancing PA for this age group. Popular playground areas included soccer fields and remote areas as well as equipment for girls. These findings contribute with important knowledge on what to build to attract tweens to more PA on school playgrounds. **Funding:** This work was supported by the Innovation Fund, Denmark [0153-00012B].

Keywords: Tweens, Physical Activity, School Playgrounds, Accelerometry, Hot Spot Analysis

Mini-Oral Presentation B1.5 Effects of active and active structured play on physical activity in preschool children – A systematic review

11:08 am - 11:10 am (London, England, Wednesday, October 13, 2021)

Carina Nigg^{1,2}, Mirnes Dekanovic¹, Simon Endes³, Claudio R. Nigg¹, Mirko Schmidt¹

¹Institute of Sport Science, University of Bern, ²Institute of Sports and Sports Science, Karlsruhe Institute of Technology, ³Ecoplan AG – Economic Research and Policy Consultancy

Background: While it is well known that active play is an essential behavior in preschool children, less is known how its structure, specifically active free and structured play, impacts physical activity. **Purpose:** To systematically review the literature on active free and structured play. **Methods:** We searched six major databases for relevant literature. To be included, studies were required to 1) report on an active structured or free play intervention, 2) include children ≤ 7 years, and 3) investigate effects on physical activity or sedentary behavior. **Results:** Of 9,768 search results obtained, 45 publications were included. Most studies were conducted in preschools and investigated active free play interventions which mainly consisted of environmental changes (e.g., equipment provision) and additional play time. Active structured play interventions consisted of physically active games and play-based motor skill activities. Compared to treatment-as-usual, most studies showed that free play was effective in increasing device-based moderate-to-vigorous physical activity and decreasing sedentary behavior. Most studies indicated that free play was not effective in improving motor skills. Structured play results for physical activity and sedentary behavior were heterogenous. **Conclusions:** Active free play can be useful to increase moderate-to-vigorous physical activity and decrease sedentary behavior. For motor skill improvement, other physical activity types should be implemented. Future research should expand research on active structured play. For both active free and structured play, the scope should be expanded beyond physical activity and motor skill outcomes. **Funding:** Health Promotion Switzerland.

Keywords: Active Play, Preschool, Physical Activity, Sedentary Behavior

Mini-Oral Presentation B1.6 Association between the perceived neighbourhood environmental walkability and self-reported physical activity in South African adolescents

11:10 am - 11:12 am (London, England, Wednesday, October 13, 2021)

Feyisayo. A. Odunitan-Wayas¹, Damaris K. Musera¹, Ayanda Africa¹, Sacha West², Tenielle Venter², Maylene Shung-King³, Tolullah Oni^{3,4}, Abby C. King^{5,6}, Estelle V. Lambert¹

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Background: Globally, policy and environmental interventions have been endorsed to reduce physical inactivity for improved wellbeing, especially in adolescents. **Purpose:** Understanding the physical activity (PA) levels of urban South African (SA) adolescents and their association with perceived neighbourhood walkability could lead to age-specific interventions to increase PA. **Methods:** Adolescents (90 girls; 42 boys; mean age 14.95) from 3 high schools were recruited to represent 3 categories of learners from: low-income households schooling in low-income neighbourhoods (L-L); low-income households schooling in middle-high-income neighbourhoods (L-MH); and middle-high income households schooling in middle-high-income neighbourhoods (MH-MH). A locally-validated adolescent PA questionnaire and the Neighbourhood Environment Walkability Scale (NEWS)-Africa were administered. Data were analysed using descriptive analyses, independent t-tests and Spearman's correlations. **Results:** L-L adolescents reported less vigorous PA in school sports ($p=0.001$), and more active transport ($p=0.017$) and chores ($p=0.009$) PA compared to other categories. Vigorous leisure PA was positively associated with land-use mix access ($r=0.3$; $p=0.03$) and negatively correlated ($r=-0.04$; $p=0.02$) with traffic safety in L-MH adolescents. In L-L adolescents, Traffic, crime, lack of personal safety and worse infrastructure for cycling/walking were associated with less active transport PA, while better aesthetics was associated with more light-PA ($r=-0.3$; $p=0.03$). Lack of personal safety was correlated with less PA outside school ($p<0.05$) for all 3 categories. **Conclusions:** Perceived lack of safety is a major barrier to PA in South African adolescents, and the built environment may negatively influence the PA levels of L-L adolescents in particular. This study adds to the limited available evidence on environmental constraints to physical activity in young persons from lower- and middle-income countries. **Funding:** NIHR (16/137/34), NIH FIC D43TW010540 and OBSSR.

Keywords: Adolescents, Physical Activity, Neighbourhood-Walkability, Socioeconomic

Mini-Oral Presentation B1.7 Urban-rural differences in children's and adolescent's physical activity and screen time trends across 15 years

11:12 am - 11:14 am (London, England, Wednesday, October 13, 2021)

Carina Nigg^{1,2}, Christoph Weber^{3,4}, Jasper Schipperijn⁵, Markus Reichert⁶, Doris Oriwol^{2,7}, Annette Worth⁷, Alexander Woll², Claudia Niessner²

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Background: Urban and rural areas experienced rapid developments over the last decade, but it is unclear how youth's physical activity and screen time have developed across urban and rural areas. **Purpose:** To investigate youth's physical activity and screen time trends across urban and rural areas. **Methods:** We obtained weighted data of three cross-sectional studies of the German nationally representative Motorik-Modul (MoMo) Study at three timepoints between 2003 and 2017 ($N=12,161$, age=4-17 years). We analyzed trends in self-reported physical activity and screen time domains over time and across four urbanicity levels (rural, small town, medium-sized town, city) using structural equation modeling. **Results:** A 30.26 minutes/week-decrease in total physical activity was only observed in rural areas. Leisure time physical activity and outdoor play decreased across all levels, with the strongest decline in rural areas (leisure time physical activity: -41.00 minutes/week, outdoor play: -0.54 days/week). Physical education and extracurricular sports increased between 4.74-7.20 minutes/week across all levels. Computer and gaming time increased across all levels except cities, with the strongest increase in rural areas (+36.66 minutes/day). The decline in outdoor play was driven by adolescents, the decline in computer and gaming time by adolescents and girls. **Conclusion:** Detrimental trends in physical activity and screen time occur at higher rates in rural areas, contributing to the urban-rural health gap. Rural youth should be specifically targeted to tackle decreasing levels of physical activity and increasing levels of screen time. **Funding:** Federal Ministry of Education and Research (01ER1503).

Keywords: Urban, Rural, Trend, Inequality, Children, Adolescents

Mini-Oral Presentation B1.8 A social media-based physical activity intervention targeting socially disadvantaged young adults: pilot study

11:14 am - 11:16 am (London, England, Wednesday, October 13, 2021)

Liane Guenther¹, Claudia R. Pischke¹

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Background: In Germany, 67% of women and 44% of men aged 18-29 years with low levels of education do not reach the WHO recommendations for physical activity (PA). Online social networks, such as Facebook, are used by 67% of individuals with low levels of education and may therefore be an appropriate channel for delivering PA interventions. This pilot study aims to evaluate the feasibility of a PA intervention delivered via an online social network in a sample of socially disadvantaged young adults.

Program Delivery: In this two-armed controlled intervention trial, 160 participants will be recruited either at vocational schools or via Facebook and randomized to an experimental or a waitlisted control group. Vocational school students will be asked to set up their own team of 2-8 Facebook friends. Through rival comparison and self-monitoring, the teams in the intervention arm will be encouraged to walk 10,000 steps per day for two months using Facebook and a linked pedometer app. **Evaluation:** To estimate the feasibility of the intervention, aspects related to the process of implementation will be tracked. Potential intervention effects on PA will be assessed at baseline, two- and four-month follow-ups via accelerometers and questionnaires in both groups.

Conclusions: The current study will help guide the development and implementation of future social media-based PA interventions on a larger scale targeting young socially disadvantaged adults. **Funding:** This study is part of the dissertation of the first author and not externally funded.

Keywords: Social Media, Physical Activity, Health, Young Adults, Social Disadvantage

Mini-Oral Presentation B1.9 The relationship between physical activity and psychological distress among medical students

11:16 am - 11:18 am (London, England, Wednesday, October 13, 2021)

Abdelkader Jalil El hangouche^{1,2,3}, Narjisse Damoun¹, Youssra Amekran¹

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Background: Mental health problems have been clearly identified in medical students. A growing body of literature indicates that physical activity is associated with positive mental health characteristics. **Purpose:** This study aimed to evaluate physical activity and psychological distress among Moroccan medical students and to analyze the association of levels of physical activity with psychological distress. **Methods:** 635 participants were included in this cross-sectional study. The International Physical Activity Questionnaire (IPAQ) was used to assess physical activity and the Kessler Psychological Distress Scale (K10) to evaluate the psychological distress. The data obtained were analyzed by Statistical Package for the Social Sciences (SPSS). **Results:** Among the whole participants, 55.1% were females and 42.6% lived in university campus. The median age was 20.0 [19.0 – 21.0] years. 25.1% of students reported low level of physical activity, with 30.4% in females and 18.8% in males. The overall prevalence of psychological distress was 48.1% and 14.7% experienced severe level. Females had higher levels of psychological distress than males ($p < 0.001$). The multivariate analysis showed significant association between levels of physical activity and psychological distress. Low level of physical activity is associated with a higher risk of psychological distress (OR=2.98; 95% CI: 1.95; 4.54). **Conclusions:** The prevalence of psychological distress and low physical activity appears to be high and are significantly associated amongst medical students. Engagement in physical activity can be an important factor to consider in preventing mental health. **Funding:** None.

Keywords: Physical Activity, Psychological Distress, Medical Students

Mini-Oral Presentation B1.10 Are "sport" esports athletes healthier than "non-sport" esports athletes?

11:18 am - 11:20 am (London, England, Wednesday, October 13, 2021)

Alex Bodman¹, Sascha Ketelhut², Claudia Kubica², Claudio Nigg²

¹German Sport University Cologne, ²Institute of Sports Science, University of Bern

Background: The association between video game genre and esports athlete (EA) health is unknown. EA who compete in sport games may have a different health profile than EA who compete in non-sport games. **Purpose:** To compare the body composition (BC), and maximal grip strength (MGS) between "sport" EA (SEA) and "non-sport" EA (NSEA). **Methods:** To date, the sample comprises 16 male SEA (age: 24.1 ± 3.2 years) and 20 male NSEA (age: 24.1 ± 3.8 years). Body mass index (BMI), waist-to-height ratio (WHtR), and body composition (BC) using bioimpedance analysis (Tanita RD-545) were assessed. MGS was recorded using a digital hand dynamometer (Saehan DHD-1). Welch's t-test and Cohen's d were used to compare EA groups. **Results:** NSEA had higher BMI values than SEA ($p = 0.06$; $d = 0.6$). WHtR ($p = 0.04$; $d = 0.68$), and body fat percentage ($p = 0.02$; $d = 0.75$) were also higher amongst NSEA than SEA, with both reaching statistical significance with large effect sizes. No statistical significance was found for MGS ($p = 0.1$; $d = -0.54$). **Conclusions:** Overall, SEA appear healthier than NSEA, however differences between MGS could not be drawn. Further research is needed with more objective fitness assessments and larger sample sizes to establish if health promotive efforts should be directed more strongly towards NSEA. **Funding:** None.

Keywords: Esports, Health, Genre, Body Composition, Grip Strength

Mini-Oral Presentation B1.11 Esports player health status and maximal grip strength – A cross sectional study

11:20 am - 11:22 am (London, England, Wednesday, October 13, 2021)

Alex Bodman¹, Sascha Ketelhut², Claudia Kubica², Claudio Nigg²

¹German Sport University Cologne, ²Institute of Sports Science, University of Bern

Background: Participation in esports has grown significantly leading to potential concerns regarding the health status of players due to the inherent sedentary nature of playing video games. **Purpose:** To examine the weight related health status via body mass index (BMI), waist-to-height ratio (WHtR), and body composition (BC), as well as maximal grip strength (MGS) in a sample of esports athletes (EA) living in Germany and Switzerland. **Methods:** To date, the sample consists of 36 male EA (age: 24.2 ± 3.5 years). Body mass index (BMI), waist-to-height ratio (WHtR), and body composition (BC) using bioimpedance analysis (Tanita RD-545) were assessed. MGS was recorded using a digital hand dynamometer (Saehan DHD-1). Descriptive statistics were compared to established age-matched normative data from the German population. **Results:** According to BMI, 16.7% ($n=6$) of the EA were classified as obese, while 16.7% ($n=6$) and 66.7% ($n=24$) were classified as overweight and normal weight respectively. Compared to age-matched population data from Germany, the esports players had a higher percentage of obesity (16.7% vs 6.6%) but lower percentage of overweight (16.7% vs 26.0%). From WHtR measurements, 25.0% ($n=9$) were classified as at an increased health risk while 75% ($n=27$) were classified as having healthy values. According to body fat percentage, 16.7% ($n=6$) were over the 25% threshold for overweight. As for MGS, only 15.9% ($n=5$) had values above their respective age-height matched normative values, with 25% ($n=9$) of the esports participants being considered "weak" and at an increased risk for health issues. **Conclusions:** The prevalence of obesity was higher amongst EA compared to values from the general population, however, the prevalence of overweight was much lower, highlighting the diversity of EA health status. Overall, the prevalence of obesity and subaverage MGS suggests EA may be an ideal target group for health promotive efforts. **Funding:** None.

Keywords: Esports, Health, Body Composition, Grip Strength

Mini-Oral Presentation B1.12 Uptake of and engagement with health apps in app stores and on health app portals

11:22 am - 11:24 am (London, England, Wednesday, October 13, 2021)

Dorothy Szinay¹, Olga Perski², Andy Jones¹, Tim Chadborn³, Jamie Brown², Felix Naughton¹

¹University of East Anglia, United Kingdom, ²University College London, United Kingdom, ³Public Health England, United Kingdom

Background: Health apps can improve access to behaviour change interventions. However, the selection of apps is often influenced by factors such as popularity as opposed to evidence-based content. Rapid disengagement is also common. **Purpose:** To explore how potential users 1) select and 2) engage with health apps in commercial app stores and on curated health app portals.

Methods: Semi-structured interviews and a think-aloud approach were used. 18 UK-based adults who were interested in using a health app were recruited online. Participants were asked to verbalise their thoughts whilst searching for a health app of their choice. Data were analysed using the framework approach. The COM-B model and the Theoretical Domains Framework informed the analysis. The study protocol was registered on the Open Science Framework (<https://osf.io/jrkd3/>). **Findings:** The following factors influenced the selection of and engagement with health apps: 1) physical capability (e.g. enhancing app literacy skills to reduce the digital divide); 2) psychological capability (e.g. reduced cognitive load); 3) physical opportunity (e.g. low financial cost and tailored content); 4) social opportunity (e.g. social proof and embedded practical support); 5) automatic motivation (e.g. emotional factors and rewards); 6) reflective motivation (e.g. beliefs about the utility of the app). **Conclusions:** Health organisations that develop app portals may consider targeting the factors identified across the COM-B domains as this could help to increase impact through better selection of apps. The findings will inform the development of web-based interventions that aim to promote the uptake of and engagement with evidence-based health apps. **Funding:** Study funded by DS's PhD studentship (funded by Public Health England and the University of East Anglia).

Keywords: mHealth, Health Apps, Behaviour Change, Health Apps, COM-B Model, Engagement, Uptake

Mini-Oral Presentation B1.13 The health promoting sports club model (HPSC): An intervention planning framework

11:24 am - 11:26 am (London, England, Wednesday, October 13, 2021)

Aurélien Van Hove¹, Stacey Johnson², Susanna Geidne³, Alex Donaldson⁴, Florence Rostan⁵, Fabienne Lemonnier⁵, Anne Vuillemin²

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Background: Researchers and policymakers acknowledge sports clubs (SCs) as health promoting settings but SCs need strategies to inform their health promotion efforts. **Purpose:** To provide SCs with an intervention planning framework for developing and implementing health promotion interventions. **Methods:** The 4-step process included: 1) investigating 'health promoting' indicators, 2) adapting the theoretical HPSC concept to create a model, 3) reformulating evidence-driven guidelines into intervention components (ICs) and 4) merging the model with ICs to produce an intervention planning framework. During 3 workshops, researchers defined the HPSC model and ICs before participants classified ICs into the model (each IC could be classified multiple times). **Results:** Researchers drafted 5 HPSC indicators: 1) an approach embracing all SC actions, 2) involve all SC levels in actions and decisions, 3) involve external partners, 4) promoting health is continuous and iterative and 5) base actions on needs. Researchers created the HPSC model by defining elements based on indicators: 3 SC levels (club, management, coaches) and 4 health determinants (organizational, social, environmental, economic). Published guidelines aided in developing 14 strategies with 55 ICs. Workshop classification of ICs into the model included: club (n=79), management (n=67) and coaches (n=48). **Conclusions:** The HPSC model and intervention planning framework are starting points to increase SC health promotion efforts by: 1) applying strategies based on goals, 2) targeting specific SC levels with corresponding ICs or 3) targeting specific health determinants using ICs. **Funding:** Study funded with a grant from Santé publique France.

Keywords: Sports Clubs, Health Promotion, Intervention Planning Framework

Mini-Oral Presentation B1.14 Hot topics and trends in sports research related to college students: a bibliometric systematic review

11:26 am - 11:28 am (London, England, Wednesday, October 13, 2021)

Shuaibo Wang¹, Xinglong Zhou¹

¹Beijing Sport University

Background: This study aimed to use CiteSpace software to conduct a bibliometric analysis of published studies related to college students from 2000 to 2020. The study also aimed to determine publication patterns and to identify recent trends for research in this field. **Methods:** Publications on the association between cognitive function and pain between 2000 and 2020 were identified from the Web of Science database. We used the keywords "college" OR "university" AND "students" AND "Sport" in databases. 2,614 publications were identified. Bibliographic information, including country, citation frequency, changes in a citation, and interactive visualization were generated using CiteSpace software. Co-citation, or frequency of two publications cited together by another publication, was also studied. **Results:** The sports research related to college students keeps increasing. (125 articles in 2010, 384 articles in 2020), but it is still in infancy. The United States (1051 publications) and the University of North Carolina (80 publications) were the most productive country and institution, respectively. The journal, International Journal of Environmental Research and Public Health (45 publications) had the largest number of publications, and the journal, Medicine & Science in Sports & Exercise was the most frequently cited journal (citation counts, 520) with the highest centrality (32), that indicates that the journal is important. The field of this study mainly focuses on alcohol and sports, injury prevention and mental health. Before 2015, the

relationship between alcohol use and the collegiate student is a research hot topic. Researchers explored the impact of different levels of exercise, education background, game day on alcohol consumption. Besides, the relationship between membership of a university sports group and drinking behavior and the influence of sporting idols on alcohol have also been studied. After 2015, Injury prevention and monitoring of athletes becoming a hot topic of research, especially sudden death and concussion. International Consensus Conferences on Concussion issued a Consensus statement on concussion to provide athletic trainers, physicians, and other health care professionals with best-practice guidelines for the management of sport-related concussions. The statement is revised every four years. National Athletic Trainers' Association also issued a Position Statement about Management of Sport Concussion to help college students' recovery, and even return to the game. Researchers are also paying more attention to psychological factors. The researchers focused on the psychological factors that affect performance, such as mindfulness and self-determination. Importance should be placed on improving the mental health of elite athletes. Researchers explored depression and anxiety in elite players and the difference of depressive symptoms in high-performance athletes and non-athletes. Apart from the research hotspots mentioned earlier, researchers' interest in dual-career of student-athletes and physical activities for college students, especially sedentary behavior have also increased. **Conclusions:** Bibliometric analysis of the association between pain and cognitive function might identify new directions for future research. In addition to maintaining the focus on the psychology and injury of college athletes, research should also strengthen the physical activity of college students. **Funding:** No Funding Received.

Keywords: Alcohol and Sports, College Students, Injury Prevention

Mini-Oral Presentations Session B2

Mini-Oral Presentation B2.1 Gender differences in the associations between physical activity, nature visits and pro-environmental behaviors

4:35 pm - 4:37 pm (London, England, Wednesday, October 13, 2021)

Andreia Teixeira¹, Ronaldo Gabirel^{1,2,5}, José Martinho^{1,3}, Graça Pinto^{1,2,4}, Ana Alençõo^{1,3}, Helena Moreira^{1,2,4,5}

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Background: It has been suggested that nature visits are positively associated with higher levels of physical activity (PA) and generates greater respect and responsibility for the natural environment. These benefits may differ between men and women, making this gender differentiation required. **Purpose:** Analyze, in both genders, the influence of age and PA on nature visits and pro-environmental behaviors (PEB's). **Methods:** We recruited a sample of 219 individuals (77 men and 142 women) and a self-administered questionnaire was used to measure nature visits, PEB's and obtain some demographic variables. PA was measured using ActiGraph accelerometers (wGT3X-BT). Pearson's correlation and logistic regression analysis was used to analyze the data. **Results:** The results showed a gender difference in nature visits ($p < 0.01$), with men (1.56 ± 1.01) visiting nature more often than women (1.20 ± 1.05). In females, age explained 3.3% of the variation of nature visits ($b = 0.290$; $p = 0.02$) and moderate-vigorous PA proved to be a significant predictor of PEB's. In men, the regressors selected for visits to natural spaces were dog ownership ($b = 0.369$; $p < 0.01$), residence place ($b = -0.224$; $p = 0.03$) and PEB's ($b = 0.198$; $p = 0.05$). **Conclusions:** In men, nature visits were associated with daily steps and PEBs. Conversely, in women, no associations were identified between visits to natural environments and levels of PA and environmentally concerned. **Funding:** This work is supported by National Funds by FCT-Portuguese Foundation for Science and Technology, under the projects UIDB/04033/2020, UIDO4045/2020 and UIDB/00073/2020. The investigation was also supported by European funding program Interreg Atlantic Area, under the project (EAPA_772/2018-Triple-C).

Keywords: Accelerometry, Natural Environment, Environmental Concern

Mini-Oral Presentation B2.2 The influence of dog ownership on physical activity, pro-environmental behaviors and nature visits

4:37 pm - 4:39 pm (London, England, Wednesday, October 13, 2021)

Andreia Teixeira¹, Ronaldo Gabirel^{1,2,6}, José Martinho^{1,3}, Mário Santos^{1,4,6}, Graça Pinto^{1,2,5}, Helena Moreira^{1,2,5,6}

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Background: The literature suggests that dog ownership may improve physical activity (PA) and nature visits, however, most previous studies used self reported PA measures. The association between owning a dog and adopting pro-environmental behaviors (PEB's) is also under researched. **Purpose:** Explore the differences between dog owners and non-dog owners concerning objectively measured physical activity, nature visits and pro-environmental behaviors. **Methods:** Our sample was comprised 219 individuals, 64.8% female and mean age of 40.63 (± 15.35) years, divided into the following groups: dog owners (DO) and nondog owners (NDO). PA was measured using ActiGraph accelerometers (wGT3X-BT). Dog ownership, nature visits and PEB's were assessed by questionnaire. The data were analyzed using the Student's T test or the Mann-Whitney U test. **Results:** Approximately 33% of a sample reported having a dog. The TPA ($p = 0.02$), steps/day ($p = 0.03$) and nature visits ($p < 0.01$) were higher among men DO than NDO. In women, no significant results were observed between DO and NDO. Male DO perform a greater number of daily steps ($p = 0.03$) and visit nature more often ($p < 0.01$) compared to female DO. Among individuals NDO no gender differences were not identified. **Conclusions:** In both genders, there were no differences in the adoption of PEB's between DO and NDO. Only in

men, dog-ownership was associated with higher total PA, daily steps and nature visits. Within individuals DO we found gender differences in the number of steps and nature visits. **Funding:** This work is supported by National Funds by FCT-Portuguese Foundation for Science and Technology, under the projects UIDB/04033/2020, UID04045/2020 and UIDB/00073/2020. The investigation was also supported by European funding program Interreg Atlantic Area, under the project (EAPA_772/2018-Triple-C).

Keywords: Accelerometry, Pet Ownership, Natural Environments

Mini-Oral Presentation B2.3 Nature visit frequency and its influence on physical activity and pro-environmental behaviors

4:39 pm - 4:41 pm (London, England, Wednesday, October 13, 2021)

Andreia Teixeira¹, Ronaldo Gabriel^{1,2,5}, José Martinho^{1,3}, Luís Quaresma^{1,2}, Ana Alencão^{1,3}, Helena Moreira^{1,2,4,5}

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Background: Physical inactivity is an issue that needs to be addressed and nature visits could be a key health promotion strategy, contributing to increased levels of physical activity (PA). **Purpose:** Explore the differences in physical activity and pro-environmental behaviors accordingly the nature visit frequency. **Methods:** We recruited a sample of 219 individuals (77 men and 142 women). A self-administered questionnaire was used to measure nature visits and PEB's. Physical activity was measured using ActiGraph accelerometers (wGT3X-BT). Kruskal-Wallis test was performed to explore the differences on total PA, moderate-vigorous PA, steps/day and PEB's through the nature visit frequency (never, once a week, 2-3 times/week and ≥ 4 times/week). **Results:** There was a significant difference between groups with respect to moderate-vigorous PA ($p=0.01$), steps/day ($p=0.02$) and PEB's ($p=0.04$) according to the number of visits to natural spaces. Individuals who visit nature 2-3 times/week achieved higher levels of moderate-vigorous PA and performed a greater number of daily steps, compared to those who visited natural spaces only once time/week or never visit. It was the individuals who visited nature ≥ 4 times/week those who adopted a greater number of PEB's. **Conclusions:** Individuals who visited natural spaces 2-3 times per week tended to achieve higher levels of moderate-vigorous PA, perform a greater number of steps, and adopt a greater number of environmentally friendly behaviors. **Funding:** This work is supported by National Funds by FCT-Portuguese Foundation for Science and Technology, under the projects UIDB/04033/2020, UID04045/2020 and UIDB/00073/2020. The investigation was also supported by European funding program Interreg Atlantic Area, under the project (EAPA_772/2018-Triple-C).

Keywords: Accelerometry, Natural Environment, Environmental Concern

Mini-Oral Presentation B2.4 Assessing parks of Delhi – For physical activity and health

4:41 pm - 4:43 pm (London, England, Wednesday, October 13, 2021)

Prarthna Mukerjee¹, Dimple Kondal², Mohammed Tayyab³, Garima Rautela², Gyanendra Gongal⁴, Siddharth Mandal², Sailesh Mohan¹, D. Prabhakaran², Shifalika Goenka^{1,2}

¹Public Health Foundation of India, ²Centre for Chronic Disease Control, ³Delhi Development Authority, ⁴WHO- SEARO

Background: Parks profoundly influences health and physical activity levels **Purpose:** To do a situational assessment of parks in Delhi from a physical activity & health perspective & elicit user experiences. **Methods:** Observations, user perceptions, and qualitative elicitation from users and Normalised difference vegetative index (NDVI) calculation. Setting & sampling. Delhi is spread over 1484 km². 564 parks were randomly sampled from 3427 parks identifiable on Google Earth Pro. We report data from 206/564 parks, and 1613 users. (Data collection stopped due to COVID lockdown, restarting, will be completed by August.) Observations, assessments, user experiences: Quantitative: Data collection instruments uploaded on tablets and field workers trained. Objective observations on park maintenance, presence of open gyms etc. Subjective perception of park users, usage of Open gyms etc. Qualitative elicitation of user experiences/stories. NDVI calculated - Geographic Information System software 'ArcGIS'. **Results:** Qualitative "Our houses are so small, that we can't even breathe there that is why we come here." "We have become old now, our families don't want us to be at home for long time so we spend our time here at the park." "We sit and talk together, maintain the park, exercise together. Quantitative: 201/206 were accessible to the public. 36/206 had sidewalks encroached/illegal shops/garbage. OPEN GYMS 143/ 206(69.4%) had open gyms. Yoga and group fitness activities were carried out in 60.7% and 32.5% of the parks respectively. Park in low Socio-economic areas faced encroachments, badly maintained. User views (n=1613, 725: women): 689/1613 stayed ≥ 2 km away from the park. 83.1% used the park on daily basis. Parks were motivational and gave happiness (98.6%); Presence of open gym - encouraged 87.4%. **Conclusions:** Delhi is one of the few cities to have allocated green parks/urban forests. These enhance physical activity, mental health and equity in its users. **Funding:** WHO- South-East Asia Regional Office APW number 202602587-1.

Keywords: Built Environment, Parks, Open-Gyms, Physical Activity, Mental Health, Green Spaces

Mini-Oral Presentation B2.5 Beyond climate change and active transport: Physical activity as sustainable behaviour

4:43 pm - 4:45 pm (London, England, Wednesday, October 13, 2021)

Carina Nigg¹, Claudio R. Nigg²

¹Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Karlsruhe, Germany, ²Institute of Sport Science, University of Bern, Bern, Switzerland

Background: Individuals' physical activity (PA) and sustainable behavior (SuB) are important for human's well-being. To date,

research in PA has mostly focused on health outcomes. However, considering the interdependence of human's and nature's health within the planetary health concept, we evaluated how PA can be conceptualized as SuB and how PA relates to other types of SuB within the United Nations' comprehensive sustainable development goal (SDG) framework. Policy components: PA should be considered as part of SuBs related to the SDGs. **Evaluation:** Regarding social SDGs, mostly (organized) sports and exercise activities were identified as sustainable PAs that also relate to other SuBs (e.g. skill acquisition, cultural practices) contributing to combat malnutrition (SDG 2), health behaviors (SDG 3), education (SDG 4), reducing inequalities (SDG 10), sustainable cities (SDG 12), and peace (SDG 16). For ecological SDGs, mostly leisure and commuting PAs were identified as sustainable PAs that also relate to other SuBs (e.g. bike sharing, pro-environmental behavior) contributing to sustainable consumption (SDG 11) and combating climate change (SDG 13). **Conclusions:** Our results suggest that PA is more than a health behavior, but a behavior that allows each person individually to contribute to planetary health and sustainable development. Thus, we recommend establishing PA and SuB as a future research field to investigate 1) PA as social and ecological SuB, 2) sustainable PA promotion, 3) measurement of sustainable PA, 4) common underlying constructs and contextual factors of PA and SuB, and 5) exploring technology's role to assess and promote PA and SuB. **Funding:** N/A.

Keywords: Physical Activity, Sustainable Behavior, Planetary Health, Sustainable Development Goals, Sustainable Development

Mini-Oral Presentation B2.6 Translation of the International Physical Activity Questionnaire to Maltese and reliability testing

4:45 pm - 4:47 pm (London, England, Wednesday, October 13, 2021)

Karl Spiteri¹, Kate Grafton², John Xerri de Caro³, David Broom¹

¹Coventry University, ²University of Lincoln, ³University of Malta

Purpose: The International Physical Activity Questionnaire (IPAQ) is a widely used self-reported physical activity (PA) measure at population level, developed to allow for international cross-country comparisons. Due to its unavailability, the aim of this study was to translate the IPAQ-long to Maltese and undertake reliability testing. **Method:** The IPAQ-long English version was translated into Maltese following the IPAQ guidelines which included backward translation. Maltese-speaking participants, aged between 18 and 69 years, were recruited through convenience sampling (n = 170). Participants completed the IPAQ-long twice within an 8-to-48-hour period between completions. PA was calculated in MET minutes per week and reliability was calculated using Spearman correlation, interclass correlation coefficient (ICC), concordance correlation coefficient (CCC), and Bland Altman plots. **Results:** 155 participants completed the questionnaire at two-time points. Spearman correlation was 0.83 (0.76-0.88) for total PA and 0.84 (0.77-0.89) for total sitting time. The ICC was 0.83 (0.76-0.88) and CCC 0.75-0.87 for total PA. The lowest reliability was for total transport with CCC of 0.21-0.45. Bland Altman plots highlight that 95% of the differences fell within 2 standard deviations from the mean. **Conclusion:** The Maltese IPAQ-long has similar reliability to the English version, we recommend healthcare professionals and physical activity practitioners use this tool when examining population-level PA amongst Maltese-speaking individuals.

Funding: Study part-funded by the ENDEAVOUR scholarship scheme – Group B- National funds - Malta MEDE/1117/2017/43 (individual grant).

Keywords: Activity Assessment, Physical Activity, Self-Reported Questionnaire, Reliability

Mini-Oral Presentation B2.7 Implementing the German national recommendations for physical activity and physical activity promotion: A project overview

4:47 pm - 4:49 pm (London, England, Wednesday, October 13, 2021)

Lea Dippon¹, Simone Kohler¹, Natalie Helsper¹, Karim Abu-Omar¹, Alfred Rütten¹, Klaus Pfeifer¹, Jana Semrau¹

¹Department of Sport Science and Sport, Friedrich-Alexander-University Erlangen-Nuremberg

Background: In Germany, National Recommendations for Physical Activity (PA) and PA Promotion are available since 2016, but their implementation at the local level remains a challenge. The project KOMBINE (Community-based PA promotion to implement the National Recommendations) aims to address this challenge with a focus on health equity. **Program Delivery:** KOMBINE is based on a transdisciplinary approach and the multi-level model of health promotion. Phase 1 consists of a systematic activation of stakeholders from policy, practice, and research to co-produce an action-oriented framework for community-based PA promotion focusing on health equity. In Phase 2 the framework is implemented in six communities (rural, urban, metropolis) with different levels of community readiness and socioeconomic deprivation. Building on the experiences of phase 2, a KOMBINE-manual is developed in phase 3. **Evaluation:** A participatory case study design is used with an evaluation of input (e.g., contextual conditions), process (e.g., structural change and development of measures), output (e.g., developed measures and their implementation), outcome (e.g., effects on the individual and population level), and impact (e.g., effects on the structural level). **Conclusion:** KOMBINE contributes to a deeper understanding of the implementation of National PA recommendations at the local level in Germany and the establishment of structures for sustainable PA promotion with a focus on health equity. **Funding:** Federal Centre for Health Education (BZgA) on behalf of and with funds from the statutory health insurances in accordance with Para.20a.SGB V within the GKV Alliance for Health (Number: Z2/1.01G/18).

Keywords: Community-Based Physical Activity Promotion, Health Equity, Participatory Approach

Mini-Oral Presentation B2.8 Exploring the pleasure and sense of purpose associated with older peoples' activities using ecological momentary analysis

4:49 pm - 4:51 pm (London, England, Wednesday, October 13, 2021)

Karen E. Hancock¹, Lauren B. Sherar², Paul Downward¹

¹School of Sport, Exercise and Health Sciences, Loughborough University, Leicestershire, ²National Centre for Sport and Exercise Medicine, Loughborough University, Leicestershire

Background: Older people have more leisure time, but many are physically inactive. Momentary feelings of pleasure or happiness and sense of purpose can be sources of intrinsic motivation. This study's objective was to investigate how the type (sedentary, active) and context (social and environmental) of older peoples' activities relate to momentary feelings of happiness and purpose to inform intervention and policy design. **Methods:** Details of activities, contexts and feelings of semi-retired adults (n=67, aged 50-78y) were captured over 7 days using ecological momentary assessment (EMA) via a smart phone app. Participants were prompted six times at random per day resulting in 2,065 valid prompts. Participants wore an Actigraph accelerometer on the waist for 7 days to measure physical activity. Happiness and sense of purpose outcome variables were regressed on EMA-identified activities, context and confounding variables. **Results:** Sedentary activities were negatively associated with sense of purpose, especially when indoors; however, social sedentary activities (e.g. visiting friends and family) were positively associated with feelings of happiness. Active, social outdoor activities were positively associated with both happiness and sense of purpose. Less sedentary adults were more likely to experience higher happiness and sense of purpose during all activities. **Conclusions:** Both happiness and sense of purpose could be leveraged to design more effective interventions and policy for older people. Context is important for happiness, and social and outdoor activities are likely to have the widest appeal. The study needs to be replicated in a larger and more representative samples of older people. **Funding:** None.

Keywords: Older Adults, Physical Activity, Sedentary Behaviour, Ecological Momentary Assessment, Accelerometry, Momentary Happiness, Sense of Purpose

Mini-Oral Presentation B2.9 Absolute or relative handgrip strength – Which one is a better cancer risk predictor? Findings from the UK Biobank prospective study

4:51 pm - 4:53 pm (London, England, Wednesday, October 13, 2021)

Solange Parra-Soto^{1,2}, Jill P. Pell¹, Carlos Celis-Morales^{1,2,3}, Frederick K. Ho¹

¹Institute of Health and Wellbeing, University of Glasgow, Glasgow, UK, ²British Heart Foundation Cardiovascular Research Centre, Institute of Cardiovascular and Medical Sciences, University of Glasgow, Glasgow, UK, ³Laboratorio de Rendimiento Humano, Grupo de Estudio en Educación, Actividad Física y Salud (GEEAFyS), Universidad Católica del Maule, Talca, Chile

Background: Reduced muscular strength has been associated with an increased risk of some site-specific cancers. However, there is a lack of evidence on whether grip strength expressed in absolute or relative terms could predict cancer risk differently. **Purpose:** Therefore, this study aimed to evaluate the association between absolute and relative grip strength with all-cause and 15 site-specific cancers. **Methods:** This is a prospective cohort study using data from the UK Biobank. There were 445,552 participants (53.8% women; mean age 56.3) across the UK. The exposure variable was grip strength, in absolute form (kg) and relative to weight, body mass index (BMI), height and body fat mass (BFM), the outcome was incident cancer (fatal and non-fatal). Cox proportional hazard and 95% confidence intervals (CIs). **Results:** During an 8.8-year follow-up period, 48,886 patients were diagnosed with cancer and 11,560 died from it. Absolute grip strength was inversely associated with five cancer sites including endometrium (HR: 0.74, 95% CI: 0.69; 0.79), gallbladder (HR: 0.81, 95% CI: 0.72; 0.92), liver (HR: 0.86, 95% CI: 0.79; 0.93), kidney (HR: 0.93, 95% CI: 0.88; 0.99), breast cancer (HR: 0.93, 95% CI: 0.91; 0.96), and all-cause cancer (HR: 0.97, 95% CI: 0.95; 0.98). Similar risk estimate for these cancers were observed when grip strength was expressed in relation to body weight, BMI and body fat but not when was expressed relative to height (Figure 1). **Conclusions:** Absolute grip provide similar risk estimate to those observed for relative grip strength using body weight, BMI and body fat, but not height. **Funding:** SPS receives financial support from the Chilean Government for doing her PhD (ANID-Becas Chile 2019).

Keywords: Hand Strength, Cancer, Cohort Study, Body Mass Index

Mini-Oral Presentation B2.10 Associations of habitual physical activity and carotid-femoral pulse wave velocity; A systematic review and meta-analysis of observational studies

4:53 pm - 4:55 pm (London, England, Wednesday, October 13, 2021)

Rebecca Lear¹, Brad Metcalf¹, Gemma Brailey¹, Michael Nunn², Bert Bond¹, Melvyn Hillsdon¹, Richard M. Pulsford¹

¹Department of Sport and Health Sciences, University of Exeter, ²College of Medicine and Health, University of Exeter

Background: Habitual physical activity (hPA) reduces cardiovascular disease (CVD) risk. Carotid-femoral Pulse Wave Velocity (cfPWV) is indicative of CVD risk, however the precise association between hPA and cfPWV is unclear and warrants further investigation. **Purpose:** To understand the association between hPA and cfPWV in an ostensibly healthy adult population. **Methods:** Searches were performed in Medline, Web of Science, SPORTDiscus and CINAHL databases to identify observational studies assessing hPA and cfPWV published up to 22/02/2021. All articles were included in the narrative synthesis and vote count analyses. Articles were included in pooled analyses where a standardised association statistic for continuous hPA and cfPWV were reported. **Results:** Twenty six articles were included detailing 72 analyses. Overall in 47% of analyses a significant negative association was observed between hPA and cfPWV, with no association observed in 53%. Sixteen articles provided sufficient data for meta-analysis, which demonstrated a small, significant, negative correlation between hPA and cfPWV $CC = -0.09$ (95%CI -0.18, -0.01); $P = 0.03$. Heterogeneity was high at $I^2 = 95.10\%$ $P < 0.001$. Sub-group analyses did not change overall findings, however heterogeneity was low, effect size was smaller and 95%CI narrower in articles with device based measurement of hPA and those of a good/fair quality rating. **Conclusion:** There is a significant negative association between hPA and cfPWV. However, the variation in PA metrics reported and the high heterogeneity within pooled analyses, suggests that findings should be interpreted with a degree of caution. The ability to precisely quantify day-to-day movement behaviours should support future high quality research in this field.

Keywords: Vascular Function, Carotid-femoral Pulse Wave Velocity (cfPWV), Habitual Physical Activity (PA), Cardiovascular Disease (CVD)

Mini-Oral Presentation B2.11 Experiences of physical activity for individuals with spinal cord injury: A meta-study

4:55 pm - 4:57 pm (London, England, Wednesday, October 13, 2021)

Laura Wilcock^{1,2}, Andrew C. Sparkes¹, Adam B. Evans², Toni L. Williams¹

¹Leeds Beckett University, ²University of Copenhagen

Objectives: The purpose of this study was to critically examine the qualitative research on experiences of leisure time physical activity (LTPA) for individuals with spinal cord injury (SCI). Meta-study methodology was used as a diagnostic tool to assess the theory, methods and findings of the current literature contributing to the literature by considering both the process and product of this body of research. This meta-study therefore provides a fresh perspective on research in this field. **Methods:** A comprehensive search of 6 sport and exercise electronic databases and manual journal searches yielded an initial total of 675 peer reviewed articles once duplicates were removed, reduced to 57 papers read in full after analysis of titles and key words. Of these 57 papers, 25 papers were identified as suitable for full based on the inclusion criteria. Studies were reviewed using meta-study methods, comprising analysis of theoretical perspectives, methodologies and findings. **Results:** Research guided by occupational theory is common in this field, and has contributed by identification of numerous barriers, benefits and facilitators of LTPA for individuals with SCI. More recently, narrative inquiry has revealed health narratives that are associated with SCI, narratives existing in the LTPA environment (chaos, restitution and quest) and exercise narratives restitution, exercise is medicine and exercise is progressive redemption. **Conclusion:** Theoretical and methodological opportunities were identified for future research that suggest a need for greater attention to be paid to the structural and contextual conditions that shape and influence the physical activity experience. **Funding:** Not externally funded.

Keywords: Meta-Study, Leisure Time Physical Activity, Spinal Cord Injury, Disability

Mini-Oral Presentation B2.12 Evaluation of a nationally delivered workplace step count challenge: Productivity, perceived stress and work engagement

4:57 pm - 4:59 pm (London, England, Wednesday, October 13, 2021)

Gemma C. Ryde¹, Simone A. Tomaz^{1,5}, Krissi Sandison^{1,2}, Carl Greenwood³, Paul Kelly⁴

¹University of Stirling, ²NHS Health Scotland, ³Paths for All, ⁴University of Edinburgh, ⁵University of Glasgow

Background: Workplace step count challenges show promise for increasing walking and overall physical activity (PA). Both PA and walking are linked to many positive physical, mental and social health benefits but few studies have investigated the effects of interventions on work-related outcomes. **Purpose:** The aim of this study was to; 1) describe the process of collecting work-related outcomes as part of a real-world workplace intervention called the Step Count Challenge (SCC), and; 2) report on step counts and work-related outcomes (productivity, perceived stress and work engagement). **Methods:** This observational study was conducted as part of a four-week national SCC targeting employee from multiple workplaces in Scotland, UK. Participants completed an online survey and reported steps, productivity (HWQ), perceived stress (Cohen Perceived Stress Scale) and work engagement (UWES) on the week prior to the intervention starting (baseline), week 1 and week 4. Process data such as recruitment and retention rates were monitored throughout. **Results:** Baseline data were reported for 246 participants (mean age 42.5 yrs., 83% female). Preliminary data indicate positive changes in step counts (3558 steps/day by week 4), stress and productivity. However, process data show low uptake to the study (16% of intervention participants) and high drop out across surveys. **Conclusion:** The findings highlight challenges with conducting research within real-world interventions. The SCC may have a positive change on steps and some work-related outcomes such as stress and productivity. Further investigation into how robust research methods can be delivered without influencing real-world interventions is warranted.

Keywords: Physical Activity, Step Count, Workplace, Stress, Productivity

Mini-Oral Presentation B2.13 Physical activity at work may not be health enhancing for cardiovascular health

4:59 pm - 5:01 pm (London, England, Wednesday, October 13, 2021)

Bart Cillekens¹, Maaike A. Huysmans¹, Andreas Holtermann^{2,3}, Willem van Mechelen¹, Leon Straker⁴, Niklas Krause⁵, Allard J. van der Beek¹, Pieter Coenen¹

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Background: Emerging evidence suggests contrasting health effects for different physical activity domains, in particular when comparing leisure-time to occupational physical activity (OPA). **Purpose:** Our purpose was to systematically review the association between OPA and cardiovascular mortality disease (CVD) mortality. **Methods:** We searched the literature for prospective observation studies assessing the relationship between OPA and CVD mortality. Articles were included if they controlled for age and gender and at least one other relevant variable. We performed random-effects meta-analyses on the association between OPA and CVD mortality. **Results:** Twenty-three studies were included. In our meta-analyses, OPA showed no significant association with CVD mortality for both males (HR=1.00, 95% CI: 0.87-1.15) and females (HR=0.95, 95% CI: 0.82-1.09). Higher levels of OPA were non-significantly associated with a 15% increase in ischemic heart disease mortality. Subgroup analyses for gender, adjustment for different variables and study design features; such as country, historical time and duration of follow-up period, had no substantial effect on the effect estimate. **Conclusions:** While the beneficial association between leisure time physical activity and CVD mortality has been widely documented, OPA was not found to have a beneficial association with CVD mortality. This

observation may have implications for our appreciation of the association between physical activity and health for workers in physically demanding jobs, as OPA may not be health enhancing. **Funding:** We did not receive any particular funding for this research.

Keywords: Occupational Physical Activity, Cardiovascular Mortality, CVD, Systematic Review

Mini-Oral Presentation B2.14 Associations between maternal physical activity and sedentary behavior and mRNA expression of oxidative stress and vascularization markers in term placenta of obese pregnant women: Findings of the DALI study

5:01 pm - 5:03 pm (London, England, Wednesday, October 13, 2021)

Saghi Zafarani¹, Anna Maria Dieberger², Gernot Desoye², David Simmons³, Mireille van Poppel¹, on behalf of DALI Core Investigator Group

¹Institute of Human Movement Science, Sport and Health, University of Graz, Graz, Austria, ²Medical University of Graz, ³Western Sydney University, Australia

Background: Maternal obesity can affect placental development, often reflected in changes in oxidative stress and vascularization. Sufficient physical activity and reduced sedentary time might mitigate these effects. **Purpose:** To test if vascularization and oxidative stress in the placenta of obese pregnant mothers are associated with maternal moderate-to-vigorous physical activity (MVPA) and sedentary time (ST). **Methods:** This is a contribution to the DALI study including women with a pre-pregnancy body mass index (BMI) ≥ 29 kg/m². Time spent in MVPA, and ST were measured with accelerometers at <20, 24–28 and 35–37 weeks of gestation. Placental tissue was dissected from four quadrants, mRNA isolated and pooled per placenta. Expression of markers of vascularization (VEGF, PEDF, CD34) and oxidative stress (Lp_PLA2, GADD45 α , GADD45 β , Nrf2, HSP70, HO-1, MT2A) was quantified by NanoString nCounter Technology. In a two-step analysis, changes in MVPA and ST during pregnancy for each woman and average MVPA and ST were entered into multilevel regression models to estimate associations with mRNA expressions. **Results:** Outcomes were available from 96 women. Higher average maternal ST was only associated with higher expression of the anti-oxidative lipoprotein-associated phospholipase A2 (Lp_PLA2; 0.5; 95% CI 0.1, 0.9). Changes in MVPA or ST over time were not associated with mRNA expression. **Conclusions:** While no significant association was observed between maternal lifestyle and mRNA expression of the vascularization markers, ST might associate with oxidative stress levels in placenta. To better understand this, serum oxidative stress markers and total antioxidant capacity will be measured in maternal and cord blood. **Funding:** The DALI project has received funding from the European Community's 7th Framework Program (FP7/2007–2013) under grant agreement no 242187.

Keywords: Physical Activity, Lifestyle Intervention, Obesity, Pregnant Women, Health Promotion

Mini-Oral Presentation B2.15 Measurement and classification of disability in large-scale physical activity related studies: A scoping review

5:03 pm - 5:05 pm (London, England, Wednesday, October 13, 2021)

Shelby Carr¹, Andrew J. Atkin¹, Andy Jones¹, Karen Milton¹

¹University of East Anglia, Norwich, United Kingdom

Background: Evidence on the prevalence and determinants of physical activity in disabled people is limited; this may partly stem from limitations in how disability is assessed in research studies. One challenge is that the traditional medical perspective towards disability focuses solely on a person's diagnosed condition and fails to acknowledge the heterogeneity in the level and type of impairment experienced by people with the same condition. **Purpose:** This scoping review explores how disability and impairment have been measured in research studies that include a device-based measure of physical activity. **Methods:** Following the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) framework, the search strategy and article screening aimed to identify observational and cross-sectional studies with a sample size ≥ 500 that included a device-based measure of physical activity. Survey instruments used in these studies were explored to identify what was asked about disability, chronic conditions and impairment. **Results:** 64 studies were included in this review. The review identified discrepancies in the style and quality of questions used to assess chronic conditions, disability and impairments, especially the number of impairments asked about, and specific reference to disability being 'long-term'. **Conclusions:** This research highlights the need for a more consistent measure of disability to be used internationally, and ideally a measure that captures detail about a person's impairment as well as condition. **Funding:** This research is funded by a University of East Anglia Faculty of Medicine and Health Studentship.

Keywords: Physical Activity, Disability, Impairment, Scoping Review

Mini-Oral Presentation B2.16 Settings privileged for practice of physical activity: differences in body composition, nature visits and environmental concern

5:05 pm - 5:07 pm (London, England, Wednesday, October 13, 2021)

Andreia Teixeira¹, Ronaldo Gabirel^{1,2,6}, José Martinho^{1,3}, Mário Santos^{1,4,6}, Luís Quaresma^{1,2}, Helena Moreira^{1,2,5,6}

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³Department of Geology, Geosciences, Centre of the University of Coimbra (CGeo), ⁴Laboratory of Applied Ecology, ⁵Research Center in Sports Sciences, Health Sciences and Human Development (CIDESD), ⁶Centre for the Research and Technology of Agro-Environmental and Biological Sciences (CITAB)

Background: Natural environments may influence individual physical activity (PA) and subsequently body composition, reducing

obesity and improving community health. **Purpose:** Examine, in both genders, the differences in body composition, PA, nature visits and pro-environmental behaviors (PEB's) according to the settings privileged for the PA practice. **Methods:** We studied 216 individuals (77 men and 139 women). Participants wore the Actigraph GT3X accelerometer to collect information concerning to total PA, moderate-vigorous PA and steps/day. Body composition variables were assessed by octopolar bioimpedance (InBody 720). The contexts for PA, nature visits and PEB's were self-reported. The data were analyzed using the Student's T test or the Mann-Whitney U test. Statistical significance was set at $p \leq 0.05$. **Results:** More than half of the male and female sample (59.7% and 52.1% respectively) privileged outdoor spaces for the PA practice, preference reported particularly by older individuals. Only in men, the preference for outdoor settings contributed to the increase in visitation to nature. Women with higher levels of central adiposity have a preference for these outdoor spaces for PA practice ($p=0.01$). Non-significant differences were observed in the remaining variables. **Conclusions:** The parks/outdoor spaces are the privileged contexts for PA practice by older people, regardless of gender. The same applies to women with high central adiposity. In both genders, the preference for natural outdoor environments does not seem to translate into higher levels of PA. **Funding:** This work is supported by National Funds by FCT-Portuguese Foundation for Science and Technology, under the projects UIDB/04033/2020, UID04045/2020 and UIDB/00073/2020. The investigation was also supported by European funding program Interreg Atlantic Area, under the project (EAPA_772/2018-Triple-C).

Keywords: Natural Environments, Accelerometer, Adiposity

Mini-Oral Presentation B2.17 Associations Between Accelerometer-Measured Physical Activity and Incident Type 2 Diabetes: Findings from the UK Biobank Prospective Cohort Study

5:07 pm - 5:09 pm (London, England, Wednesday, October 13, 2021)

Jirapitcha Boonpor¹, Fanny Petermann-Rocha^{1,2}, Solange Parra-Soto^{1,2}, Frederick K. Ho², Carlos Celis-Morales^{1,2,3}, Stuart R. Gray¹

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Background: Very few studies investigating risk of type 2 diabetes (T2D) have directly measured physical activity (PA) via accelerometers. **Purpose:** To investigate the association of PA, measured by an accelerometer, with T2D incidence. **Methods:** 40,823 participants from UK Biobank were included in this prospective cohort study. Wrist-worn accelerometers were used to measure total, moderate-to-vigorous (MVPA), moderate (MPA), and vigorous (VPA) PA. All PA domains were categorised into quartiles (Q1 to Q4). Q1 (Lowest quartile) was the reference group. Associations between PA and T2D incidence were analysed using Cox proportional hazard models excluding events in the first two years of follow-up. **Results:** After excluding the first two years of follow-up, the median follow-up period was 1.8 years (IQR: 1.2; 2.4), with 492 (1.2%) participants developing T2D. Compared to the lowest quartile, the highest quartile was associated with lower risk of T2D (HR_{total PA}: 0.29 [95% CI: 0.18 to 0.46], HR_{MPA}: 0.28 [0.17 to 0.44], HR_{VPA}: 0.34 [95% CI: 0.21 to 0.55], HR_{MVPA}: 0.28 [95% CI: 0.17 to 0.45]) after adjusting for socio-demographic and lifestyle factors for women. **Conclusions:** Accelerometer measured PA is associated with a lower risk of developing T2D. Public health policy should increase focus on increasing PA levels at a population level. **Funding:** No funding.

Keywords: Accelerometer, Physical Activity, Type 2 Diabetes Incidence

Mini-Oral Presentation B2.18 Associations of physical activity fitness, strength and sedentary behaviours with breast cancer risk: Findings from the UK Biobank prospective cohort study

5:09 pm - 5:11 pm (London, England, Wednesday, October 13, 2021)

Solange Parra-Soto¹, Craig Tumblety², Frederick K. Ho¹, Jill P. Pell¹, Carlos Celis-Morales^{1,2,3}

¹Institute of Health and Wellbeing, University of Glasgow, Glasgow, UK, ²Institute of Cardiovascular and Medical Sciences, University of Glasgow, Glasgow, UK, ³Laboratorio de Rendimiento Humano, Grupo de Estudio en Educación, Actividad Física y Salud (GEEAFyS), Universidad Católica del Maule, Talca, Chile

Background: Although low physical activity level is associated with breast cancer, evidence of associations with sedentary behaviours and physical fitness/capability is limited. Therefore, this study aimed to investigate of the association of breast cancer with various measures of physical activity, fitness, strength and sedentary behaviours. **Methods:** Data from 243,004 (60,897 premenopausal and 144,858 postmenopausal) women in the UK Biobank cohort were analysed. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ) and wrist accelerometers. Handgrip strength was assessed using a hand dynamometer and fitness through a submaximal cycle ergometer test. Hazard ratios (HR) were calculated for all exposure variables, using multivariable-adjusted Cox proportional models. **Results:** 8,179 incident breast cancers (1,735 premenopausal and 5,163 postmenopausal) were diagnosed during follow-up (mean 8.8 years in the 2-year landmark analysis). Compared with those in the lowest tertiles, women in the highest tertiles of physical activity (HR: 0.95, [95% CI: 0.92; 0.98], ptrend: 0.002), relative grip strength (HR: 0.96 [95%CI: 0.92; 0.99], ptrend: 0.046) self-reported walking (HR: 0.96, 95% CI: 0.93; 0.99, ptrend: 0.009), and moderate PA (HR: 0.96, 95% CI: 0.93; 1.00, ptrend: 0.030) had lower risk of incident breast cancer. Risk of breast cancer was associated with total and moderate PA among premenopausal women and walking pace, total PA, walking, fitness, relative grip strength and sedentary time in postmenopausal women. **Conclusion:** Physical activity, fitness/capability, strength, and sedentary behaviours are consistently associated with reduced risk of breast cancer in women pre- and post-menopause. **Funding:** SPS receives financial support from the Chilean Government for doing her PhD (ANID-Becas Chile 2019).

Keywords: Breast Cancer, Physical Activity, Strength, Cohort Study

Congress Day Three

Symposia

Symposium C1: The current and evolving state of physical activity promotion in Canada

9:30 am - 11:00 am (Vancouver, Canada, Thursday, October 14, 2021)

Ronald Wilson¹, Christa Costas-Bradstreet², Christine Cameron³, Leigh Vanderloo⁴, Drew Mitchell⁵, Robert J. Petrella^{6,7,8}

¹Theme Lead for Exercise, Faculty of Medicine, University of British Columbia, ²Director, Partnerships and Policy, CPRA, ³President, CFLRI, ⁴Knowledge Translation Manager, ParticipACTION, ⁵Director of Physical Literacy, Sport for Life, ⁶Professor and Head, Department of Family Practice and Division of Sport Medicine, University of British Columbia, ⁷Emeritus Professor in Family Medicine and Kinesiology at Western University, ⁸Developer and Principal Investigator for the Hockey Fans in Training (Hockey FIT) Program

Chair: Dr. Ronald Wilson, Theme Lead for Exercise, UBC Faculty of Medicine.

Presenters:

1. Christa Costas-Bradstreet, Director, Partnerships and Policy, CPRA.
2. Dr. Christine Cameron, President, CFLRI.
3. Dr. Leigh Vanderloo, Knowledge Translation Manager, ParticipACTION.
4. Drew Mitchell, Director of Physical Literacy, Sport for Life.
5. Dr. Robert J Petrella, MD, PhD, FCFP, FACSME is Professor and Head, Department of Family Practice and Division of Sport Medicine, University of British Columbia and Emeritus Professor in Family Medicine and Kinesiology at Western University; Developer and Principal Investigator for the Hockey Fans in Training (Hockey FIT) Program.

Purpose: This symposium will bring together speakers from the Public Health Agency of Canada (PHAC), ParticipACTION, Sport for Life Society, the Canadian Fitness and Lifestyle Research Institute (CFLRI) and the Canadian Parks and Recreation Association (CPRA) to discuss the current state of physical activity (PA) promotion in Canada and its evolving direction. Over the past 40 years, the Canadian Fitness and Lifestyle Research Institute has been a leader in physical activity, sport, and recreation research in Canada. The CFLRI has developed a comprehensive, long-standing, and credible surveillance system which monitor not only population participation rates in physical activity and sport, but has also collected a multitude of factors associated with participation rates from the population and from key settings which support participation. This data has been integral for national policy development, evaluation, and for assessing impact.

As Canada's premier physical activity brand, ParticipACTION helps Canadians to incorporate PA into their daily lives, through impactful engagement initiatives and thought leadership. One of the ways that ParticipACTION works to achieve this mandate, is to ensure that Canadians and its multi-disciplinary partners and collaborators are informed about physical activity, sport participation and sedentary behaviour by gathering, translating, and disseminating the most relevant evidence on the subject. For 50 years ParticipACTION has been one of the world leaders in sport and physical activity advocacy. The organization has engaged more than 4 million Canadians to sit less and move more through their initiatives, events, and programs. ParticipACTION's vision is a Canada where PA is a vital part of everyday life.

Sport for Life is a leader in the area of Physical Literacy. Physical Literacy for Communities (PL4C) leverages multi-sectoral capacity and connections to affect change in health outcomes around chronic disease and injury. Physical literacy presents an opportunity to leverage capacity and develop healthy strategies together. In both the young child and older adult population, the skills and confidence of an individual to participate in various physical activities is a strong predictor of participation levels. The awareness and education of physical literacy (as it applies to the older adult population and informs the strategies of PA advocates, promoters and facilitators, and older adults themselves) is proving to be the missing link in the successful and sustained increase in PA participation by older adults.

Informed and inspired by Indigenous perspectives and input from many key organizations and leaders

A Common Vision for Increasing Physical Activity and Reducing Sedentary Living is a national policy document intended to lead the country forward to move more and sit less. This policy has a singular focus on physical activity and its relationship to sport, recreation and health. PHAC is coordinating implementation of this policy. A Common Vision is for all that have a stake in promoting physical activity and reducing sedentary living in Canada. Funded by the PHAC and a host of partners, the Hockey Fit program is designed to use the power of sport, of being a fan of local hockey teams to engage at risk men in a healthy lifestyle program that produces important long term health indicator and behavioral change.

Results and Conclusions: Together the presenters will address the current state of promotion and the challenges ahead for improving PA levels and reducing sedentary behaviour in Canada.

Keywords: Physical Activity, Sedentary Behavior, Health Promotion

Symposium C2: From laboratory to community: The process of translating evidenced-based physical activity interventions into community contexts

9:30 am - 11:00 am (Vancouver, Canada, Thursday, October 14, 2021)

Mary Jung¹, Majidullah Shaikh², Corliss Bean¹, Amanda Wurz³, Nicole Culos-Reed³

¹University of British Columbia, Okanagan Campus, British Columbia, Canada, ²University of Ottawa, Ontario, Canada, ³University of Calgary, Alberta, Canada

Background: Translating efficacious physical activity (PA) interventions into the community is rarely done. This research to practice gap is concerning as those who need these programs most rarely have access to PA programming that is evidence-informed, safe, and feasible. Knowledge translation projects that foster partnerships with community organizations can close the gap. Cultivating quality partnerships and evaluating such projects to ensure effectiveness (vs. efficacy), methodological rigour, and sustainability is needed.

Purpose: This symposium will detail four cases that adopt varied processes of translating evidenced-based PA interventions into practice: a trauma-informed youth sport program, a PA and diet diabetes prevention program, a multi-pronged approach to enhancing PA for children and adolescents affected by cancer, and PA programming for adult cancer survivors will be described.

Description:

Chair: Dr. Mary Jung, University of British Columbia. *Introduction to Symposium*

Presenter 1: Majidullah Shaikh, University of Ottawa. Title: Building up the Bounce Back League: Embedding Trauma-Informed Sport Interventions throughout a National Youth Community Organization. Description: Trauma-informed sport is intended to promote resilience and psychosocial development of youth at risk of exposure to traumatic experiences. Shaikh will discuss a collaborative partnership with Boys and Girls Clubs of Canada to scale-out such practices and programming across Canada.

Presenter 2: Dr. Corliss Bean, University of British Columbia. Title: Small Steps for Big Changes: A Collaborative Approach to Integrating a Diabetes Prevention Program into YMCA Sites. Description: Bean will outline the process of translating an evidence-based diabetes prevention program aimed to improve healthy eating and exercise adherence in individuals with prediabetes into a community setting through a case example partnership between the YMCA of Okanagan and the Diabetes Prevention Research Group.

Presenter 3: Dr. Amanda Wurz, University of Calgary. Title: Developing and Implementing Physical Activity Programming for Children and Adolescents Diagnosed with Cancer. Description: Wurz will describe the multifaceted, integrated knowledge translation (iKT) approach being used to develop and implement evidence-informed PA programming for children and adolescents diagnosed with cancer. This includes the development of population-specific PA guidelines, training resources, community-based programming, and in-hospital programming.

Presenter 4: Dr. Nicole Culos-Reed, University of Calgary. Title: Dissemination and Implementation of a Clinic-to-Community Exercise Oncology Model. Description: Culos-Reed will describe PA programming for adult cancer survivors in Alberta, and ongoing work to move their "hub and spoke" clinic-to-community exercise oncology model to reach rural cancer survivors across Canada. The importance of training fitness professionals and implementing behaviour change principles to support a culture shift of wellness in cancer care will be presented.

Results: Strengths, challenges, and lessons learned will be shared with regards to program scale-up and sustainability including different engagement strategies (e.g., iKT) and developing resources and initiatives rather than providing mere programming (e.g., facilitator training, newsletters, walking groups, monthly meetings). An overview of the integration of evaluation frameworks (e.g., RE-AIM), models of behaviour change (e.g., COM-B), and patient-oriented research approaches will be highlighted.

Conclusions: Lessons learned from these cases will continue to inform next steps in working collaboratively toward program scale-up and sustainability. Further, these cases can help to advance and translate knowledge of integrating and sustaining PA programming for optimal health and well-being across the lifespan.

Funding: MS: Public Health Agency of Canada; MJ and CB: Michael Smith Foundation for Health Research, Social Sciences and Humanities Research Council of Canada, Canadian Institutes of Health Research (CIHR), UBC; AW and NCR: CIHR, SPOR, AI, ACF, CCSRI-CIHR, UCalgary.

Keywords: Implementation Science, Sport, Cancer, Diabetes, Behaviour Change

Symposium C3: SBRN's Evidence-Based School-Related Sedentary Behaviour Recommendations

9:30 am - 11:00 am (Vancouver, Canada, Thursday, October 14, 2021)

Travis Saunders¹, Scott Rollo², Nicholas Kuzik², Mark Tremblay², Wendy Huang³

¹Active Living Lab, University of Prince Edward Island, ²HALO Research Group, CHEO Research Institute, ³Hong Kong Baptist University

Purpose: The purpose of this symposium is to release evidence-based school-related sedentary behaviour recommendations, as well as present the process used to develop these recommendations.

Description: Although several nations have released sedentary behaviour guidelines for school-aged children and youth, these all focus on recreational sedentary behaviour and explicitly exclude school-related sedentary behaviours (i.e., occurring during school hours [e.g., classroom, recess] or outside of school hours but within the control of the school [e.g., homework]). Therefore, there are no current evidence-based recommendations for appropriate types and amounts of school-related sedentary behaviour. The absence

of guidelines has precluded the development of school policies related to sedentary behaviours, which have important implications for the health of children and youth. This is especially important given recent shifts to online learning in many jurisdictions during the COVID-19 pandemic. To address this knowledge gap, the Sedentary Behaviour Research Network (SBRN) assembled an expert panel to develop evidence-based recommendations for school-related sedentary behaviours. The purpose of these recommendations is to provide guidance to teachers, administrators, and policy makers in order to improve the health of school-aged children and youth. This presentation will be the official release of these recommendations, as well as providing an overview of the development process.

Chair: Dr. Mark Tremblay, HALO Research Group, CHEO Research Institute. Title: Introduction to Symposium.

Presenter 1: Dr. Scott Rollo, HALO Research Group, CHEO Research Institute. Title: Existing Sedentary Behaviour Guidelines for Children and Youth: A Systematic Scoping Review.

Presenter 2: Dr. Nicholas Kuzik, HALO Research Group, CHEO Research Institute. Title: School-Related Sedentary Behaviours and Health Outcomes Among Children and Youth: A Systematic Review.

Presenter 3: Dr. Travis Saunders, Active Living Lab, University of Prince Edward Island. Title: SBRN School- Related Sedentary Behaviour Recommendations for Children and Youth.

Presenter 4: Dr. Wendy Huang, Hong Kong Baptist University. Title: Implications and Future Directions.

Results: The presentations in this symposium will provide an overview of previous sedentary behaviour recommendations for this age group (Presentation 1), results from a new systematic review examining the relationships between school-related sedentary behaviours and a range of health outcomes (Presentation 2), and unveil the recommendations themselves (Presentation 3).

Conclusions: These recommendations are likely to lead to the development of novel policies for school-related sedentary behaviour. This will have important implications for sedentary behaviour and screen time for school-aged children and youth.

Keywords: Sedentary Behaviour, Screen Time, School-Aged Children, Adolescents, Policy

Symposium C4: Gleaning real-world evidence on multisectoral partnerships to equitably promote physical activity in urban areas

9:30 am - 11:00 am (Vancouver, Canada, Thursday, October 14, 2021)

Lise Gauvin^{1,2}, Nazeem Muhajarine^{3,4}, Jacob Alhassan^{3,4}, Kadia Saint-Onge^{5,1}, Jany St-Cyr^{5,1}

¹Centre de recherche du Centre Hospitalier de l'Université de Montréal (CRCHUM), ²École de santé publique de l'Université de Montréal, ³Saskatchewan Population Health Research Unit (SPHERU), ⁴Community Health and Epidemiology, College of Medicine, University of Saskatchewan, ⁵Département de psychologie, Université du Québec à Montréal

Purpose: To share real-world evidence on multisectoral partnerships (MP) aimed at equitably promoting physical activity in Canadian cities and to derive practical implications.

Description: In the fall of 2018, the WHO launched the Global Action Plan on Physical Activity 2018-2030. The plan proposes four strategic objectives and 20 policy actions to attain 10% and 15% reductions in physical inactivity by 2025 and 2030 respectively. A central feature of the accompanying implementation plan involves the creation and nurturing of MP to effect system changes. In this symposium, we report on findings and methodological challenges encountered in conducting a pan Canadian program of research called MUSE: Multisectoral Urban Systems for health and Equity in Canadian cities. MUSE focuses on studying MP that will equitably lead to promoting physical activity and healthy eating in Montreal, Toronto, Saskatoon, and Vancouver. The program of research is aimed at gleaning new evidence on the composition, structure, functioning, and outputs of Canadian MP that are nurtured by public health organizations with municipalities to improve built environments related to transportation, leisure infrastructure, and the food environment – that is, “system components” that can support physical activity. Another cross-cutting issue of interest is how equity is – or is not integrated into the work and outputs of MP. The symposium will include an overarching view of the MUSE research program and a synthesis of current knowledge about successful MP. Presentations will outline: i) findings from a content analysis of mission statements and partnership activities as posted on websites, ii) results of qualitative interviews and focus groups conducted with the leadership of the partnerships, and iii) perceptions of action capacity to enact the 20 WHO policy actions among the organizations that are members of one of the partnerships.

Presenter 1: Dr. Lise Gauvin, CRCHUM & École de santé publique de l'Université de Montréal and Dr. Nazeem Muhajarine, Saskatchewan Population Health Research Unit (SPHERU) & Community Health and Epidemiology, College of Medicine, University of Saskatchewan. Title: Overview and Canadian examples of MP. Description: This introduction provides an overarching view of MUSE and describe examples of MP.

Presenter 2: Jany St-Cyr, Département de psychologie, Université du Québec à Montréal & CRCHUM. Title: Multisectoral partnerships: What the literature tells us. Description: This presentation overviews the facilitators and barriers to multisectoral partnerships as reported in the literature.

Presenter 3: Dr. Nazeem Muhajarine and Jacob Alhassan, SPHERU & Community Health and Epidemiology, College of Medicine, University of Saskatchewan. Title: Perspectives from the leaderships of multisectoral partnerships. Description: This presentation highlights what MP leaders in Saskatoon believe are key ingredients.

Presenter 4: Kadia Saint-Onge, Département de psychologie, Université du Québec à Montréal & CRCHUM. Title: Aspirations and

action capacity for multisectoral work. Description: This presentation outlines how partnership members in Montreal perceive their action capacity and what they aspire the partnership to be.

Presenter 5: Dr. Lise Gauvin, CRCHUM & École de santé publique de l'Université de Montréal. Title: Perceptions of capacity for the 20 policy actions proposed in the WHO's Global Action Plan 2018-2030. Description: This presentation outlines what partnership members believe their organisation and the partnership can and cannot do in terms of policy action.

Presenter 6: Dr. Lise Gauvin, CRCHUM & École de santé publique de l'Université de Montréal and Dr. Nazeem Muhajarine, SPHERU & Community Health and Epidemiology, College of Medicine, University of Saskatchewan. Title: Methodological challenges, recommendations, and next steps. Description: This introduction provides overarching comments before open-up the discussion with the audience.

All participants: To optimize discussion, symposium participants will be invited to respond to multiple choice questions and to provide open-ended comments through an online voting and response system. Responses and comments will be shared "live" with the audience. A panel discussion will maximize opportunities for sharing ideas.

Results: Advancing knowledge about MP involves several methodological and operational challenges. Interacting with knowledge-users allows for collectively identifying of practical implications for creating and nurturing MP.

Conclusion: Studying MP holds promise for strengthening physical activity promotion.

Funding: Research supported by a CIHR Healthy Cities Team Grant.

Keywords: Multisectoral Partnerships, Built Environment, Health Equity, Mixed Methods

Symposium C5: The Evolution of National and Global Physical Activity Guidelines

9:30 am - 11:00 am (Vancouver, Canada, Thursday, October 14, 2021)

Peter Katzmarzyk¹, Abby King², Charlie Foster³, Robert Ross⁴, Emmanuel Samatakis⁵

¹Pennington Biomedical Research Center, Baton Rouge, LA, USA, ²Stanford University, Stanford, CA, USA, ³University of Bristol, Bristol, UK, ⁴Queens University, Kingston, ON, Canada, ⁵University of Sydney, Sydney, NSW, Australia

Purpose: The purpose of this symposium is to compare and contrast the most recent national and global physical activity guidelines.

Description: Over the last few years, several countries have developed and released new physical activity guidelines. In addition, The World Health Organization has recently updated their global recommendations on physical activity. While these recent public health guidelines share several commonalities, there are some key differences. These differences can be explained by differences in the development processes, target audiences, stakeholder engagement, and the role of the expert advisory committees in drafting the final recommendations.

Chair: Peter T. Katzmarzyk, Pennington Biomedical Research Center, Baton Rouge, LA, USA.

Presenter 1: Dr. Abby King, PhD, Stanford University, Stanford, CA, USA. Title: Development and Scientific Foundation of the Physical Activity Guidelines for Americans, 2nd Edition.

Presenter 2: Charlie Foster, OBE, University of Bristol, Bristol, UK. Title: Development and Scientific Foundation of the UK Chief Medical Officers' Physical Activity Guidelines

Presenter 3: Dr. Robert Ross, PhD, Queens University, Kingston, ON, Canada. Title: Development and Scientific Foundation of the Canadian 24-Hour Movement Guidelines for Adults and Older Adults

Presenter 4: Dr. Emmanuel Stamatakis, PhD, The University of Sydney, Sydney, NSW, Australia. Title: Development and Scientific Foundation of the WHO Guidelines on Physical Activity and Sedentary Behaviour for Children and Adolescents, Adults and Older adults.

Results: This symposium will present recent physical activity guidelines developed by the United States, United Kingdom, Canada, and the World Health Organization. The presentations will outline the guideline development processes, identify key differences among the guidelines, and explore reasons for these differences. Although all of these guidelines share several core features, there are some differences related to the way in which sleep and sedentary behavior were integrated into the guidelines, as well as differences in the way that the recommended dose and intensity of physical activity is expressed.

Conclusions: This symposium addresses several issues related to the congress themes, including epidemiology, the 24-hour paradigm, knowledge translation, and advocacy. Attendees of this symposium will understand the key elements of recent physical activity guidelines, key differences across countries, and reasons for these differences.

Keywords: Physical Activity, Sedentary Behaviour, Guidelines, Advocacy

Symposium C6: Council on the Environment and Physical Activity: Building evidence for active communities across the globe

9:30 am - 11:00 am (Vancouver, Canada, Thursday, October 14, 2021)

Deborah Salvo¹, Erica Hinckson², Ester Cerin³, Takemi Sugiyama⁴, Jasper Schipperijn⁵, Alejandra Jauregui⁶, Adewale Oyeyemi⁷, Billie

Giles-Corti⁸, James Sallis^{3,9}

¹Washington University in St. Louis, USA, ²Auckland University of Technology, New Zealand, ³Australian Catholic University, Australia, ⁴Swinburne University of Technology, Australia, ⁵University of Southern Denmark, Denmark, ⁶Instituto Nacional de Salud Publica, Mexico, ⁷University of Maiduguri, Nigeria, ⁸University of Melbourne, Australia, ⁹University of California San Diego, USA

Purpose: We are conducting a 90-minute Satellite symposium to highlight the most recent work of the Council on the Environment and Physical Activity (CEPA), an official ISPAH council. This session will present updates on the activities, research products, and ongoing collaborative research projects which CEPA leads.

Rationale: CEPA is an official and highly productive ISPAH council. CEPA supports investigators in conducting rigorous research on the environmental influences of physical activity, and the use of results to advocate for evidence-based environmental and policy changes to support and promote physical activity through the creation of active communities. The council is composed by a vibrant mix of physical activity researchers with expertise in public health, behavioral science, urban design, urban policy, transportation, planning, recreation, systems science, among other disciplines. CEPA has five objectives: a) to stimulate and support research on physical activity and the environment internationally, b) to increase communication and collaboration among researchers to develop new measures, adapt measures for local contexts, and organize networks focusing on specific population subgroups, geographic regions, and research questions, c) to encourage formation of interdisciplinary teams to conduct research, d) to encourage teams from different countries to conduct joint and pooled studies, and e) to support investigators and practitioners to become effective advocates for evidence-based environmental and policy change. CEPA operates through thematic working groups, including those focused on understanding the relation between the built environment and physical activity among specific age groups (children and adolescents workgroup; older adults workgroup); those centered on the role of different settings and systems on physical activity (green space workgroup, transportation workgroup); those designed to build cohesion and capacity for more and better built environment and physical activity research in world regions where the field remains nascent (Latin America working group; Africa workgroup); and one with focus on translation and dissemination of evidence into policy and action (policy workgroup).

Format: The symposium will be chaired by Deborah Salvo, CEPA's current Chair. Following a 5-minute overview of the purpose and history of CEPA by Deborah Salvo, each working group director will deliver 10-minute presentations outlining their most recent projects and products. This will include new methods and results of multi-country studies, systematic reviews involving authors from multiple countries and at multiple career stages, and an exciting new initiative to standardize city-level indicators from across the world to facilitate policy and practice work in this real.

Working group leaders (symposium presenters) include:

Erica Hinckson (childhood and adolescence), Ester Cerin (older adults), Takemi Sugiyama (transportation), Jasper Schipperij, (green spaces), Alejandra Jauregui (Latin America), Adewale Oyeyemi (Africa), and Billie Giles-Corti (policy). The session will close with a 15-minute open discussion, facilitated by James Sallis (founder of CEPA).

Outcomes: Through this session, ISPAH 2020 attendees will be exposed to the latest, globally relevant findings on the role that environments play in shaping the physical activity patterns of populations. Additionally, this session will allow us to identify and encourage new members in becoming active contributors to the activities of CEPA, and the ISPAH mission and vision at large.

Keywords: CEPA, Built Environment, Global Collaborations, ISPAH Council

Symposium C7: Physical Activity among People with Disabilities: A Global Perspective

9:30 am - 11:00 am (Vancouver, Canada, Thursday, October 14, 2021)

Gregory W. Heath¹, Hidde van der Ploeg², Kwok Ng³, Christopher B. McBride⁴, Kathleen A. Martin Ginis⁵

¹University of Tennessee, Chattanooga, USA, ²Amsterdam University Medical Centres, the Netherlands, ³University of Limerick, Republic of Ireland, ⁴Spinal Cord Injury British Columbia, Canada, ⁵University of British Columbia, Canada

Purpose: As a population, people with disabilities (PWD) experience poorer health which is associated with lower levels of physical activity (PA) compared to the general population. The purpose of this symposium is to provide an update and overview of the global prevalence of physical activity among PWD, the role of policies in supporting PA among PWD, and the status of evidence-based interventions to promote PA among PWD.

Description: This symposium provides an overview of the current knowledge regarding the patterns of PA among PWD; the role of policies in providing opportunities for and inclusion of PWD in PA by creating active living environments; and a review of effective physical activity promotion interventions among PWD living in low, middle, and high-income countries.

Chair: Dr. Gregory W. Heath, University of Tennessee Chattanooga, USA. Introduction to the Symposium.

Presenter 1: Dr. Hidde van der Ploeg, Amsterdam University Medical Centres, the Netherlands. Title: Global Patterns of Physical Activity among PWD. Description: Summary of the epidemiology of PA among adults with disabilities, especially those meeting the WHO recommended levels of PA. Review of the accrued health benefits of PA among PWD and the association of physical inactivity and selected non-communicable disease (NCD) outcomes.

Presenter 2: Dr. Kwok Ng, University of Limerick, Republic of Ireland. Title: Global Patterns of Physical Activity among Children and Youth with Disabilities: Transport, Recreation, and Sport. Description: Summary of the global pattern of PA among children and youth with disabilities. A focus on modes, opportunities, and settings.

Presenter 3: Dr. Christopher B. McBride, Spinal Cord Injury British Columbia, Canada. Title: Integrated Knowledge Translation Approaches: An essential step for Global Physical Activity Policy Development. Description: The importance of policy development directed towards PA research and promotion among PWD will be explored considering needed essential input and guidance from among PWD.

Presenter 4: Dr. Kathleen A. Martin Ginis, The University of British Columbia, Canada. Title: Effectiveness of Physical Activity Interventions among PWD." Description: A systematic review of the factors, determinants, and barriers related to PA participation among PWD and effective intervention strategies designed to increase PA among PWD.

Results: The proportion of people meeting the WHO PA recommendations is much lower among PWD than in the general population; PWD can achieve significant health benefits from PA participation well below the 150 min/week guideline; Disability sport continues to grow and may play a role in promoting empowerment, social inclusion and social participation of PWD worldwide; Theory-based interventions are needed to target barriers at all levels of the social ecological model in order to increase both the quantity and quality of PA participation among PWD; Current policies lack explicit plans on how to ensure and uphold the rights of PWD to full and effective participation in PA.

Conclusions: International coordinated efforts are needed to measure and monitor PA levels among PWD; Epidemiologic studies are needed to examine the association between PA and risk of NCD among PWD; Research on PA among PWD lags behind PA research in the general population; The majority of extant data on PA and PWD has been collected in HIC, thus improved data collection among LMIC must be a priority; PWD need to be meaningfully engaged in developing the research and policy agendas to advance PA knowledge and participation among PWD globally; Deliberate progress towards the UN sustainable development goal of healthy lives and well-being for all needs to be pursued across the globe.

Keywords: People With Disabilities, Epidemiology, Policy, Promotion

Symposium C8: Indigenous Health, Wellness, and Sport: Empowerment and Self-Determination

11:10 am - 12:40 pm (Vancouver, Canada, Thursday, October 14, 2021)

Darren Warburton¹, Moss Norman², Rosalin Miles^{3,1}, Paul Whitnui⁴, Waneek Horn-Miller⁵

¹Indigenous Health and Physical Activity Program, University of British Columbia, ²Indigenous Studies in Kinesiology, University of British Columbia, ³Lytton First Nation, ⁴Ngā Puhī, Te Aupōuri, Ngāti Kuri, University of Victoria, ⁵Mohawk, Kahnawake Territory

Purpose: The primary purpose of this symposium is to support the empowerment and self-determination of Indigenous community members from around the world providing greater ownership over health, wellness, and sport.

Description: This symposium will include leading Indigenous and non-Indigenous ally scholars and community leaders in the discussion of the latest advancements in Indigenous led health, wellness, and sport initiatives. Using real world examples, the presenters will share their lived experiences and the important lessons learned through the genuine inclusion of Indigenous ways of understanding and doing in health, wellness, and sport settings.

Chair and Presenter 1: Dr. Moss Norman, Indigenous Studies in Kinesiology, University of British Columbia. Title: Introduction to Symposium & The Relationship between Land, Culture, Physical Activity, Sport, and Identity Description: Dr. Norman will briefly introduce the Symposium topics and presenters. He will then discuss his experiences supporting Indigenous-centred, community-first research designs that examine the relationship between land, culture, physical activity, sport, and identity.

Presenter 2: Dr. Rosalin Miles, Lytton First Nation and University of British Columbia. Title: The Empowerment and Self-Determination of First Nations Communities in British Columbia Description: Dr. Miles will discuss her lived experiences as a First Nations community leader, scholar, athlete, and high-performance coach. She will discuss the importance of the genuine engagement of Indigenous Elders, community leaders, and youth in community-based initiatives that build upon the strengths and aspirations of Indigenous peoples and communities.

Presenter 3: Dr. Paul Whitnui, Ngā Puhī, Te Aupōuri, Ngāti Kuri, University of Victoria. Title: Developing an Indigenous Cultural Safety Training Impact Assessment Tool for Sport Dr. Whitnui is an Indigenous Māori scholar from the Confederation of Tribes in the Far North of Aotearoa New Zealand. Description: The focus of his talk will be on lessons learned from the development of an Indigenous Cultural Safety Training Impact tool for sport. This talk will provide on-going support for coaches, athletes, trainers, managers, and leaders to better self-evaluate their professional and personal practices when working with Indigenous Peoples.

Presenter 4: Waneek Horn-Miller, Mohawk, Kahnawake Territory. Title: The Warrior Within Description: Waneek will discuss her lived experiences as an Olympic athlete, coach, and Indigenous leader. Her talk will provide an example of the power of sport to help Indigenous peoples focus their emotions and experiences into achievement.

Results: This symposium will provide a greater appreciation of the importance of the genuine inclusion of Indigenous ways of understanding and doing in health, wellness, and sport settings. This symposium will also include a discussion of the importance of the inclusion of a wholistic vision of physical, emotional, mental, and spiritual ceremonies and practices in health, wellness, and sport settings. It is anticipated that this symposium will support an increased understanding and acceptance of traditional Indigenous

practices through Indigenous-led and community-based approaches.

Keywords: Physical Activity, Health, Sport, Exercise, Indigenous

Symposium C9: Review and comparison of new sedentary behaviour guidelines in adults and older adults for the United States, Canada, and the World Health Organization

11:10 am - 12:40 pm (Vancouver, Canada, Thursday, October 14, 2021)

Emmanuel Stamatakis¹, Peter T. Katzmarzyk², Travis Saunders³, Matthew P. Buman⁴

¹School of Health Sciences, University of Sydney, ²Penington Biomedical Research Center, ³Department of Applied Health Sciences, University of Prince Edward Island, ⁴College of Health Solutions, Arizona State University

Purpose: To provide an overview, comparison, and discussion of recently released public health guidelines for sedentary behaviour by the United States, Canada, and the World Health Organization (WHO).

Description: Sedentary behaviour (i.e., seated/reclining posture with low energy expenditure) has emerged as an important public health target and evidence on its relationship with mortality and other important health outcomes is rapidly accumulating. Sedentary behaviour guidelines have now been released by several countries targeting children and adolescents, and to a lesser extent adults and older adults. Most recently, guideline committees in the United States, Canada, and for the WHO have conducted comprehensive reviews to synthesize the evidence on sedentary behaviour and health and generated new or updated guidelines on sedentary behaviour for adults and older adults. Despite being derived from a similar evidence base, guideline statements differ for these governing bodies in important ways. This symposium will highlight the processes each of these committees followed and how these processes led to similarities and differences in the resultant guideline statements. A robust discussion will follow on the research gaps that have emerged and how these gaps can be addressed by the scientific community.

Dr. Emmanuel Stamatakis, University of Sydney (Chair/Discussant), Title: Guideline development processes for sedentary behaviour. Description: Dr. Stamatakis will provide introductory comments on the importance of national and international guidelines for public policy and the need to contextualize evidence for individual country environments.

Dr. Peter Katzmarzyk, Penington Biomedical Research Center. Title: Elements of Sedentary Behaviour in the Physical Activity Guidelines for Americans, 2nd Edition. Description: Dr. Katzmarzyk will provide an overview of the sedentary behaviour elements of the Physical Activity Guidelines for Americans, 2nd Edition (2018).

Dr. Travis Saunders, University of Prince Edward Island. Title: Sedentary behaviour guidelines in Canada: An integral component of 24-hour movement guidelines. Description: Dr. Saunders will provide an overview of the sedentary behaviour guidelines development process for the 2020 Canadian 24-Hour Movement Guidelines for Adults and Older Adults.

Dr. Matthew Buman, Arizona State University. Title: Updating evidence and crafting stand-alone sedentary behaviour guidelines for the WHO. Description: Dr. Buman will provide an overview of the sedentary behaviour guidelines development process for the 2020 WHO Guidelines on Physical Activity and Sedentary Behaviour for Children and Adolescents, Adults and Older Adults.

Results: Several important scientific issues had considerable bearing on the formation of sedentary behaviour guideline statements by these guidelines committees, including but not limited to: (a) definitions of sedentary behaviour and its bearing on measurement in reviewed evidence; (b) dose-response evidence for sedentary behaviour and health and the appropriateness of quantitative guidelines, evidence on total sedentary time v. patterns of sedentary time (i.e., 'breaks'), and (c) knowledge translation, communication, and inclusivity considerations in how guideline statements are crafted and communicated to various stakeholders.

Conclusions: National and international public health guideline statements play an important role in shaping public policy, and the evidence on sedentary behaviour and health is rapidly accumulating. A deliberate and coordinated effort is needed to address important research gaps that will build greater international consensus on how to optimally reduce health risks through limiting sedentary time.

Keywords: Sedentary Behaviour, Guidelines

Symposium C10: The Effects of the COVID-19 Pandemic on Physical Activity Behaviours and The Implications for Health and Wellness

11:10 am - 12:40 pm (Vancouver, Canada, Thursday, October 14, 2021)

Shannon Bredin¹, Jack Taunton^{1,2}, Paul Oh³, Jodi Edwards⁴, Simon Bacon⁵, Anthony Burke⁶

¹University of British Columbia, ²Allan McGavin Sports Medicine Centre, ³Toronto Rehabilitation Institute, ⁴University of Ottawa Heart Institute, ⁵Concordia University, ⁶Vivo for Healthier Generations

Description: This symposium chaired by Dr. Shannon Bredin, University of British Columbia, will explore the current evidence regarding the effects of the COVID-19 pandemic on physical activity behaviours and the implications for health and well-being in diverse populations.

Dr. Jack Taunton, Professor Emeritus, UBC and Allan McGavin Sports Medicine Centre, will discuss the treatment of persons exposed to COVID-19 with particular emphasis on those with the Long Hauler Syndrome.

Dr. Paul Oh, Toronto Rehabilitation Institute, will highlight the important role cardiac rehabilitation approaches will play in the

treatment of those living with the long-term effects of COVID-19 infection.

Dr. Jodi Edwards, University of Ottawa Heart Institute, will provide a patient's perspective living with and recovering from COVID-19.

Dr. Simon Bacon, Concordia University, will discuss the lessons learned from global initiatives, such as the International Assessment of COVID-19-related Attitudes, Concerns, Responses and Impacts in Relation to Public Health Policies (iCARE) study.

The session will end with a discussion of Public Health Agency of Canada funded projects and the changes that were made to deal with the effects of the COVID-19 pandemic on physical activity programming at the community level.

Symposium C11: Leveraging social networks to increase physical activity

11:10 am - 12:40 pm (Vancouver, Canada, Thursday, October 14, 2021)

Tracie A. Barnett^{1,2}, Andraea Van Hulst¹, Ariane Belanger-Gravel³, Johanne Saint-Charles⁴, Elena Tresierra-Farbridge⁵

¹McGill University, ²CHU-Sainte-Justine, ³Université Laval, ⁴Université du Québec à Montréal, ⁵Concordia University

Background: The structure and composition of social networks (SN) are emerging determinants of physical activity and sedentary behaviour. Greater understanding of these dynamics could inform innovative interventions designed to engage youth in more physical activity and to reduce their sedentary time.

Purpose: In this symposium, we provide an overview of social network analysis, we review the evidence linking social network characteristics to physical activity and sedentary behaviour, and we describe promising strategies that leverage social networks in order to increase physical activity and decrease sedentary behaviour in youth.

Description:

Dr. Johanne Saint-Charles, Université du Québec à Montréal. Title: Introduction to Social Networks: The What and the Why

Elena Tresierra-Farbridge, Concordia University. Title: Social Networks and Cardiometabolic Health: Scoping Review Methods

Dr. Tracie Barnett, McGill University. Title: Linking social networks to physical activity/sedentary behaviour in youth: evidence from observational studies

Dr. Ariane Bélanger- Gravel, Université Laval. Title: Linking social networks to physical activity/sedentary behaviour in youth: evidence from intervention studies

Methods: The nature of social networks, their assessment, and key social network indicators are described in an introductory session. A narrative literature review on the relationship between social networks, physical activity and sedentary behaviour is presented, and a systematic review of social network interventions designed to promote greater physical activity and/or to reduce sedentary behaviour is discussed.

Discussion: Speakers will engage attendees and discuss potential applications in clinical and public health settings, current gaps in knowledge, and research priorities moving forward, notably with respect to vulnerable populations.

Keywords: Social Networks, Physical Activity, Sedentary Behaviour, Adolescents, Young Adults, Clinical Interventions, Public Health

Symposium C12: Five-year experience of the Global Observatory for Physical Activity (GoPA!): Progress, Lessons Learned and Future Steps

11:10 am - 12:40 pm (Vancouver, Canada, Thursday, October 14, 2021)

Michael Pratt^{1,2}, Adrian Bauman^{3,2}, Andrea Ramirez Varela^{4,2}, Pedro Hallal^{5,2}

¹Professor and Director, Institute for Public Health and MPH Program, Department of Family Medicine and Public Health, University of California San Diego School of Medicine, ²Global Observatory for Physical Activity (GoPA!) ³University of Sydney, ⁴Assistant professor, School of Medicine, Universidad de los Andes, Columbia, ⁵President, Federal University of Pelotas, Pelotas, Brazil

Purpose: To present progress, main findings, lessons learned and future steps after five years of the launch of the Global Observatory for Physical Activity (GoPA!) and, to officially launch the 2020 Country Cards and 2nd Physical Activity Almanac.

Description: The Global Observatory for Physical Activity (GoPA!) was launched to monitor the progress of worldwide physical activity population level over time. GoPA! has become a leader in global monitoring of national physical activity surveillance, policy and research. Despite its importance and great progress, challenges remain as physical activity worldwide monitoring remains inadequately prioritized in the global public health arena. This symposium will present 5-year experience in physical activity monitoring in more than 145 countries worldwide including the methods, main findings and lessons learned from Country Cards project. Finally, the official launch of the 2020 Country Cards and 2nd Physical Activity Almanac will be held. The Chair, Steering Committee Members, Country Cards update working group and the Country Contacts will be invited to the launch.

Chair: Dr. Michael Pratt, University of California San Diego, USA

Discussant: Dr. Adrian Bauman, University of Sydney. Global Observatory for Physical Activity - GoPA!

Presenter 1: Dr. Michael Pratt, University of California San Diego, USA. Global Observatory for Physical Activity - GoPA!
Title: The Global Observatory for Physical Activity (GoPA!): Five-year progress and lessons learned for physical activity promotion worldwide.

Presenter 2: Dr. Andrea Ramirez Varela, School of Medicine, Universidad de los Andes, Colombia. Global Observatory for Physical Activity - GoPA!
Title: Global status of Physical Activity Surveillance, Policy and Research: release of the 2020 Country Cards and 2nd GoPA! Physical Activity Almanac.

Presenter 3: Dr. Pedro Hallal, Federal University of Pelotas, Pelotas, Brazil. Global Observatory for Physical Activity - GoPA!
Title: The Global Observatory for Physical Activity (GoPA!): Future steps and strategic projects to advance physical activity promotion worldwide.

Discussion/Q&A/Results: After five years of implementation, GoPA! is actively monitoring physical activity surveillance, policy and research worldwide. Also, it has turned a dynamic network with regular products related to its main project the Country Cards. Currently the Country Cards are being updated until July 2020. Preliminary results have been collected from October 2019 - January 2020 for 54 GoPA! country members around the world. Once data collection is finished, a comprehensive analysis and comparison of national surveillance, policy and research indicators in 145 countries worldwide will be provided. The 2020 Country Cards will be put in the 2nd physical activity Almanac and will be launched in the GoPA! website as a free resource for more than 200 academics, policy makers and practitioners involved in the GoPA! and ISPAH network.

Conclusions: GoPA! enters 2020 with the launch of the Second Set of Country Cards and Second Physical Activity Almanac. A discussion of previous and current findings, lessons learned and future steps in light of the current status of physical activity promotion worldwide is indispensable.

Keywords: Surveillance, Policy, Research, Physical Activity

Symposium C13: The South American Physical Activity and Sedentary Behavior Network (SAPASEN)

11:10 am - 12:40 pm (Vancouver, Canada, Thursday, October 14, 2021)

Se-Sergio Baldew¹, Clarice Martins^{2,3}, Danilo Rodrigues Pereira da Silva⁴, André Oliveira Werneck⁵, Kabir P. Sadarangani^{6,7}

¹Anton de Kom University of Suriname, ²Federal University of Paraíba, Brazil, ³University of Porto, Brazil, ⁴Federal University of Sergipe, Brazil, ⁵University of São Paulo, Brazil, ⁶Universidad Diego Portales, Santiago, Chile, ⁷Universidad San Sebastián, Providencia, Santiago, Chile

Purpose: To present the aims, initial findings, and perspectives of the SAPASEN.

Description: This symposium will highlight the importance collaboration in the battle against physical activity and sedentary behavior and the initiation of a new network of researchers and policymakers from South American countries. This network is created to design and implement effective ways to reduce physical inactivity and sedentary behavior among South American countries. The social, cultural and economic diversity and the varying pattern of disease between and within the South American countries form a challenging environment to implement interventions that have been proven effective in other parts of the world. Therefore, it was important to access information from national health surveys, evaluating their quality, and interpreting them to understand specific frequency, distribution and correlates of physical inactivity and sedentary behavior in this sub-continent. Parallel to this, actions have been taken to add interested people in the network and work closer to the health sector of each South American country. Thus, we see this symposium as a unique opportunity to present the SAPASEN for the scientific community and to strengthen the potential of the network.

Chair: Dr. Se-Sergio Baldew, Anton de Kom University of Suriname. Introduction to Symposium. The chair will also highlight the main initiatives on physical activity and sedentary behavior around the world and reasons for this new network.

Presenter 1: Danilo Rodrigues Pereira da Silva, Federal University of Sergipe, Brazil. Presentation about the creation of SAPASEN, since the idea, first contacts and organization. The main aims, membership and work policy of the network will be also presented.

Presenter 2: André Oliveira Werneck, University of São Paulo, Brazil. The initial findings from the SAPASEN will be presented in order to demonstrate the current state of the work and how these data could be used in public health actions on physical inactivity and sedentary behavior.

Presenter 3: Kabir Sadarangani, Diego Portales University, Chile. The challenges faced, the next steps, expectations and prospects for SAPASEN will be discussed.

Results: SAPASEN has been analyzing available information on physical activity and sedentary behavior from participating South American countries. We already have data from approximately 91% of the South American population, which allowed the identification of specific correlates of physical inactivity and sedentary behavior in each country/region. The next steps include the approximation of health sectors to think of ways to assess physical activity and sedentary behavior in health surveys as well as strategies to use the information provided by these surveys effectively.

Conclusions: The SAPASEN's goals are strongly related to the general ISPAH aims. We propose to view this new network as a regional eye of the global approach that the ISPAH promotes. Also, we hope to advance in advocating for the effective promotion of an active lifestyle, with attention to health disparities around the world.

Keywords: Exercise, Inequalities, Global Health

Satellite Symposium C14: Sedentary Behaviour Council Workshop: Building Global Capacity

11:10 am - 12:40 pm (Vancouver, Canada, Thursday, October 14, 2021)

Paul Mackie¹, Audrey Bergouignan^{2,3}, Aoko Oluwayomi⁴

¹University of Newcastle, Newcastle, Australia, ²French National Centre for Scientific Research, ³Institut Pluridisciplinaire Hubert Curien, Université de Strasbourg, ⁴University of Lagos

Confirmed Mentors

Claire Laurens
Borja del Pozo Cruz
John Bellettiere

Confirmed Mentees

Marco Ariono
Chloe Forte
Carmen Ortega Santos
Julissa Ortiz Brunel
Ana Pinto
Andreia Pizarro
Dylan Power
Shannon Wilson
Jasper Unyime

Purpose: This satellite session is designed to provide early and mid-career researchers (EMCRs) with an interest in sedentary behaviour with one-on-one mentoring from a senior researcher with aligned expertise.

Learning Objectives: The aims of the proposed workshop are to support EMCRs in their career planning and in creating international networks that will result in career development opportunities.

Learning objective 1: EMCRs will develop an ongoing professional relationship with their mentor, resulting in continued mentoring, sponsorship and/or research opportunities.

Learning objective 2: EMCRs will acquire insights and advice in relation to research leadership.

Learning objective 3: EMCRs will receive detailed feedback from their mentor on their submitted piece of work (paper, grant application, job or promotion application), which they will revise and improve substantially, over the ongoing mentorship period.

Target audience: EMCRs with an interest in sedentary behaviour research. We will limit the workshop to 10 EMCRs paired with 10 senior scholars; a balance of genders and participants from high and low-middle income countries will be sought.

Organisation and method of presentation: The application process, pre-workshop work and workshop agenda are outlined as separate steps, below.

Application: EMCR members of the Sedentary Behaviour Council will be invited to submit an application for the ISPAH Congress workshop. The application will comprise a section on their research experience to date (brief CV); a paragraph or two on their career aspirations; a paragraph or two on the paper, grant application, job or promotion application that they would like a mentor to review and provide guidance on.

One month prior to the workshop: EMCRs will be matched to a senior researcher and both parties will be notified of their match. The EMCRs will send a working version of their paper, grant application, job or promotion application to their mentor for review prior to the workshop.

Workshop: 0 – 15 mins: Welcome from co-Chairs; brief presentation on the value of mentoring and building strong international networks. 16 – 30 mins: Set exercise for mentors and mentees to work through together (icebreaker type activity). 31 – 75 mins: Mentors to provide feedback on paper, grant application, job or promotion application; discuss ways to improve; discuss future directions. These conversations will be largely self-guided, but will provide a list of prompts to mentors and mentees to assist in case the conversation does not flow. 76 – 90 mins: Both mentors and mentees are to complete a follow-up and action form, which will ask them to commit to at least one follow-up mentoring activity (this may be via email). The form will be submitted to the Sedentary Behaviour Council. The Council will send follow-up surveys to participants at 3-, 6- and 12-months post-workshop to track the outcomes from the event.

Symposium C15: Myths and Misconceptions: what do we really know about physical activity/exercise during pregnancy?

3:15 pm - 4:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

Wendy Brown¹, Lene Haakstad², Mel Hayman³, Loretta diPietro⁴, Gregore Mielke¹, Sonja Kahlmeier⁵

¹University of Queensland, Australia, ²Norwegian School of Sports Science, Oslo, Norway, ³Central Queensland University, Australia, ⁴George Washington University, Washington, DC, ⁵Swiss Distance University of Applied Science, Switzerland

Purpose: A key objective of this conference is to advance our knowledge of the benefits of physical activity (PA) for optimal health

and well-being across the lifespan. As levels of PA typically decline in women during young adulthood, and a key correlate of this decline is pregnancy. This symposium will focus on the evidence, myths and misconceptions about PA/exercise during pregnancy.

Description: Researchers worldwide agree that PA/exercise during pregnancy has benefits for both the mother and the developing foetus. However, critical evaluation of the evidence on PA/exercise during pregnancy and health outcomes, conducted for the development of new guidelines for PA/exercise during pregnancy in Australia, Canada, the USA and several European countries, suggests a lack of consensus on the strength of the evidence relating to some health outcomes. In a series of short (8 minute) presentations, a panel of researchers will describe the health outcomes with the strongest evidence of benefit, types of activity (strength training and vigorous activity) for which we are less certain of the health benefits, limitations that are common in research on PA/exercise during pregnancy, the challenges of conducting research with pregnant women, and what all this means for translation into public health practice.

Chair: Professor Wendy Brown, University of Queensland, Australia. Title: Brief overview of the challenges of working in this area.

Presenter 1: A/Professor Lene Haakstad, Norwegian School of Sports Science, Oslo, Norway. Title: PA/exercise during pregnancy; where is the strongest evidence of benefits?

Presenter 2: Dr. Mel Hayman, Central Queensland University, Australia. Title: Strength training during pregnancy: what do we know?

Presenter 3: Professor Loretta di Pietro, The George Washington University, Washington, DC. Title: Vigorous-intensity PA/exercise (including high intensity training) during pregnancy: what do we know?

Presenter 4: Dr. Gregore Mielke, Research Fellow, University of Queensland. Title: Common methodological limitations in research on PA/exercise during pregnancy.

Presenter 5: Dr. Sonja Kahlmeier, Swiss Distance University of Applied Science, Switzerland. Title: Public health implications: what advice do different countries provide on PA/exercise during pregnancy?

Interactive discussion: the presenters will form a “Q and A” style panel to answer questions from delegates (posted on-line) and engage in debate about the most contentious issues in this field, moderated by the Chair.

Conclusions: This symposium will advance delegates’ knowledge of the most recent evidence in this field and dispel some of the myths and misconceptions that are common in the area of PA/exercise and pregnancy. This will add to our understanding of the benefits of PA for promoting health and well-being of both the mother and foetus during this important life-stage. If more women could be encouraged to be active during and following pregnancy, they may be more likely to continue with life-long activity, which has countless health, social and economic benefits for themselves, their children and health systems.

Keywords: Physical Activity/Exercise, Pregnancy, Lifestage

Symposium C16: Evaluating and benchmarking physical activity policy as a tool to address the challenges of inactivity

3:15 pm - 4:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

Guy Faulkner¹, Catherine Woods², Peter Gelius³, John C. Spence⁴

¹University of British Columbia, Canada, ²University of Limerick, Ireland, ³FAU Erlangen-Nuremberg, Germany, ⁴University of Alberta, Canada

Purpose: This symposium will explore what we know and what we have yet to learn about physical activity policy monitoring, evaluation, and benchmarking.

Description:

Chair: Professor Guy Faulkner, University of British Columbia, Canada. The UN Sustainable Development Goals and the WHO Global Action Plan on Physical Activity highlight the need to move beyond *individual* behaviour change to broader *policy and system* approaches, focusing not only on health but also on sustainability. Despite initial progress the systematic evaluation, benchmarking and continuous monitoring of public policies to promote physical activity (PA) are in their infancy and remain a challenge both from an academic and a practical perspective. Using lessons from international research, this symposium will take a deep look at promising approaches in addressing the inactivity, obesity and climate challenges through policy solutions in a systematic way.

Presenter 1: Professor Catherine Woods, University of Limerick, Ireland. Title: Examining what the scientific literature adds to our understanding of PA policy effectiveness. Description: This presentation will assess the contribution of existing scientific evidence from sport, education, transport and mass media to PA policy benchmarking and to informing policy-makers’ choice of appropriate policy instruments.

Presenter 2: Dr. Peter Gelius, FAU Erlangen-Nuremberg, Germany. Title: The usefulness of existing tools for policy monitoring and evaluation. Description: This presentation will examine the usefulness of existing tools for monitoring national and cross-national PA policy, e.g. the WHO HEPA Policy Audit Tool (PAT) and the EU Monitoring Framework on HEPA across sectors.

Presenter 3: Professor John C. Spence, University of Alberta, Canada. Title: Common Vision: Canada’s PA plan and how it is to be evaluated. Description: This presentation will analyse the evaluation of national PA policy, using Canada as a case study.

Results: Preliminary evidence from a review of reviews (Gelius et al., 2020) and a review of studies (Woods et al., 2021) indicates that evidence for the effectiveness of PA policy is rather solid in some areas (especially school-based and infrastructural policies) but remains insufficient in others (especially economic policies). Both the WHO HEPA PAT and the EU Monitoring Framework were found to be useful across several EU countries, and data suggests these tools can provide an overview of national policy, while also aiding in valid cross-country comparisons (Gelius et al., 2021). However, sufficient resources and adaptation to national contexts are essential. Experience from the Canadian “Common Vision” PA plan indicates that evaluation is necessary, achievable and does not have to be expensive.

Conclusions: The Discussant, Mr. Matt Hermann, BC Ministry of Health, previously responsible for strategic leadership for PA, injury prevention, built environment, healthy communities and workplace with various levels of government will critique the evidence with respect to its usefulness to policy-makers. Further research is necessary to arrive at proper policy benchmarking; existing monitoring tools or bespoke frameworks - allowing for adaptation to national contexts - may serve as a basis for gathering information on policy implementation. They may also become an additional source of inspiration for countries wishing to undertake PA policy monitoring and evaluation.

Keywords: Physical Activity, Policy Monitoring, Benchmarking, Evaluation, Population Health

Symposium C17: ShineLA: A multi-sector, transdisciplinary initiative to create healthy, active, and engaged communities in Los Angeles

3:15 pm - 4:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

Celina H. Shirazipour¹, Michael Shull², Krystina Castella³, Gillian Gresham¹, Olga L. Sarmiento⁴

¹Cancer Research Center for Health Equity, Cedars-Sinai Medical Center, Los Angeles, California, USA, ²City of Los Angeles, Department of Recreation and Parks (LA RAP), Los Angeles, California, USA, ³Art Center College of Design, Pasadena, California, USA, ⁴Universidad de los Andes, Bogota, Colombia

Purpose: Despite extensive knowledge of the health benefits of physical activity (PA), PA participation rates are low, and physical inactivity remains a global pandemic. PA levels are even lower among girls, underserved, and minority populations. There is no single solution to increasing PA. Thus, in order to effectively increase and sustain PA levels, there is a need for community partnerships and a large multi-sectoral approach. In advance of the 2028 Olympics hosted in LA, the Cedars-Sinai Research Center for Health Equity (CSMC RCHE) is leading a partnership with the City of LA to create healthy, active, and engaged communities using LA as a case example: ShineLA.

Description: This symposium provides an overview of our multi-sectoral, multi-level approach that incorporates innovative, evidence-based strategies to promote and improve physical and mental health, as well as social connection across diverse LA communities for a sustained impact through the 2028 Olympics and Paralympics and beyond. To achieve this goal, we have assembled a transdisciplinary team comprised of key stakeholders across multiple sectors including health, sports, arts & design, civil society, government, academia, the private sector, and representative members from a community advisory board. We will share approaches and insights that may be relevant to other research programs and municipalities internationally.

Chair: Celina Shirazipour, PhD, Cancer Research Center for Health Equity. Title: Introduction to the Symposium.

Presenter 1: Michael Shull, Recreation and Parks. Title: Restoring and Enhancing Public Spaces Where All People Have Easy Access To Clean, Safe, and Sustainable Spaces. A landscape analysis of Recreation and Parks with a focus on cultural inclusivity

Presenter 2: Krystina Castella, Art Center College of Design. Title: How Art and Design Impact Health and Society, with a focus on physical activity

Presenter 3: Dr. Gillian Gresham, PhD, Cancer Research Center for Health Equity, Cedars-Sinai Medical Center. Title: Harnessing Technology to Monitor and Promote Physical Activity among Diverse Communities

Presenter 4: Dr. Olga L Sarmiento, MD PhD., University of De Los Andes Title: Starting Small, Learning What Works, And Building From There: An Iterative Behavior Change Approach

Results: Over the next ten years, our overarching objective is to increase PA levels and ultimately improve health outcomes across LA, with a focus on underserved communities. Specifically, our team aims to: (1) Leverage the current LA Recreation and Parks (RAP) PA programming (e.g., PA programs, informal activities, special events, etc.) to maximize the use of public recreation spaces and participation in PA; (2) Explore the role of art and design (e.g., branding, marketing, signage, etc.) in promoting PA and impacting health and society; (3) Integrate technology to enhance the participants' experience with PA and obtain objective measures of PA and other health outcomes. We plan to use a culturally-tailored mobile application (App) developed by key partners and community stakeholders and fitness trackers as tools to engage and connect our participants; (4) Determine the impact of this approach on behavior change at the individual, family, neighborhood, and city level. Further, we will include a Citizen Science approach that focuses on neighborhood safety, beautification, and the interaction between the social and built environment at the community level. We combine qualitative and quantitative research methods to inform the development and evaluation of ShineLA.

Conclusions: Through a multi-level, multi-sectoral, and health disparities lens, this initiative will fill an important gap in our knowledge base of the complex interplay between policy, neighborhood/community, family, and individual factors that influence PA. Using LA as a case example for other cities across the globe, we plan to increase and sustain PA levels and ultimately improve health outcomes at the population level.

Keywords: Physical Activity, Population Health, Community, Olympics
Symposium C18: Intersections between Physical Activity, Obesity, and Cancer Risk
3:15 pm - 4:45 pm (Vancouver, Canada, Thursday, October 14, 2021)
Peter Katzmarzyk¹, Christine Friedenreich^{2,3,4}, Justin Brown¹

¹Pennington Biomedical Research Center, Baton Rouge, LA, ²Alberta Health Services, ³Cumming School of Medicine, University of Calgary, Calgary, AB, ⁴Faculty of Kinesiology, University of Calgary, Calgary, AB

Purpose: The purpose of this symposium is to explore the relationships among physical activity, obesity and cancer risk and survival, with a particular emphasis on the role of physical activity in reducing future health risks among cancer survivors.

Description: Over the past three decades, it has become increasingly clear that the risk of several cancers is associated with obesity and physical inactivity. This symposium will present updated observational epidemiological evidence on these associations. In addition to the risk of developing a first cancer, there is also evidence that physical activity can attenuate the risk of developing further cancers in addition to reducing the risk of premature mortality. Finally, intervention studies among cancer survivors are beginning to identify potential mechanisms between these observed associations.

Chair: Dr. Peter T. Katzmarzyk, Pennington Biomedical Research Center, Baton Rouge, LA

Presenter 1: Dr. Peter T. Katzmarzyk, PhD, FACS, FAHA, FTOS, Pennington Biomedical Research Center, Baton Rouge, LA. Title: Physical Activity, Obesity and Cancer Risk: Epidemiological Evidence

Presenter 2: Dr. Christine Friedenreich, PhD, FCAHS, FRSC, Alberta Health Services and Cumming School of Medicine and Faculty of Kinesiology, University of Calgary, Calgary, AB. Title: Role of Physical Activity and Weight Management in Promoting Health in Cancer Survivors

Presenter 3: Dr. Justin Brown, PhD, Pennington Biomedical Research Center, Baton Rouge, LA. Title: Testing Novel Physical Activity Intervention Strategies in Cancer Survivors: Understanding the Mechanisms

Results: Obesity is a significant risk factor for 13 cancers. The 2018 US Physical Activity Guidelines Advisory Committee found strong evidence that physical inactivity is associated with an increased risk of 7 cancers (bladder, breast, colon, endometrium, esophagus, gastric, and kidney), moderate evidence for 1 cancer (lung), and limited evidence for 7 cancers (hematologic, head and neck, ovary, pancreas, prostate, thyroid and rectal). Six of the 7 cancers with strong evidence of association with physical inactivity are obesity-related cancers. Furthermore, physical activity before and after diagnosis of a cancer is associated with improved survival for those diagnosed with breast and colon cancer. Intervention studies among cancer survivors have identified several potential underlying mechanisms that can be exploited to maximize personalized physical activity and obesity reduction therapies for cancer survivors.

Conclusions: This symposium addresses several issues related to the congress themes, including epidemiology, behaviour change, and clinical populations. The results will be widely applicable to clinical and public health settings around the world.

Keywords: Cancer, Obesity, Physical Activity, Survival, Risk

Symposium C19: Physical activity and sedentary behavior in cognitive and functional aging: the Adult Changes in Thought cohort

3:15 pm - 4:45 pm (Vancouver, Canada, Thursday, October 14, 2021)
Dori Rosenberg¹, Mikael Anne Greenwood-Hickman¹, Paul Gardiner²

¹Kaiser Permanente Washington Health Research Institute, ²University of Queensland

Purpose: This symposium shares new insights on the roles of sedentary behavior (SB) and physical activity (PA) in aging and cognitive and functional health from data collected as part of a long-term cohort study of older adults.

Description: Few epidemiologic studies have examined device-measured sitting patterns and health outcomes. Furthermore, there is a need to continue understanding the role of prospectively measured PA in relation to older adult health. The Adult Changes in Thought (ACT) study is an on-going epidemiologic study of adults age ≥ 65 years that began in 1994. Participants complete biennial assessments including assessment of cognitive function with the Cognitive Assessment Screening Instrument (CASI), measures of gait speed (time to complete a 10-foot course) and time to complete 5 chair stands as metrics of physical function, and a self-reported measure of PA (frequency of walking). Starting in 2016, ACT participants could enroll in an activity monitoring sub-study that involved wearing at least 1 of 2 devices around the clock: a thigh-worn activPAL and waist-worn ActiGraph. After removing self-reported sleep time, mean daily device measures of duration and patterns of sitting, standing, Light-intensity Physical Activity (LPA), and Moderate- to-Vigorous Physical Activity (MVPA) were calculated.

Chair: Dr. Dori Rosenberg, Kaiser Permanente Washington Health Research Institute (KPWHRI). Introduction to Symposium

Presenter 1: Dr. Dori Rosenberg, KPWHRI. Title: Cross-sectional associations between ACT device-based activity pattern measures and physical function

Presenter 2: Dr. Mikael Anne Greenwood-Hickman, KPWHRI. Title: Prospective associations between ACT device-based activity pattern measures and cognitive function

Presenter 3: Paul Gardiner, University of Queensland. Title: Associations of longitudinal walking trajectories with cognitive function.”

Results: Of ACT participants approached to join the sub-study, 1151 (61%) consented to wear Actigraph, 1135 (60%) consented to wear activPAL, and 1054 (56%) consented to wear both. Of those, 1,088 had valid wear data (≥ 4 days with 10-20 hours of data/day) for Actigraph, 1,039 for activPAL, and 954 for both devices. Consenting sub-study participants were generally younger with fewer chronic conditions than those who did not consent. Cross-sectionally, higher measures of total sedentary behavior (sitting time), higher pattern indicators of uninterrupted sitting (mean sitting bout duration) and lower measures of PA (steps, MVPA) were associated with worse physical function. Measures of PA (steps, MVPA) were more consistently associated with cognitive function than measures of SB over 2-years. Trajectories of higher sustained walking over time were associated with higher cognitive function at later-life follow-up.

Conclusions: These findings begin to shed light on the potential functional impacts of activity patterns as we age. These findings suggest that both the amount we sit and move, as well as the pattern in which we do these activities throughout the day, may impact physical function in older age. However, only metrics of PA were associated with cognitive function. In the future with ACT’s data we will be able to link PA and SB measures to prospective changes in cognitive and physical function.

Keywords: Sitting Time, Older Adults, Device Data

Symposium C20: Monitoring National Physical Activity Policy using GoPA! Policy Inventory: A Global Challenge

3:15 pm - 4:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

Bojana Klepac Pogrmilovic¹, Andrea Ramirez Varela^{2,3}, Michael Pratt^{4,3}, Zeljko Pedisic⁵, Adrian Bauman⁶

¹Early Career Scholar, PhD candidate, Institute for Health and Sport, Victoria University, Melbourne, Australia, ²Assistant professor, School of Medicine, Universidad de los Andes, Columbia, ³ Global Observatory for Physical Activity (GoPA!), ⁴Professor and Director Institute for Public Health and MPH Program, Department of Family Medicine and Public Health, University of California San Diego School of Medicine, ⁵Associate Professor, Institute for Health and Sport, Victoria University, Melbourne, Australia, ⁶University of Sydney, Australia

Purpose: To present the progress, findings and lessons learned from the implementation of The Global Observatory for Physical Activity (GoPA!) Policy Inventory, put the results in perspective with international efforts since 1990 and propose future steps for GoPA! global physical activity (PA) policy monitoring, by taking into account current evidence.

Description: Physical inactivity accounts for approximately 5 million deaths per year globally, but its high prevalence remains to be effectively addressed by national governments. A plethora of initiatives led by international organisations, national governments and non-governmental organisations, researchers, and physical activity promoters have been implemented to turn PA into a public health priority. In 2015, the GoPA! was launched to monitor progress on PA surveillance, policy and research globally. In 2017, the GoPA! started developing a PA Policy Inventory to enable collecting comparable data on PA policy worldwide. In 2017, the instrument was piloted in 12 countries. In 2019, after three rounds of open discussion with policy experts and consultations with the GoPA! Country Contacts, the GoPA! Policy Inventory, version 3.0 was developed. The GoPA! Policy Inventory collects information related to: national PA policy and its implementation, comprehensiveness, and effectiveness; national PA surveillance/monitoring; quantifiable national targets for PA; national PA recommendations; and ministries with an active role in PA promotion. In this symposium, we will address key questions about PA policy monitoring, by describing the lessons learned during the development of the GoPA! Physical Activity Inventory and its use in the assessment of national policies globally. We will put these experiences in perspective with different policy monitoring initiatives since 1990 and more current ones, such as The Global Action Plan for Physical Activity. We will examine whether it is feasible to track PA policy at the global and national levels, what are the role and contribution the GoPA! has had in PA policy monitoring, and how the policy indicators may be used for advocacy and guidance in the coming years.

Agenda and Presenters:

Chair: Bojana Klepac, Victoria University, Melbourne, Australia. Introduction to the symposium.

Discussant: Dr. Adrian Bauman, University of Sydney, Australia.

Presenter 1: Dr. Andrea Ramirez Varela, Universidad de los Andes, Bogotá, Colombia. Title: Introduction to the GoPA! Policy Inventory and the methods of its implementation.

Presenter 2: Bojana Klepac, Victoria University, Melbourne, Australia. Title: Main findings and lessons learned from the implementation of the GoPA! Policy Inventory.

Presenter 3: Dr. Michael Pratt, University of California San Diego School of Medicine UCSD. Title: GoPA! Policy Inventory in the context of the development and monitoring of PA policy since 1990 to today.

Presenter 4: Dr. Željko Pedišić, Victoria University, Melbourne, Australia. Title: What are the future steps for global PA policy monitoring with the GoPA! Policy Inventory?

Discussion Q&A

Results: Data on national PA policies were collected using GoPA! Policy Inventory. The responses were obtained from 76 countries. A comprehensive analysis and comparison of national PA policies in low-, middle, and high-income countries was conducted.

Conclusions: The GoPA! National Policy Inventory contributes to collecting PA policy data worldwide and is aligned with previous and current international policy monitoring initiatives. Targeting examples of good practice and providing a broad international assessment of PA policies will serve as a good foundation for future policy improvements and recommendations.

Keywords: Physical Activity, Surveillance, Policy, National, Global

Oral Presentations Session C1

Oral Presentation C1.1 Game On, Down Under! Evaluating the long-term impact of parasport through the 2018 Invictus Games

8:35 am - 8:45 am (Vancouver, Canada, Thursday, October 14, 2021)

Celina H. Shirazipour^{1,2}, Emily Mayhew³, M. Blair Evans⁴, Amy E. Latimer-Cheung⁵, Alice B. Aiken⁶

¹Cedars-Sinai Medical Center, ²University of California Los Angeles, ³Imperial College London, ⁴Western University, ⁵Queen's University, ⁶Dalhousie University

Background: Parasport is a popular method for promoting recovery among military personnel with illness and injury. However, despite powerful anecdotal, cross-sectional, and short-term findings revealing benefits to military parasport programming, researchers have yet to determine whether benefits are maintained in the long-term, particularly in comparison to military personnel who do not participate in competitive parasport events. **Purpose:** To explore the long-term impact of parasport through the Invictus Games, an international parasport competition for military personnel. In particular, to compare physical and psychosocial health outcomes between Sydney 2018 Invictus Games competitors and individuals not selected for the Games. **Methods:** The current analysis focused on English and French-speaking military personnel from Australia, Canada, New Zealand, the United Kingdom, and the United States of America. Seventy competitors and 145 non-competitors, experiencing physical (e.g. amputation, spinal cord injury, traumatic brain injury) and/or psychological (e.g. depression, anxiety, post-traumatic stress) illnesses and injuries, completed surveys at six time-points assessing affect, psychological well-being, life satisfaction, post-traumatic growth, and physical health. The first survey was distributed 3 months before the Sydney 2018 Invictus Games and the final survey was distributed one year after the Games. Repeated measures ANCOVA were used to compare outcomes between competitors and non-competitors. **Results:** Competitors demonstrated significantly better affect, psychological well-being, life satisfaction, post-traumatic growth, and general health than non-competitors ($ps < .05$). However, there was no difference between groups on measures of bodily pain and pain interference ($ps > .05$). **Conclusions:** Findings suggest that parasport may result in positive long-term physical and psychosocial health outcomes. However, the lack of difference between groups on pain-related outcomes needs to be further explored, particularly as pain is a common side effect of the illnesses and injuries experienced by Invictus Games competitors. Future research will also examine the impact across additional Invictus nations, as well as earlier in training to determine when differences initially emerge between groups. **Funding:** Study completed in partnership with the Invictus Games Foundation, with funding provided by Forces in Mind Trust, a £35 million funding scheme run by the Trust using an endowment awarded by the Big Lottery Fund.

Keywords: Disability, Mental Health, Military, Sport, Well-Being

Oral Presentation C1.2 The impact of COVID-19 on military personnel with illnesses and injuries participating in parasport recovery programs

8:45 am - 8:55 am (Vancouver, Canada, Thursday, October 14, 2021)

Julia Shabanian¹, M. B. Evans², Emily Mayhew³, Amy E. Latimer-Cheung⁴, Alice B. Aiken⁵, Celina H. Shirazipour¹

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Background: Among those most vulnerable to the negative effects of COVID-19 mitigation measures, such as social distancing, were individuals with physical (e.g. amputation, cancer) and mental (e.g. post-traumatic stress) illnesses and injuries. **Purpose:** This study examined the psychosocial impact of COVID-19 on military personnel with physical and mental illnesses and injuries participating (i.e. competitors) or seeking to participate (i.e. non-competitors) in a competitive parasport recovery program. **Methods:** In May, August, and November 2020, measures assessing the psychosocial impact of COVID-19 were added to English-language surveys as part of international longitudinal research examining the impact of parasport for military personnel post-injury and illness. Data were analyzed using descriptive analyses, repeated measures ANOVA, and content analysis. **Results:** Participants [$n=135$; competitors $n=56$] represented 5 countries. Some participants coped with COVID-19 by engaging in positive health behaviors (e.g. seeking connection, relaxing), while others coped with negative health behaviors (e.g. drinking, smoking, eating higher fat or sugary foods). Half of participants experienced delays or cancellations in mental health appointments. Non-competitors demonstrated significantly more perceived stress than competitors ($p<.05$) despite no significant difference in physical activity participation during COVID-19. **Conclusions:** As countries end COVID-19 restrictions, attention should be paid to individuals with traumatic illnesses and impairments who had changes in access to physical and mental health programs during the pandemic. **Funding:** Funding provided by Forces in Mind Trust, a £35 million funding scheme run by the Trust using an endowment awarded by the Big Lottery Fund.

Keywords: Disability, Mental Health, Military, Sport, Well-Being

Oral Presentation C1.3 Parental perceptions of the impact of COVID-19 on the interruption of youth sport

8:55 am - 9:05 am (Vancouver, Canada, Thursday, October 14, 2021)

Mark S. Rice¹, Darren E. R. Warburton¹, Joseph Baker², LeAnne Petherick¹, Shannon S. D. Bredin¹

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Background: The global COVID-19 health crisis resulted in a cessation of youth sport. While COVID-related restrictions were necessary to limit spread, the impact of interruptions to sport participation on children and youth during critical periods of development is unclear. **Purpose:** To examine parental perceptions of the impact of COVID-19 restrictions on their child's sport participation. **Methods:** Parents and/or guardians of children/youth (between 6 and 18 years) registered in at least one organized sport in British Columbia, Canada completed an online survey. Questions asked parents about the impact of COVID-19 restrictions on their child's sport development via 10-point Likert scales and open-ended responses. A descriptive analysis of the data was conducted and inductive thematic analysis was used to examine parental statements. **Results:** A total of 63 parents completed the survey, representing athletes ranging in age from 7 to 18 years (mean = 13.7, SD = 2.8) across 33 unique sports. Overall, parents perceived COVID had a major impact on sport participation and major emerging themes included concerns around lost opportunities for competition, decreased access to training and facilities, and a negative impact on mental health. **Conclusions:** The childhood and adolescent years are critical years for promoting sport engagement and establishing healthy physical activity behaviours. This data highlights parental concerns on their child's physical and mental health in relation to COVID-19 restrictions on sport participation. A major question that emerges from this work is "to what extent will cessation of sport impact youth sport participation and physical activity behaviours post-pandemic?" **Funding:** No funding was provided.

Keywords: Physical Activity Participation, Sport Participation, Children and Adolescents, COVID-19

Oral Presentation C1.4 Association between cardiovascular risk and coronary artery disease in Masters athletes

9:05 am - 9:15 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Studies have shown that coronary artery disease (CAD) is more prevalent in those with a lifelong exercise history compared to the general population and that cardiovascular risk scores (i.e., Framingham Risk Score (FRS)) underestimate the presence of CAD in Masters athletes (> 35 years old). **Purpose:** To establish whether physical activity intensity and volume in a highly active population contributes to the risk of CAD. **Methods:** Masters athletes (n=799) underwent yearly cardiovascular screening for five years, including, anthropometrics, blood pressure, blood lipids (to determine FRS), and a health survey. Participants with an abnormal screen underwent further evaluations. All variables of interest (age, sex, FRS, body mass index, LDL cholesterol, HDL cholesterol, family history, physical activity volume, lifetime training hours, history of hypertension) were aggregated up to the first diagnosis for those that were diagnosed and aggregated over the entire time period for those who were not diagnosed. Logistic regression analysis assessed the relationship between cardiovascular risk factors and CAD. **Results:** 81 (10%) Masters athletes were diagnosed with CAD over the study period. Increasing age (OR=1.05, 95%CI 1.00-1.09; p=0.038), FRS (%) (OR=1.09, 95%CI 1.03-1.16; p=0.003), and LDL cholesterol (mmol/L) (OR=1.71, 95% CI 1.22-2.40; p=0.002) were statistically significant in predicting the presence of CAD, whereas physical activity intensity and volume were not. **Conclusions:** These results support the utility of the cardiovascular risk score (FRS) in predicting CAD in Masters athletes, whereas physical activity/exercise participation does not. **Funding:** Canadian Institutes of Health Research (FRN: 157930), Natural Sciences and Engineering Research Council of Canada (RGPIN-2018-04613), and MITACs.

Keywords: Masters Athletes, Cardiovascular Screening, Risk Factors, Physical Activity

Oral Presentation C1.5 Leveraging professional sports teams to encourage healthy behavior: Calgary Flames Health Training Camp Events

9:15 am - 9:25 am (Vancouver, Canada, Thursday, October 14, 2021)

Elaine M. Ori^{1,2}, Tanya R. Berry², Gavin R. McCormack^{3,4}, Kelly R. Brett⁵, George A. Lambros⁶, William, A. Ghali^{3,4}

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Background: Professional sporting teams may be well-positioned to act as promoters of health behaviors given their fixture within a community, and association with physical activity, nutrition and other healthy behaviors. Over four years, the Calgary Flames Sport and Entertainment Corporation in conjunction with local health promotion professionals, delivered a health promotion event to the public, The Calgary Flames Health Training Camp (FHTC) in Calgary, Alberta, Canada. **Purpose:** The purpose of these annual events has been to inspire and encourage healthy behavior uptake and adherence. A description of the FHTC over each of four years (2015-2018), lessons learned, and some evaluative work done alongside the event on two of the four years. **Methods:** In 2017, self-report surveys were administered to event attendees in order to assess current health status including physical activity, socio-cognitive variables, health information preference, and intention to make healthful behavior change based on event attendance. Biometric data was collected including blood pressure, height, weight, and resting heart rate. **Results:** Evaluations of the four consecutive events showed that the Calgary Flames Sport and Entertainment Corporation has an ability to attract substantial numbers of the general public to attend FHTC events. Self-report measures from 2017 suggest that already-active populations may be most interested in attending however, the events do appear to inspire attendees to consider behavioural changes for health. **Conclusions:** The events helped to identify individuals with health risks requiring medical attention. Positive community health impacts may arise from collaboration between health promoters and professional sporting organizations. **Funding:** This study and the Flames Health Training Camps were supported by in-kind contributions from the O'Brien

Institute for Public Health at the University of Calgary. TRB is supported by the Canada Research Chairs program.

Keywords: Professional Sports Organizations, Healthy Communities, Community Health Promotion, Healthy Cities

Oral Presentations Session C2

Oral Presentation C2.1 Who will more likely improve in a program promoting healthy lifestyle habits at work?

8:35 am - 8:45 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Few studies have examined who positively responds to programs promoting healthy lifestyle habits (LHs) at work. More precisely, baseline characteristics that predict LH improvements need to be studied to improve the effectiveness of the program. **Purpose:** To identify predictors of improvement in LHs [physical activity (PA), eating habits, sleep habits, and stress management] and in health risk factors [stress levels at work and body mass index (BMI)]. **Methods:** Baseline and post-program data of 506 employees who participated in the *Activate Your Health* program and had the potential to improve at least one outcome were used. An online questionnaire provided self-reported sociodemographic data, health- and stress-related variables, perceived general health and life satisfaction, LHs of interest, and the intention to improve them in the next six months. Univariate and multivariate logistic regression were used. **Results:** Being a man and intending to improve alcohol consumption increased the odds of improving PA (both $p < 0.05$). Intending to improve sleep habits and reporting depression predicted stress management improvement (both $p < 0.05$). Having a very good/excellent perceived general health, poor sleep habits, high alcohol consumption, and intending to improve stress management increased odds of improving stress levels at work (all $p < 0.05$). Reporting feelings of pleasure increased the odds of BMI improvement ($p < 0.05$). **Conclusions:** To improve LHs, health promotion professionals should implement a targeted approach when offering multiple habits programs to employees who may need them the most. **Funding:** Public Health Agency of Canada and Capsana.

Keywords: Healthy Lifestyle Habit, Health Risk Factor, Worker

Oral Presentation C2.2 Physical activity, sedentary behavior and outcomes health of workers in Chile according to the 2017 National Health Survey

8:45 am - 8:55 am (Vancouver, Canada, Thursday, October 14, 2021)

Jaime Leppe^{1,2}, Marco Leppe³, Sonia Roa-Alcaino¹, Olga Lucia Sarmiento⁴

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Background: Work is associated with physical activity (PA) levels and sedentary behaviours (SB). **Purpose:** This study aims to determine the level of PA, SB, and the association with health outcomes of the employed population, according to the 2017 National Health Survey for different types of occupations. **Methods:** The sample was $n=2024$ subjects; 49.7% are women, and 88% from urban areas. The working population was defined as subjects who reported working for income in the last 12 months. PA and SB were obtained from the GPAQ reported in the survey. Wilcoxon, Kruskal-Wallis, and Chi-square tests were used. Logistic regression were used in the analysis of musculoskeletal symptoms. **Results:** 71.7% was classified as sufficiently active, 25.1% reported an SB ≥ 4 hours/day, with no differences within sex. The Total PA was $P50=125$ $RIQ=23-381$ min/day. By PA domain was: Travel $P50=20$ $RIQ=0-60$ min/day, Work $P50=0$ $RIQ=0-257$ min/day and Leisure time $P50=0$ $RIQ=0-13$ min/day. For SB $P50=120$ $RIQ=60-300$ min/day. Cardiovascular risk, metabolic syndrome, arterial hypertension, diabetes mellitus reported less time of PA of leisure time $p < 0.05$. There is not a difference in the other domains. The risk of musculoskeletal symptoms increases with PA at work, SB more than 4 hours $OR=1.5$ $CI(1.1-2.1)$, age, and being a woman. **Conclusion:** PA and SB are risk factors for workers' health. The workplace is an environment that can be intervened to improve the health of the population.

Keywords: Physical Activity, Sedentary Behaviour, Workers, Health Outcomes, Survey

Oral Presentation C2.3 Movement profiles associated with the optimal cardiometabolic health of workers: A cluster analysis of Canadian population-based accelerometry data

8:55 am - 9:05 am (Vancouver, Canada, Thursday, October 14, 2021)

Avirop Biswas^{1,2}, Cynthia Chen¹, Stephanie A. Prince^{3,4}, Peter M. Smith^{1,2}, Cameron M. Mustard^{1,2}

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Background: There is a scarcity of population-based, accelerometry data describing the movement patterns of workers at work and outside work, while the relationship between variations in workers' movements and their health effects is not well understood. By examining the different movement patterns of workers, we can better recommend movement patterns that are both feasible and beneficial for optimal health. **Purpose:** To develop cluster profiles from accelerometry-based population-level movement data of workers at work and outside work, and identify which profiles are associated with optimal cardiometabolic health. **Methods:** Accelerometry and clinically-measured health outcome data from 11,250 working adults who responded to the Canada Health Measures Survey (2007 to 2017) were examined. A cluster analysis statistical data-mining approach was used to

examine the common types of distinct movement patterns based on the average time spent in sedentary behaviour (SB), light-, moderate-, and vigorous- intensity physical activity (PA) over a week. Multivariable regressions models were fit to examine associations between each movement cluster and cardiometabolic risk markers (blood pressure, cholesterol, waist circumference, triglycerides) and 10-year risk score of atherosclerotic cardiovascular disease. Model estimates were examined for differences according to gender, age, and BMI. Clusters were also described by occupational and industry classification codes. **Results:** The cluster profile corresponding with engaging in mostly moderate-to-vigorous PA over the waking day was associated with the most optimal cardiometabolic health outcomes for the full sample and this finding was consistent across gender, age, and BMI. The least optimal cardiometabolic profile was associated with workers with the lowest movement counts over the working day, although this varied for certain sample subgroups. **Conclusions:** The healthiest profile of workers were those who engaged in the highest intensity of PA over their work and non-work hours. The unhealthiest worker profile differed according to gender, age, and BMI status. The findings can inform health promotion strategies which take into account the real-world movement profiles of workers. **Funding:** Canadian Institutes for Health Research (CIHR) Project Grant (#FRN162244).

Keywords: Workers, Accelerometry, Population-based Studies, Cluster Analysis, Cardiometabolic Health

Oral Presentation C2.4 The effect of leisure time physical activity and sedentary behaviour on the health of workers with different occupational physical activity demands: a systematic review

9:05 am - 9:15 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Although it is generally accepted that physical activity (PA) reduces the risk for chronic disease and mortality, accumulating evidence suggests that occupational PA (OPA) may not confer the same health benefits as leisure time PA (LTPA). It is also unclear if workers in high OPA jobs benefit from LTPA the same way as those in sedentary jobs. **Purpose:** To determine whether LTPA and leisure time sedentary behaviour (LTSB) confer the same health effects across occupations with different levels of OPA. **Methods:** Five bibliographic databases were searched from inception to June 2020. Prospective or experimental studies which examined the effects of LTPA or LTSB on all-cause and cardiovascular mortality and cardiovascular disease, musculoskeletal pain, diabetes, metabolic syndrome, arrhythmias and depression among adult workers grouped by OPA (low OPA/sitters, standers, moderate OPA/intermittent movers, high OPA/heavy labourers). **Results:** The review includes 38 papers. Across all outcomes, except cardiovascular mortality, metabolic syndrome and atrial fibrillation, greater LTPA was consistently protective among low OPA, but conferred less protection among moderate and high OPA. For cardiovascular mortality and metabolic syndrome, higher levels of LTPA were generally associated with similar risk reductions among all OPA groups. Few studies examined effects in standers and none examined effects of LTSB across OPA groups. **Conclusions:** Evidence suggests that LTPA is beneficial for all workers, but with larger risk reductions among those with low compared to high OPA jobs. Tailored interventions for different occupational groups may be required. More high-quality studies are needed to establish recommended levels of LTPA/LTSB for different OPA groups. **Funding:** None.

Keywords: Physical Activity, Sedentary Behaviour, Occupation, Leisure, Cardiovascular Disease, Mortality

Oral Presentation C2.5 Relationship between leisure-time and occupational physical activity with depression among Brazilian adults

9:15 am - 9:25 am (Vancouver, Canada, Thursday, October 14, 2021)

Bruno Gonçalves Galdino da Costa¹, Marcus Vinicius Veber Lopes¹, Thiago Sousa Matias¹, Kelly Samara Silva¹, Jean-Philippe Chaput², Felipe Barreto Schuch³

¹Department of Physical Education, Federal University of Santa Catarina, ²Children's Hospital of Eastern Ontario Research Institute, ³Department of Sports Methods and Techniques, Federal University of Santa Maria

Background: The physical activity paradox suggests that while leisure-time physical activity (LTPA) provides many health benefits, occupational physical activity (OPA) is related to an increased risk of adverse health outcomes. However, whether this paradox holds for depression in a middle-income setting is unknown. **Purpose:** To test the association between LTPA and OPA with depression in a nationwide sample of Brazilian adults. **Methods:** This cross-sectional sample comprises adults who participated in the Brazilian National Health Survey 2019. Depression was assessed using the Patient Health Questionnaire-9, with scores ≥ 9 being considered as having depression. Participants reported how much time per week they spent in LTPA and OPA. Sex, age, and education were used as covariates in logistic regression models. **Results:** Participants ($n=88,522$; 53% females; 44.9 ± 17.2 years old) reported 100.1 min/week of LTPA. Adults in the workforce ($n=52,468$) spent 564.4 min/week in OPA. Compared to not engaging in any LTPA, participants who engaged in 1-149 (OR=0.67, 95%CI: 0.59;0.76), 150-300 (OR=0.64, 95%CI: 0.57;0.72), and ≥ 301 (OR=0.70, 95%CI: 0.61;0.81) min/week of LTPA had lower odds of depression. On the other hand, those exceeding 300 min/week of OPA had higher odds of depression (OR=1.32, 95%CI 1.17;1.50) compared to those who did not engage in OPA. **Conclusions:** LTPA and OPA are associated with lower and higher odds of depression, respectively, among Brazilian adults. These results suggest that not all physical activities are equivalent when depression is concerned, and workers exposed to high volumes of OPA could especially benefit from mental health care. **Funding:** The Brazilian National Health Survey 2019 was funded

by the Brazilian Ministry of Health. No funding was received for this study.

Keywords: Physical Activity, Mental Health, Adults, Depression

Oral Presentations Session C3

Oral Presentation C3.1 Exploring the role of physical activity during COVID-19 in the UK

8:35 am - 8:45 am (Vancouver, Canada, Thursday, October 14, 2021)

Paul F. Franco¹, Michelle Lee D'Abundo¹, Deborah A. DeLuca¹

¹Department of Interprofessional Health Sciences and Health Administration at the School of Health and Medical Sciences, Seton Hall University

Background: Participation in physical activity (PA) is important to health and well-being. Prior to the pandemic, about 34% of men and 42% of women in the UK were not active enough for good health (GOV.UK, 2019). Prolonged quarantines can lead to sedentary lifestyles, which are associated with chronic health conditions (Chen et al., 2020; Mattioli et al., 2020). While many health professionals are purporting the need to stay healthy and physically active during COVID-19, there is little information about the general public's PA during the pandemic. **Purpose:** The purpose of this study is to explore the experience of PA during COVID-19. **Methods:** A qualitative study using the Physical Activity During COVID-19 Questionnaire (PADCQ) was conducted January-March 2021 online via SurveyMonkey®. The instrument consisted of 8 demographic items and 9 survey questions, two of which are the focus of this abstract: 1) Compared to before the COVID-19 pandemic, are you currently more physically active, less or about the same? and 2) What role is physical activity playing in your life today? Data from 172 respondents were exported from Excel into Atlas.ti for analysis including preparing data, open-coding, sorting codes, and organizing themes. **Results:** Most respondents (57.6%) described themselves as less active, 24.4% as more active and 18.0% as about the same. 52.3% felt PA had a positive role, 29.7% had a negative outlook on PA, 3.49% had both a positive and negative outlook and 14.5% acknowledged PA without being positive or negative. Many reasons attributed to the positive PA-related responses including that it is important/vital, improves mental health/acuity and aids in general fitness. The negative outlook was primarily due to PA being a minor/minimal priority and/or having a decreased life role, particularly due to COVID-19 restrictions. **Conclusions:** If predictions are correct, due to climate change and other factors, the occurrence of infectious outbreaks may increase and to maintain health and well-being, public health will need to tailor PA recommendations, programming, and measurement. This information provides a baseline understanding of PA during COVID-19 and could be used to create PA promotion strategies and programs for situations where lifestyle is restricted or limited to home and/or local environments.

Keywords: Physical Activity, Health, Wellness, COVID-19

Oral Presentation C3.2 Exploring the Experience of Physical Activity in the US During COVID-19 by Age, Gender and Race

8:45 am - 8:55 am (Vancouver, Canada, Thursday, October 14, 2021)

Michelle Lee D'Abundo¹, Paul Franco¹, Deborah Deluca¹

¹Seton Hall University

Background: Participation in physical activity (PA) is important to maintaining health and well-being. According to Healthy People 2020 (2020), more than 80% of adults did not meet the guidelines for PA prior to the pandemic. Prolonged quarantines can lead to sedentary lifestyles, which are associated with chronic health conditions (Chen et al., 2020; Mattioli et al., 2020). While many health professionals are purporting the need to stay healthy and physically active during COVID-19, there is little information about the general public's PA in the US during the pandemic and less information with attention to demographic variables. **Purpose:** The purpose of this study is to explore the experience of PA in the US during COVID-19 by age, gender, and race. **Methods:** A qualitative study using the Physical Activity During COVID-19 Questionnaire (PADCQ) was conducted January-March 2021 online via SurveyMonkey®. The instrument consisted of 8 demographic items and 9 survey questions, two of which are the focus of this abstract: 1) Compared to before the COVID-19 pandemic, are you currently more physically active, less or about the same? and 2) What role is physical activity playing in your life today? Data from 235 respondents were exported from Excel into Atlas.ti for analysis including preparing data, open-coding, sorting codes, and organizing themes. **Results:** Preliminary responses indicated 43.4% of participants described themselves as less active, 22.1% as more active and 34.5% as about the same. 61.7% of felt PA had a positive role, 17% had a negative outlook on PA, 3.8% had both a positive and negative outlook and 17.4% acknowledged PA without being positive or negative. There were a variety of reasons for the positive PA-related responses including that it is important/vital, improves mental health/acuity and is a stress reliever. The negative outlook was primarily due to PA being a minor/minimal priority, work-out challenges and feelings of guilt surrounding PA. Response trends according to age, race and gender will also be presented. **Conclusions:** If predictions are correct, due to climate change and other factors, the occurrence of infectious outbreaks may increase and to maintain health and well-being, public health will need to tailor PA recommendations, programming, and measurement with attention to demographic variables. This information provides a baseline understanding of PA during COVID-19 and could be used to create PA promotion strategies and programs for situations where lifestyle is restricted or limited to home and/or local environments.

Keywords: Physical Activity, COVID-19, Qualitative, Age, Gender, Race

Oral Presentation C3.3 Associations between physical activity, depression, and diet quality during COVID-19

8:55 am - 9:05 am (Vancouver, Canada, Thursday, October 14, 2021)

Anaderi Iniguez¹, Jane Lanigan¹

¹Washington State University

Background: The physical distancing measures implemented to mollify the spread of COVID-19 has disrupted individuals' health behaviors, including physical activity (PA). **Purpose:** The purpose of this study was to examine relationships between PA and other health-related measures during the pandemic. **Methods:** Participants (n=392) were recruited to complete an online survey. Measures on PA, sedentary behavior (SB), depression, and diet quality were collected. A one-way ANOVA was conducted to examine PA and SB across four age groups (18-25, 26-44, 45-64, 65+) prior and during the pandemic. An independent t-test was performed to examine how PA differed by depression. A bivariate correlation was performed to examine associations between PA and diet quality. **Results:** There were no statistically significant differences between groups for PA prior to the pandemic ($F_{3,340} = .325, p = .807$) and after ($F_{3,388} = .343, p = .794$). There was a significant difference with time sitting after ($F_{3,232} = 3.53, p = .016$), but not prior ($F_{3,232} = 2.3, p = .079$). Screen time prior ($F_{3,232} = 3.47, p = .017$) and after ($F_{3,232} = 5.11, p < .01$) had significant differences across groups. There was a significant difference in PA by depression status $t(195.67) = 2.167, p = .031$. A significant association was found between PA and diet quality $r(190) = .243, p < .01$. **Conclusion:** Across all age groups PA decreased during the pandemic and SB increased. PA significantly differed by depression status and was positively associated with diet quality. Scaling up interventions to increase PA and decrease depression is warranted. **Funding:** Study funded by Washington State University Vancouver mini-grant, Washington State University College of Education Collaborative grant, Nelson-McLeod Scholarship, CAHNRS, Washington State University.

Keywords: Physical Activity, Sedentary Behavior, Depression, Diet Quality, COVID-19

Oral Presentation C3.4 Physical activity and mental health among college students during COVID-19 pandemic

9:05 am - 9:15 am (Vancouver, Canada, Thursday, October 14, 2021)

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Purpose: In 2020, the coronavirus pandemic (COVID-19) caused many university campus lockdowns after spring break in which students were required to leave campus and continue their academic work as usual, remotely. The University of Vermont Wellness Environment (WE) program is an academic year long wellness behavioral change promotion program that has collected data before and during the COVID outbreak. The purpose of this study is to evaluate the change of physical activity (PA) levels and mental health in a large cohort of U.S. college students before and during the COVID-19 pandemic. **Methods:** Students were given an Apple Watch to track their daily exercise time and a daily survey measured mood, anxiety, and stress in Spring 2020. A total of 113 WE and 54 non-WE college freshman (132 female and 35 male) were included in this study. Self-perceived COVID-19 disruption and COVID-19 related questions were assessed at the end-of-year questionnaire. Generalized linear mixed models were used to examine the association of PA and mental health before and during COVID-19 remote learning. The models also controlled for gender, race, and socioeconomic status. **Results:** College students became significantly less active during COVID remote learning compared to before ($p < .05$). In the univariate model, mood ($\beta = 0.95, p < .05$) and stress ($\beta = -0.83, p < .05$) each had a significant association with exercise time separately. Anxiety ($\beta = 0.58, p = .076$) had a borderline association with exercise time in the univariate model. Significant interaction effects were found between time (before and during COVID) with anxiety and stress but not mood. Students had similar anxiety levels before COVID, but the active students had significantly lower anxiety levels compared to their sedentary counterparts ($p < .05$). Active students had significantly higher stress levels than sedentary students before COVID, but their stress levels were similar during COVID ($p < .05$). **Conclusions:** Exercise helped college students to manage anxiety and stress during the COVID lockdown.

Keywords: Apple Watch, COVID Disruption, Mobile Health

Oral Presentation C3.5 Moving through COVID-19: a methodological account of understanding physical activity behaviour in relation to mental health among university students

9:15 am - 9:25 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Physical activity (PA) has numerous mental health benefits, including positive effects on symptoms of stress, anxiety, and depression: conditions impacting students that have increased since the pandemic began. Personal safety concerns and COVID-19-related recreation facility closures have resulted in many students' PA decreasing. Alternatively, others have maintained their engagement. Understanding this dichotomy in relation to student well-being is essential for developing future interventions. **Purposes:** (Phase 1) Examine associations between PA behaviour, mental health indices, and COVID-19-related restrictions among students; and (Phase 2) Explore facilitators and barriers to PA engagement and views on mental wellness qualitatively. **Methods:** This study will use a mixed-methods design and seek to enroll 150 full-time Lakehead University students. For Phase I, an on-line survey exploring PA behaviour, COVID-restrictions, and mental health indices will be administered in September and November 2021. Data will be analyzed using multiple linear regressions. For Phase II, focus groups will be conducted with a subset of Phase I participants; a semi-structured interview guide will be used. Transcripts will be analyzed using inductive content analysis. **Results:** It is hypothesized that an inverse relationship will be observed between degree of PA and mental health indices. It is expected that the qualitative phase will reveal unique insights into reasons for engagement and future programming recommendations. **Conclusions:** Obtaining these data is an important step in determining what is/not working well

for students in this context. Study findings will be used to inform the development of a student-informed mental health promoting PA intervention. **Funding:** Study funded by Bell Let's Talk Post-Secondary Fund.

Keywords: Psychological Distress, Physical Activity, Mixed-Methods, University Students, Mental Health Well-Being

Oral Presentations Session C4

Oral Presentation C4.1 Behaviour change in the palm of your hand: Analyses of app-logged exercise following a Diabetes prevention program

8:35 am - 8:45 am (Vancouver, Canada, Thursday, October 14, 2021)

Megan MacPherson¹, Kohle Merry¹, Sean Locke², Mary Jung¹

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Background: Mobile phone applications (apps) which allow for self-monitoring of daily physical activity (PA) are commonly used in diabetes prevention programs; however, there is a little research describing how people engage with such apps, what leads to sustained use, and whether app use translates to improved PA. **Purpose:** 1) explore participant engagement with two different exercise-logging apps, and 2) assess the relationship between the number of days and average daily time participants logged exercise, and accelerometry measured moderate-to-vigorous PA (MVPA) in the six months following the Small Steps for Big Changes (SSBC) diabetes prevention program. **Methods:** SSBC has undergone an in-lab efficacy trial and effectiveness trial in the community. Participants in both the efficacy and effectiveness trials were provided with an app to log their exercise in the year following program completion. Efficacy trial participants were provided with an app which also integrated rewards and messaging features. Effectiveness trial participants used an app which did not have integrated rewards and messaging capabilities. **Results:** Small to medium correlations were found between app logged exercise and MVPA at six months (ranging from $r = .32$ to $r = .43$). 83% of efficacy trial participants and only 34% of effectiveness trial participants logging at least one day. **Conclusions:** These small to medium correlations may account for a clinically meaningful amount of PA. Messaging and reward features may have led to increased engagement in the efficacy trial. Researchers should focus efforts on improving participants' adherence to self-monitoring apps to indirectly target PA. **Funding:** This study was supported by the WorkSafeBC research program (RS2018-TG04 to M.M.).

Keywords: Mobile Applications, Self-Monitoring, Prediabetic State, Physical Activity

Oral Presentation C4.2 Examining the usage of behaviour change techniques among popular YouTube fitness videos

8:45 am - 8:55 am (Vancouver, Canada, Thursday, October 14, 2021)

Wuyou Sui¹, Anisa Morava², Anna Sui³, Jason Tsang⁴, Ryan E. Rhodes¹

¹Behavioural Medicine Lab, School of Exercise Science, Physical, and Health Education, University of Victoria, ²Exercise and Health Psychology Lab, Department of Kinesiology, Western University, ³Department of Health and Rehabilitation Sciences, Western University, ⁴Western University

Background: As a consequence of COVID-19, the popularity of online fitness videos on YouTube has exponentially increased. However, the extent that the most popular fitness creators/channels utilize behaviour change techniques (BCTs) in their videos, and how they may be related to engagement, is unknown. **Purpose:** (1) To describe the characteristics of any BCTs employed by the most popular YouTube fitness channels' videos, (2) and to examine relationships between BCTs employed and engagement metrics. **Methods:** An environmental scan was used to identify eligible channels. The popularity of channels was confirmed through socialblade.com rankings. Fifteen channels were identified for extraction. The top five most popular (i.e., relevant) videos for each channel were selected and coded for BCTs, according to Michie's 2013 BCT Taxonomy v1. Pearson's correlations were conducted between number of BCTs and engagement metrics (i.e., views, likes, comments). **Results:** Fifty-four unique BCTs were used across the 75 videos. "Demonstration of behaviour" (100%) and "Instruction on how to perform the behaviour" (90.7%) were the most used BCTs. The average number of BCTs employed was 12.5 ± 6.65 and ranged from 1 to 27. The number of BCTs used by a video was unrelated to any video engagement metric, even after controlling for subscribers ($ps > 0.05$). **Conclusions:** Most channels employed a variety of BCTs within their videos. However, the use of these BCTs was not related to engagement with the video. Future work examining other elements that contribute to engagement is warranted. **Funding:** None.

Keywords: YouTube, Behaviour Change Technique, Physical Activity, Digital Health

Oral Presentation C4.3 Smartphone app with behaviour change techniques to increase physical activity: Sequential multiple assignment randomized trial

8:55 am - 9:05 am (Vancouver, Canada, Thursday, October 14, 2021)

Maria do Socorro Morais Pereira Simões¹, Neli Leite Proença¹, Vinicius Tonon Lauria¹, Matheus Bibian do Nascimento¹, Ricardo da Costa Padovani², Victor Zuniga Dourado^{1,3}

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Background: App-based interventions to increase physical activity (PA) might be effective, although multi-component interventions appear to be better. **Purpose:** To investigate the effects of a smartphone app with behavior change techniques on PA of adults. **Methods:** Sequential Multiple Assignment Randomized Trial. The protocol lasted 24 weeks: after baseline assessments,

participants were randomized into 3 groups: Group 1 (G1) - app + tailored messages, Group 2 (G2) – app + tailored messages + gamification I, Control group (CG) – PA counseling. We recorded the average number of daily steps from G1 and G2. At week 6, we classified participants as responders or non-responders according to daily steps; non-responders were re-randomized, with the chance to participate in Group 3 – app + tailored messages + gamification II. From week 12, participants no longer received intervention. Reassessments occurred at 12 and 24 weeks from baseline. We analyzed data using repeated-measures ANOVA with an intention-to-treat approach. **Results:** We included 53 participants (G1: 17, G2: 19, CG: 17), aged 44 ± 1.74 years old, 56.6% women. 53.1% were responders (G1: 62.5%, G2: 43.7%). We had losses to follow-up due to the Covid-19 pandemics. There were no differences pre and post-intervention among groups. Participants from G1 significantly increased step count compared to baseline ($p < 0.05$). **Conclusions:** An app-based intervention with behavior change techniques may be effective in increasing PA of adults. **Funding:** Sao Paulo Research Foundation – FAPESP (2011/07282-6 and 2018/11817-1); FAPESP/ Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) (2018/21536-0).

Keywords: Adaptive Intervention, Behavior Change, Physical Activity, Smartphone

Oral Presentation C4.4 Systematic review of the reliability and validity of commercially available wearable devices for measuring steps, energy expenditure, and heart rate

9:05 am - 9:15 am (Vancouver, Canada, Thursday, October 14, 2021)

Daniel Fuller^{1*}, Emily M. Colwell^{1*}, Jonathan Low^{1*}, Kassia Orychock¹, Melissa Tobin², Bo Simango¹, Richard Buote², Desiree Van Heerden³, Logan Slade², Henry Luan⁴, Nathan G. A. Taylor⁵, Kimberley Cullen¹

¹School of Human Kinetics and Recreation, Memorial University of Newfoundland, ²Faculty of Medicine, Memorial University of Newfoundland, ³Faculty of Engineering, Memorial University of Newfoundland, ⁴Department of Geography, University of Oregon, ⁵School of Health Administration, Dalhousie University

Introduction: Consumer-wearable activity trackers are small electronic devices that record fitness and health-related measures. The purpose of this systematic review is to examine the validity and reliability of commercial wearables in measuring step count, heart rate, and energy expenditure. **Methods:** We identified devices to be included in the review. Database searches were conducted in PubMed, Embase, and SPORTDiscus, and only included articles published in the English language up to May 2019. Studies were excluded if they did not identify the device used and if they did not examine the validity and/or reliability of a device. Studies including the general population and all special populations were included. We operationalized validity as criterion (as compared to other measures) and construct (degree to which device is measuring what it purports) validity. Reliability measures focused on intradevice and interdevice reliability. **Results:** We included 158 publications examining 9 different commercial wearable device brands. Fitbit was by far the most studied brand. In lab-based settings Fitbit, Apple Watch, and Samsung appeared to measure steps accurately. Heart rate was more variable with Apple Watch and Garmin being the most accurate, and Fitbit tending towards underestimation. For energy expenditure, no brand was accurate. We also examined validity between devices within a specific brand. **Conclusion:** Commercial wearable devices are accurate in measuring steps and heart rate in lab based settings, but this varies by the manufacturer and device type. Devices are constantly being upgraded and redesigned to new models, suggesting the need for more current reviews and research.

Keywords: Wearable Devices, Systematic Review, Heart Rate, Steps, Calories

Oral Presentations Session C5

Oral Presentation C5.1 A systematic review of stakeholder and end-user perceptions of physical activity guidelines

8:35 am - 8:45 am (Vancouver, Canada, Thursday, October 14, 2021)

Heather Hollman¹, John A. Updegraff², Isaac M. Lipkus³, Ryan E. Rhodes¹

¹University of Victoria, ²Kent State University, ³Duke University

Background: Many of the world's population, across all age groups and abilities, are not meeting or even aware of internationally recommended physical activity (PA) guidelines. In order to enhance awareness and uptake, guidelines should be perceived positively by targeted users. **Purpose:** To review the literature on perceptions of stakeholders and end-users of PA guidelines. **Methods:** Six electronic databases were searched from October to December 2021 with keyword synonyms for "perceptions" and "PA guidelines". Studies of any design that collected stakeholder and/or end-user responses to PA guidelines were included and assessed for risk of bias. Data was extracted and analyzed using thematic synthesis. **Results:** After screening 638 abstracts and applying citation screening, 250 full-texts were retrieved. A total of 19 articles met the inclusion criteria. Stakeholders and end-users for PA guidelines across all age groups expressed the need for simplified language with more definitions, relatable examples and imagery, and quantification of PA behaviours. There was particular concern for the early years and child PA guidelines leading to guilt amongst parents. General age group PA guidelines were not perceived as usable to populations with differing abilities, clinical conditions, and socioeconomic status'. Guidelines that targeted clinical populations were well received. **Conclusions:** There is a clear need to balance the evidence base with the pragmatic needs of translation and uptake so that the guidelines are not ignored or act as a barrier to actual engagement. **Funding:** This research did not receive funding.

Keywords: Physical Activity, Guidelines, Stakeholders, End-Users, Perceptions

Oral Presentation C5.2 Implications of disability severity on 24-hour movement guideline adherence among children with neurodevelopmental disorders in the United States

8:45 am - 8:55 am (Vancouver, Canada, Thursday, October 14, 2021)

Denver M. Y. Brown¹, Patrick G. McPhee^{2,3}, Matthew Y. Kwan^{1,4}, Brian W. Timmons²

¹Department of Family Medicine, McMaster University, ²Department of Pediatrics, McMaster University, ³School of Rehabilitation Science, McMaster University, ⁴Department of Child and Youth Studies, Brock University

Background: Research has established beneficial associations between 24-hour movement guideline adherence and several health outcomes in typically developing (TD) children, but these relationships are poorly understood in children with neurodevelopmental disorders (NDD). **Purpose:** To examine: (1) 24-hour movement guideline adherence; (2) the influence of disability severity; and (3) associations between guideline adherence and health outcomes in children with NDD and TD children. **Methods:** This cross-sectional study used data from the 2018-2019 cycles of the US National Survey of Children's Health. Parental/caregiver reports of movement behaviors (physical activity, screen time, and sleep), disability severity (limitations to daily activities) and health outcomes (general health status, anxiety, and depression) were provided for 8,554 children with NDD and 19,669 TD children aged 6-17 years. **Results:** Children with NDD had significantly lower odds of meeting each movement behavior guideline compared to TD children and these effects were most pronounced for those who experienced consistent limitations to daily activities. Meeting at least two guidelines significantly lowered the odds for anxiety and depression, and increased the odds for better general health for children with NDD. **Conclusions:** These findings suggest degree of disability severity has a strong influence on adherence to 24-hour movement guidelines among children with NDD. **Funding:** N/A.

Keywords: Physical Activity, Screen Time, Sleep, Neurodevelopmental Disorders, Movement Behaviors

Oral Presentation C5.3 Changes in 24-hour movement behaviors before- and during- COVID-19 pandemic among 94,624 South Korean adolescents

8:55 am - 9:05 am (Vancouver, Canada, Thursday, October 14, 2021)

Eun-Young Lee¹

¹School of Kinesiology and Health Studies, Queen's University, Kingston, Canada

Background: The COVID-19 pandemic has disrupted the engagement in 24-hour movement behaviors, namely moderate-to-vigorous-physical activity (MVPA), recreational screen time (ST), and sleep (SLP). **Objective:** To examine the changes in 24-hour movement behaviors pre- and during-COVID-19 pandemic among South Korean adolescents. **Methods:** Self-reported, population-based data from Korea web-based Youth Risk Behavior Surveys were used (N=112,251). Relative changes in meeting individual and combinations of recommendations within 24-Hour Movement Guidelines between 2019 (pre-COVID-19) and 2020 (during-COVID-19) were calculated. **Results:** Of 94,624 adolescents (M age: 15.2 years), changes in the adherence to 24-Hour Movement Guidelines pre- and during-COVID-19 were not statistically significant for MVPA (6.1% to 5.8%) and SLP (19.6% to 19.4%); however, a decrease was observed for ST (32.2% to 20.2%, OR: 0.52, 95%CI: 0.51–0.55). Also, a decrease was observed in meeting MVPA+ST (2.3% to 1.5%; OR: 0.62, 95%CI: 0.55–0.69) and ST+SLP (6.3% to 4.0%; OR: 0.63, 95%CI: 0.58–0.67); however, no changes were observed for MVPA+SLP (1.7% to 1.6%). Furthermore, an increase was observed for not meeting any recommendations (51.8% to 61.2%; OR: 1.47, 95%CI: 1.42–1.52) while a decrease was observed for meeting one (39.3% to 32.7%; OR: 0.75, 95%CI: 0.73–0.78), two (8.9% to 6.2%; OR: 0.67, 95% CI: 0.63–0.71), or all (0.7% to 0.5%; OR: 0.67, 95%CI: 0.55–0.82) of the recommendations. **Conclusions:** Behavioral profile of adolescents has not been ideal in South Korea and this concern is further exacerbated by the COVID-19 pandemic. For recreational pursuits, non-screen-based activities should be encouraged during the pandemic. **Funding:** The author(s) received no financial support for the research, authorship, and/or publication of this work.

Keywords: 24-Hour Movement Guidelines, Adolescent, SARS-Cov-2, KYRBS, Epidemiology

Oral Presentation C5.4 Roles of privilege-disadvantage in meeting 24-Hour Movement Guidelines among South Korean adolescents during COVID-19

9:05 am - 9:15 am (Vancouver, Canada, Thursday, October 14, 2021)

HeeJun Lim, Eun-Young Lee

School of Kinesiology and Health Studies, Queen's University, Kingston, ON, Canada

Background: Adherence to physical activity (PA), recreational screen time (ST) and sleep recommendations within Canada's 24-Hour Movement Guidelines have been consistently low among South Korean adolescents, with disparities across different factors that indicate social privilege-disadvantage (e.g., gender). COVID-19 may have exacerbated such disparities. **Purpose:** To examine intersectional correlates of meeting the 24-Hour Movement Guidelines among South Korean adolescents. **Methods:** Self-reported, population-based data from 44,198 adolescents (12-18 years) who participated in the Korea Youth Risk Behavior Web-based Survey 2020 were used. Exposure included gender, effect modifiers included family economic status (FES), financial impacts due to COVID-19, and academic performance, and outcomes included meeting individual recommendations within the 24-Hour Movement Guidelines. Moderation analyses were conducted. **Results:** Overall, girls were less likely to meet PA and sleep recommendations than boys. High academic performance was associated with not meeting PA and sleep recommendations but with meeting the ST recommendation. Compared to girls with low FES, boys with high FES were more likely to meet the ST recommendation (OR: 1.24, 95%CI: 1.11–1.39). Compared to girls with low academic performance, girls (OR: 1.33, 95%CI: 1.23–1.44) and boys (OR: 1.48, 95%CI: 1.36–1.62) with high academic performance were more likely to meet the ST recommendation. **Conclusions:** Consistent with pre-COVID data, gender disparities in meeting PA and sleep recommendations were observed, but not for ST during the COVID-19 pandemic among South Korean adolescents. Boy gender with high FES as well as high academic performance, regardless of gender, has served as advantage in meeting the ST recommendation. **Funding:** The author(s) received no financial support for the research, authorship, and/or publication of this work.

Keywords: Intersectionality, Social Determinants of Health, Behavioral Epidemiology, SARS-Cov-2

Oral Presentation C5.5 Development of a multiple behaviour change intervention for post-secondary students using the 24-Hour Movement Guidelines

9:15 am - 9:25 am (Vancouver, Canada, Thursday, October 14, 2021)

Jennifer R. Tomasone¹, Stephanie M. Flood¹, Guy Faulkner², Beth Blackett³, Tala Chulak-Bozzer⁴, Katie M. Di Sebastiano², Matt Dolf^{5,6}, Mary Duggan⁷, Daniel Fuller⁸, Kirstin Lane^{7,9}, Amy E. Latimer-Cheung¹, Brooke Thompson¹, Leigh M. Vanderloo^{4,10}, Melissa C. Brouwers¹¹

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Purpose: To outline the iKT process used to develop a multiple behaviour change intervention among post-secondary students using the 24-Hour Movement Guidelines. **Methods:** Data from focus groups examining barriers and facilitators to guideline implementation were deductively mapped to the Theoretical Domains Framework and Consolidated Framework for Implementation Research to capture individual and systems-level change required, respectively. Intervention mapping was conducted by linking salient domains to the Capability Opportunity Motivation-Behaviour (COM-B) model, which were subsequently mapped to intervention functions, behaviour change techniques, and modes of delivery using the Behaviour Change Wheel. Iterative consultations between students, campus stakeholders, and the iKT team allowed for refinement and tailoring of intervention components. **Results:** An evidence- and theory-informed multiple behaviour change intervention tailored for post-secondary students was created. The 6-week long intervention will be delivered through the ParticipACTION app and will be evaluated in a proof-of-concept study using subjective (COM-B) and device-based (Fitbit) measures, as well as a process evaluation. **Conclusions:** The use of an iKT approach with intervention mapping facilitated the development of an intervention that was evidence- and theory-informed and reflected the needs of participating stakeholders. **Funding:** Study is supported by the Public Health Agency of Canada (grant number 1920-HQ-000004) and the Canadian Society for Exercise Physiology.

Keywords: 24-Hour Movement Guidelines, Intervention Mapping, Knowledge Translation, Post-Secondary Students

Oral Presentations Session C6

Oral Presentation C6.1 Psychology of physical activity: A 30-year reflection on physical activity and mental health research

8:35 am - 8:45 am (Vancouver, Canada, Thursday, October 14, 2021)

Guy Faulkner¹, Stuart Biddle², Nanette Mutrie³, Trish Gorely⁴

¹University of British Columbia, ²University of Southern Queensland, ³University of Edinburgh, ⁴University of the Highlands and Islands

Background: The first English language authored textbook on exercise psychology was published 30 years ago (Biddle & Mutrie, 1991, *Psychology of Physical Activity & Exercise*). With the publication of the 4th edition of the follow-up to this book in 2021 (Biddle, Mutrie, Gorely & Faulkner, 2021, *Psychology of Physical Activity*), it allows for a 30-year retrospective view of changes in this field. **Purpose:** To review progress concerning physical activity and mental health since the 1st edition and speculate on future developments. **Results:** Research has grown beyond typical mental outcomes (e.g., depression, self-esteem) with marked increase in cognitive functioning across the lifespan. With recognition of cognitive impairment as a transdiagnostic concern this research focus will expand. The use of large prospective studies is much more evident and this has increased the evidence base considerably. Bi-directional effects between the physical activity and mental health remain uncertain and should remain a research focus. While there is recognition of the multiple mechanisms for linking physical activity and mental health the evidence is somewhat speculative and repetitious. There has been limited progress over the past decade although the importance of definitively identifying mechanisms of action can be questioned. Given the mature evidence base for clinical populations (e.g., depression) a future focus must remain on moving from efficacy to effectiveness and real-world implementation. **Conclusions:** These trends reflect our changes in understanding across the 30 years of the textbook publication process and suggest future research directions for those interested in the field of physical activity for health.

Keywords: Exercise Psychology, Mental Health, Trends

Oral Presentation C6.2 What barriers influence mental health professionals' provision of physical activity recommendations during therapy?

8:45 am - 8:55 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: The mental health benefits of physical activity (PA) are well-established. Initiatives such as Exercise is Medicine advise healthcare providers to assess and prescribe PA, but the feasibility of implementing PA counseling in mental healthcare contexts warrants investigation. **Purpose:** To explore therapists' barriers to integrating PA recommendations into their clinical practice. **Methods:** A diverse sample of 125 therapists (including psychologists, social workers, and marriage/family therapists) completed an online survey; 14 therapists participated in one of four focus group sessions. **Results:** On the survey, therapists' most

salient barriers were lack of clients' willingness to engage in PA ($M=3.10/5$), lack of time to discuss PA with clients ($M=2.56/5$), and concerns about client safety ($M=2.54/5$). Qualitative feedback from open-ended survey questions and focus groups revealed concerns about whether promoting PA was within therapists' scope of practice, and others felt they lacked the knowledge/confidence to provide specific PA recommendations. Many participants said providing "prescriptions" contradicted their therapeutic approach, and they preferred to focus on clients' presenting issues, which may be more pressing or salient than promoting PA. However, 94.4% of therapists endorsed the importance of promoting clients' PA, and 60.8% said they would attend related training. **Conclusions:** While recognizing PA promotion as important, therapists' questions about the relevance for all clients, and how to effectively implement PA recommendations in practice, emerged as key barriers. Future studies could develop training workshops to address these barriers and equip therapists with the confidence and skills to promote PA consistently as part of their therapeutic approach.

Keywords: Mental Health, Physical Activity Counseling, Barriers, Therapists

Oral Presentation C6.3 Association among relevance, recommendation and motivation to the physical activity practice of health professionals

8:55 am - 9:05 am (Vancouver, Canada, Thursday, October 14, 2021)

Letícia Ap. Calderão Sposito¹, Joyce Fernanda da Cruz¹, Eduardo Kokubun¹

¹Postgraduate Program in Science Movement, Institute of Biosciences, São Paulo State University (UNESP), Rio Claro

Background: Practicing physical activity (PA) from a more autonomous motivation can favor the maintenance of PA practice and encourage health promotion behaviors. **Purpose:** To associate the relevance attributed to PA content, frequency of recommendation and PA time with the motivation for the practice of primary health care professionals (PHCP). **Methods:** The sample was comprising 107 PHCP from 22 health units in the city of Rio Claro, SP, Brazil, being 90.7% female, with a mean age of 39.94±9.42 years and working time of 7 years and 1 month. The BREQ-3 questionnaire was used to measure the motivation to practice PA, the IPAQ questionnaire for the PA time and closed questions to assess the relevance attributed to PA and frequency of recommendation by the PAPS. Motivation data were dichotomized from the group mean (more intrinsic and less intrinsic motivation) and PA from the recommendations (<149 min/week and >150min/week). The chi-square test was applied, adopting $p=0.05$. **Results:** Professionals who have a more internal motivation to practice PA tend to classify PA as "very important" (62% $p=0.00$). Classifying PA as "very important" has been associated with recommending more PA to the health users (73% $p=0.00$). Also, having the most intrinsic motivation was associated with values >150 min/week of PA (56% $p=0.00$). **Conclusions:** Suggesting strategies that encourage more internal motivation for the PA practice of PAPS can lead to health promotion actions and more time of PA. **Funding:** Coordination for the Improvement of Higher Education Personnel (CAPES).

Keywords: Health System, Brief Advice, Physical Exercise

Oral Presentation C6.4 The relationship between functional impairment, perceptions of self, and determinants of health in young adults' ability to assess and access mental health services

9:05 am - 9:15 am (Vancouver, Canada, Thursday, October 14, 2021)

Sandy Rao¹

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Background: The burden of disease on individuals, families and their communities are staggering in and of itself. However, the system burden that service users face has a compounding and potentially iatrogenic effect; whereby attempts to access the health care system actually exacerbates and further disenfranchises patients with mental illness. **Purpose:** This study aimed to develop a conceptual model to examine the measures of functional impairments, perceptions of self, diagnosis, determinants of health and the combination of measures, to assess the impacts on unmet healthcare needs. **Methods:** The study utilized data from the 2017-2018 Canadian Community Health Survey and focused on young adults aged 20 to 20 years old, from Alberta, Canada (N=1636). Binary logistic regression modeling was used as it is among the most frequently used approach for developing multivariable healthcare prediction models for binary outcomes. **Results:** Functional impairments—cognition and getting along with others, awareness of ratings of mental health, and diagnosis type had significant impacts on unmet healthcare needs. Conversely, determinants of health as a measure and the combination of all measures were not found to be statistically significant. **Conclusions:** Study findings are supported by the literature that positive social determinants of health are significant predictors of met healthcare needs, even when functional impairments are present. However, this suggests a need to study other diverse samples to understand the impacts of functional impairments, perceptions of self and diagnosis on persons with moderate to negative social determinants of health. **Funding:** None.

Keywords: Determinants of Health, Unmet Healthcare Needs, Access to Care, Mood Disorders, Young Adults, Functional Impairments

Oral Presentation C6.5 Fitness facility staff can be trained to deliver a motivational interviewing-informed diabetes prevention program

9:15 am - 9:25 am (Vancouver, Canada, Thursday, October 14, 2021)

Tineke E. Dineen¹, Corliss Bean², Kaela D. Cranston¹, Megan M. MacPherson¹, Mary E. Jung¹

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Background: Training programs for community interventions must be evaluated to understand whether the training is successful at

enabling staff to implement a program with fidelity. **Purpose:** Evaluate the effectiveness of the in-person Small Steps for Big Changes (SSBC) training program for fitness facility staff. **Methods:** Eight staff were trained to deliver the motivational interviewing (MI)-informed SSBC program for individuals at risk of developing type 2 diabetes. The Kirkpatrick 4-level training evaluation model was used to guide this research. Level one assessed staff satisfaction to the training. Level two assessed staff program knowledge and MI knowledge/skills. Level three assessed staff behaviors by examining their MI use with each client. Level four assessed training outcomes using clients perceived satisfaction with their staff and basic psychological needs support. **Results:** Staff were satisfied with the training ($M = 4.43$, $SD = 0.62$). All learning measures demonstrated high post-training scores that were retained at implementation follow-up. Staff used MI skills in practice and delivered the program at a client-centered level ($M = 6.34$, $SD = 0.83$). Overall, clients perceived staff supported their basic psychological needs ($M = 6.59$, $SD = 0.62$) and reported high staff satisfaction scores ($M = 6.9$, $SD = 0.32$). **Conclusion:** The SSBC training was successful, and staff delivered a MI-informed program. While not all staff operated at a client-centered level, clients perceived their basic psychological needs to be supported. Findings support the training for future scale-up sites. Community fitness staff represent a feasible resource through which to run evidence-based counselling programs. **Funding:** This research was funded by both a Social Sciences and Humanities Research Council Doctoral Scholarship (#767-2020-2130) and a Partnership Engage Grant (#892-2018-3065), the Canadian Institutes of Health Research (#333266), and Michael Smith Foundation for Health Research Reach Grant (#18120).

Keywords: Evaluation, Implementation Science, Health Behavior, Prediabetic State, Exercise

Oral Presentations Session C7

Oral Presentation C7.1 Cardiovascular and diabetes burden attributable to physical inactivity in Mexico

8:35 am - 8:45 am (Vancouver, Canada, Thursday, October 14, 2021)

Catalina Medina¹, Pamela Coxson^{2,3}, Joanne Penko^{2,3}, Ian Janssen⁴, Sergio Bautista-Arredondo⁵, Simón Barquera⁶, Kirsten Bibbins-Domingo^{1,2,3,7}

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Background: Physical inactivity (PI) is associated with the development of non-communicable chronic diseases. **Purpose:** The purposes of this study were to estimate the extent to which the 31% relative increase in PI among 35-64 years old Mexicans between 2006 and 2012 influenced diabetes (T2D) and cardiovascular disease (CVD) incidence and mortality, and to estimate the impact of the World Health Organization recommended 10% and 15% relative decrease in PI on CVD and T2D incidence and mortality by 2025 and 2030, respectively. **Methods:** Estimates were derived using the Cardiovascular Disease Policy Model-Mexico, a computer simulation, Markov model. Model inputs included cross-national data on PI levels from 2006 and 2012 measured using the International Physical Activity Questionnaire and the published literature review on the independent relationship between PI and cardiometabolic risk. **Results:** The model estimated that the 31% increase in PI resulted in an increase in the number of cases of T2D (27,100), coronary heart disease (10,300), stroke (2,200), myocardial infarction (1,500), stroke deaths (400) and coronary heart disease deaths (350). A hypothetical 10% lowering of PI by 2025 compared to status quo is projected to prevent 8,400 cases of T2D, 4,200 cases of CHD, 1,000 cases of stroke, 700 cases of MI, and 200 deaths of CHD and stroke. A 15% reduction resulted in larger decreases. **Conclusions:** While the burden of T2D and CVD raised from 2006 to 2012 in association with increased PI, achieving the WHO targets by 2030 could help reverse these trends.

Keywords: Physical Inactivity, Cardiovascular Diseases, Type 2 Diabetes, Mortality, Mexico

Oral Presentation C7.2 Does the removal of the 10-minute bout requirement change the demographic and health profiles of Canadian adults who meets the physical activity recommendations?

8:45 am - 8:55 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Recently, the Canadian adult physical activity (PA) recommendations of 150 minutes/week of moderate-to-vigorous intensity physical activity (MVPA) were revised, from requiring MVPA bouts of 10 minutes or more (bouted) to no bout requirement (non-bouted). **Purpose:** To assess whether there were differences in the socio-demographics, health and fitness status of Canadians who met the bouts and non-bouted PA recommendations. **Methods:** We used adult (18-79 years) data from two combined cycles of the Canadian Health Measures Survey (N=4733) to compare the proportions who met the PA recommendations using bouts and non-bouted accelerometer data. Differences in socio-demographics, health, and fitness measures (mental and general health, chronic conditions, body mass index [BMI], waist circumference, blood pressure, total cholesterol:HDL [TC:HDL], triglycerides, HbA1c, aerobic fitness, grip strength, sit-and-reach) were assessed using independent t-tests and chi-squares. For health and fitness measures, multivariate linear and logistic regressions controlling for age, sex, household education and smoking were conducted. **Results:** More adults met the PA recommendations using the non-bouted than the bouts requirement (43.2% vs. 17.0%). Characteristics of those who met the bouts and non-bouted recommendations were similar. Exceptions included a lower age group, higher grip strength, and a greater prevalence of unhealthy TC:HDL among those who met non-bouted recommendation

compared to bouts. **Conclusion:** Although the removal of the 10-minute bout requirement increased the proportion of Canadian adults who met the PA recommendations, it did not result in substantial differences in socio-demographic and health characteristics. Results help to inform the transition in reporting for PA surveillance. **Funding:** None.

Keywords: Physical Activity, Guidelines, Accelerometry, Health, Fitness

Oral Presentation C7.3 Is it really home-based? The necessity for accurate definitions across exercise and physical activity programmes.

8:55 am - 9:05 am (Vancouver, Canada, Thursday, October 14, 2021)

Francesca Denton^{1*}, Sofie Power^{1*}, Alexander Waddell^{1*}, Stefan Birkett², Michael Duncan¹, Amy Harwood¹, Gordon McGregor¹, Nikita Rowley¹ and David Broom¹

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Background: There is a wide discrepancy in how published research defines and reports home-based exercise programmes. Studies consisting of fundamentally different designs have been labelled as home-based, making searching for relevant literature challenging and time-consuming. This issue has been further highlighted by an increased demand for these programmes following the COVID-19 pandemic and associated government-imposed lockdowns. **Purpose:** To examine what specifically constitutes home-based exercise by 1) developing definitions for a range of terms used when reporting exercise and physical activity programmes and 2) providing examples to contextualise these definitions for use when reporting exercise and physical activity programmes. **Methods:** A literature search was undertaken to identify previous attempts to define home-based exercise programmes. A working document, including initial definitions and examples were developed, which were then discussed between seven experts for further refinement. **Results:** We generated definitions for universal key terms within three domains (and subdomains) of programme design: location (home-based, community-based or centre-based), prescription (structured or unstructured) and delivery (supervised, facilitated, or unsupervised). Examples for possible combinations of design terms were produced. **Conclusion:** Definitions will provide consistency when using reporting tools and will be tested as part of a proposed Delphi study. This is of paramount importance due to the predicted increase in emerging research regarding home-based exercise. **Funding:** No funding to declare.

Keywords: Home-Based Exercise, Definitions, Exercise Interventions, Reporting

Oral Presentation C7.4 A qualitative analysis of exit interviews exploring families' perspectives on physical activity and research participation

9:05 am - 9:15 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Family physical activity (FPA) interventions often lead to increased physical activity, but trials are only beginning to understand optimal behaviour change techniques for lasting change. This study reports on findings from interviews with families who participated in a randomized controlled trial which explored planning as a strategy to increase physical activity. **Methods:** Families who completed the FPA intervention trial (see Rhodes et al., 2019) were asked to complete an exit interview at the six-month endpoint of the study. Forty-one interviews were included in the analysis. An iterative, deductive, fully crossed, duplicate thematic analysis was used to code the interviews and reveal the major themes. **Results and Discussion:** Parents and children reported positive participation outcomes including learning, improving physical fitness, increased family time, and simply having fun. Planning could be challenging considering complex family schedules, frequent extra-curricular activities and varying fitness and energy levels. Elements like the secondary fitness measures and accelerometers used detracted from the success and enjoyment of some participants. Families shared recurrent commentary linking values, identity, planning and activity levels. **Conclusion:** Our findings highlight the importance and complexity of FPA research. Families emphasized many psycho-social benefits, but shared significant challenges involving the entire family unit simultaneously. More research is indicated to understand the interaction between planning, identity and activity, as well as the influence of secondary measures like fitness testing. Future research could benefit from the use of more seamless technology and tailored protocols to better engage families, minimize burden and support long-term change.

Keywords: Family, Physical Activity, Intervention, Planning

Oral Presentation C7.5 Public Policies, plans, and programs to promote physical activity in the urban population of low- and middle-income countries

9:15 am - 9:25 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Physical inactivity is high in low-, middle-, and high-income countries, according to the World Health Organization, about 60% of the population worldwide does not perform enough physical activity (at least 150 minutes per week of moderate

physical activity) and 80% of these inactive people live in low- and middle-income countries (LMICs). According to United Nations (2018), 55% of the global population currently lives in urban areas and by 2050, this percentage will grow to 68%. For these reasons, it is necessary to take action in the reduction of physical inactivity of at least 15% by 2030, in accordance with the goals of the Global Plan of Action to Prevent and Control NCDs. LMICs must promote the practice of physical activity through policies, programs and guidelines that high-income countries already have. The implementation of policies that alter the built environment, especially those that reduce inequalities in access to: transportation, recreational areas and facilities, green areas, and public infrastructure (such as sidewalks, streetlamps, and public transportation), can have an effect on levels of physical activity. These relationships of changes in the urban environment and increased physical activity have been supported by research in high-income countries. It is therefore important for researchers and planners to demonstrate to decision makers the impact that interventions, especially built environment interventions, have on physical activity in LMICs. In the American region 36% have a standalone plan for PA compared to European (11%) and African (17%) regions (GoPA). **Purpose:** To study the above, we focused on all interventions in urban Latin American LMICs that measured changes in physical activity that were related to the usage and/or construction of: 1) the built environment or 2) transportation. These types of environments are accessible to all of the population and permit equal and just use of public spaces. In terms of the type of physical activity that take place in these environments, these could be more standard types like walking, running, or cycling, but may also include other kinds of physical activity like dancing, aerobics, or use of outdoor gym equipment. **Methods:** We conducted a topic review to find examples of how public policies have intervened in the practice of physical activity in LA LMICs. We reviewed the country cards in the Global Observatory of Physical Activity for LA LMICs that had a national physical activity policy or plan and had research related to physical activity. For these countries, we searched for further information on these physical activity policies, programs, and any related research – we included grey literature and government web pages in this part of the search. **Results:** We were able to find information on and analyze public policies, plans, and programs to promote physical activity in the urban areas of Colombia, Mexico, Brazil, Argentina, and Ecuador. We found that communities in LA LMICs were able to change their physical activity levels through interventions in the built environment, as demonstrated in programs such as Recreovia (Colombia), Academia da Cidade (Brazil), Estaciones Saludables (Argentina) and Ecuador Ejercitate (Ecuador). In terms of transportation infrastructure, we found evidence of a positive link of physical activity and transportation interventions in Bogota, Colombia and Guadalajara and Mexico City, Mexico in the form of Ciclovias. **Recommendations:** Accessibility is important for programs and should be in all areas of the city covering different socioeconomic statuses for reducing inequalities and allowing those who most need these programs to access them. In addition, programs should offer diverse options for PA for different age groups and different target audiences centered on their abilities and health status. Also, effective programs should be adapted to and adopted by other cities in the same country at least. For example in Colombia only a few of the departments/states have the Ciclovía program while it's already been adopted in cities of other countries like Mexico and the US. If there is a policy in a country, there may need to be a push to have a program/intervention, for example in the Dominican Republic and Paraguay. Likewise, if there is a program, then it needs to be evaluated, for example the ciclovias in Peru, Bolivia, and Venezuela. We would recommend in order for this to happen that governments and funding bodies evaluate their program/interventions and prioritize funding evaluations. Finally, we recommend standardization in PA measurement across countries for evaluations, perhaps using the IPAQ, to allow for detailed cross-country comparisons. If possible, even better would be including quantitative measurements of PA using pedometers or accelerometers or measurements from participants' smartphones or smartwatches.

Keywords: Physical Activity, Built Environment, Programs, Public Policy, Latin America, LMICs

Oral Presentations Session C8

Oral Presentation C8.1 Movement behaviours during COVID-19 in children and youth (aged 5-17 years): A systematic review

1:45 pm - 1:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Being physically active is crucial for health among young people; however, their ability to live physically active lifestyles has been impacted by the COVID-19 pandemic. **Purpose:** To investigate the impact of COVID-19 lockdowns and restrictions on physical activity (PA) and sedentary behaviour (SB) among children and youth aged 5-17 years globally. **Methods:** Literature were searched on CINAHL, MEDLINE and EMBASE databases. To be included, the articles must have been 1) published March-November 2020, 2) focused on PA or SB, 3) investigated children and youth (5-17 years), and 4) written in English. Covidence software was used for screening with two independent screeners, and a Microsoft Word document was used for data extraction, which was then used to synthesize evidence. **Results:** Based on nine studies included in this review that represent 5,968 participants from eight countries, eight studies found a decrease in PA, with one study indicating varying results based on geographical location (South America vs. Europe) due to the COVID-19 pandemic. Further, six studies found an increase in SB as a result of COVID-19. **Conclusion:** The COVID-19 lockdowns and restrictions have impacted the PA and SB of children and youth unfavourably. Understanding the health implications of these behavioural changes is crucial for public health concurrently and beyond the COVID-19 era. This is still an evolving topic; therefore, more research is required to better support children and youth to return to their normal behavioural patterns as we overcome the pandemic.

Keywords: Coronavirus, Pandemic, Physical Activity, Sedentary Behaviour, Epidemiology

Oral Presentation C8.2 The effect of an after school physical activity program on children's cognitive, social, and emotional health during the COVID-19 pandemic

1:55 pm - 2:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Children's physical activity participation declined during the COVID-19 pandemic and these changes could lead to longer-term impacts on children's cognitive, social, and emotional health. **Purpose:** To determine parents' perceptions of cognitive function, peer and family relationships, life satisfaction, physical activity, affect, and global health, among their children who participated in the Build Our Kids' Success (BOKS) after school physical activity program from October to December 2020. **Methods:** Parents of children participating in the BOKS program at elementary schools in Nova Scotia, Canada were recruited. At baseline, 159 parents completed the National Institutes of Health (NIH) Patient-Reported Outcomes Measures Information System (PROMIS) Parent Proxy questionnaire, and 75 parents completed the measures at follow-up. Independent t-tests were used to determine if there were differences between pre and post Parent Proxy Questionnaire data. **Results:** All NIH PROMIS outcome variables at baseline and follow-up were within normal limits (Adjusted T-Scores: 46.67±7.15 to 50.04±7.13). There were no significant differences in life satisfaction ($t(188) = -1.05, p=.30$), family relationships ($t(189) = 0.31, p=.76$), cognitive function ($t(199) = -1.16, p=.25$), peer relationships ($t(192) = -1.86, p=.06$), positive affect ($t(195) = 0.25, p=.81$), or global health ($t(216) = -0.43, p=.67$) from baseline to follow-up. **Conclusions:** Parent Proxy questionnaires suggested that the BOKS program had a protective effect on children's cognitive, social and emotional health during the second wave of the COVID-19 pandemic. **Funding:** The Public Health Agency of Canada in partnership with Reebok Canada Fitness Foundation.

Keywords: Physical Activity, PROMIS, Children, Covid-19 Pandemic, Public Health

Oral Presentation C8.3 Impact of the COVID-19 pandemic on Ontario children's physical activity and screen time

2:05 pm - 2:15 pm (Vancouver, Canada, Thursday, October 14, 2021)

Emma Ostermeier^{1,2}, Patricia Tucker^{2,3,4}, Andrew Clark^{2,4}, Jamie Seabrook^{2,4,5,6,7,8}, and Jason Gilliland^{2,4,6,7,8,9,10}

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Background: COVID-19 protocols have restricted children's use of recreational facilities and discouraged socialization with peers, potentially exacerbating children's already low physical activity levels and excessive screen time. **Purpose:** This study examined how the COVID-19 pandemic affected children's physical activity and screen time and explored the influence of gender, socioeconomic status (SES), and family COVID-19 constraints (i.e., facility use and social interaction) on children's physical activity and screen time. **Methods:** Online surveys were disseminated to parents of grade 6 children (ages 10-12 years) in London, Ontario at two time points: before COVID-19 (May 2019 to February 2020) and during COVID-19 (November to December 2020). Surveys collected information about children's physical activity, weekday and weekend screen time, demographics and family COVID-19 constraints. Wilcoxon signed-rank tests were used to assess changes in physical activity and screen time. **Results:** Parents ($n = 95$) reported declines in children's physical activity ($p = 0.01$) and increases in weekday ($p < 0.01$) and weekend screen time ($p < 0.01$). Significant changes in physical activity and screen time were identified between gender, SES, and facility use groups. Social interaction limitations resulted in significant changes in screen time, but not physical activity. **Conclusions:** COVID-19 protocols resulted in decreased physical activity and increased screen time among children. As physical activity and limited screen time are important for children's health and well-being, resources that support physical activity during the pandemic are needed. **Funding:** The ACT-i-Pass program is funded by London's Child and Youth Network.

Keywords: Child, Physical Activity, Screen Time, COVID-19

Oral Presentation C8.4 Effects of the COVID-19 pandemic on active transportation among Canadian children: results from two national surveys

2:15 pm - 2:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Children's active transportation (AT) and independent mobility (IM) are associated with higher physical activity. COVID-19 restrictions have drastically reduced opportunities for physical activity, but their effects on AT and IM remain unknown. **Purpose:** Using two national surveys of parents across Canada conducted by separate survey firms in October and December 2020, we examined changes in AT and IM since the COVID-19 pandemic. We assessed potential disparities in changes by gender, household income, and disability status. **Methods:** Survey 1 included 1,568 parents of 5- to 17-year-olds and Survey 2 included 2,291 parents of 7- to 12-year-olds. We assessed changes associated with COVID-19 retrospectively on 5-point scales ranging from a lot less to a lot more. Changes in IM were only assessed in survey 2. We summarized changes in AT and IM with descriptive statistics and examined disparities with linear regression models. **Results:** In surveys 1 and 2 respectively, 33.4 and

37.5% of parents reported a decline in AT, 48.9 and 48.4% reported no change, and 16.8 and 14.0% reported an increase. 32.8% of parents reported a decline in IM, 56.5% reported no change and 10.7% reported an increase. In both surveys, decreases in AT were significantly larger among children from households earning CAD\$ 20,000-79,999 versus >\$100,000 with no disparities related to gender or disabilities ($p>0.05$). We obtained similar results for IM in survey 2. **Conclusions:** These findings emphasize the need for public health authorities and policymakers to promote AT and IM as activities that can comply with physical distancing requirements. **Funding:** Study 1 was funded by Dalhousie University, the Province of Nova Scotia, and ParticipACTION. Study 2 was funded by the Heart and Stroke Foundation of Canada (grant # G-19-0026216).

Keywords: Children, Physical Activity, Active Travel, Independent Mobility, Social Determinants of Health

Oral Presentation C8.5 Physical activity, screen time, and mental health during the COVID-19 pandemic among U.S. children

2:25 pm - 2:35 pm (Vancouver, Canada, Thursday, October 14, 2021)

Ashleigh M. Johnson¹, Pooja S. Tandon^{1,2}, Chuan Zhou^{1,2}, Erin Schoenfelder Gonzalez^{1,2}, Emily Kroshus^{1,2}

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Background: Children's physical activity (PA) and screen time (ST) were likely suboptimal during the COVID-19 pandemic, which may influence mental health. **Purpose:** To describe the relationship between PA and ST with mental health among U.S. children during COVID-19. **Methods:** Cross-sectional, nationally representative survey conducted October-November 2020 among 500 parents of 6 to 10-year-olds and 500 parent-child dyads with 11 to 17-year-olds. Child PA, ST, and mental health was parent-report for ages 6-10, self-report for ages 11-17. COVID-19 stressors were parent-report. Associations between mental health, COVID-19 stressors, PA, and ST were examined using weighted linear regression. **Results:** Among 1000 children (mean [SD] age, 10.83 [3.51] years, 47.43% female), 20.88% reported meeting PA guidelines. Children reported 3.89 [2.23] days/week with ≥ 60 minutes of PA and 4.41 [2.53] hours/day of ST. COVID-19 impact was significantly associated with higher total difficulties, externalizing, and internalizing symptoms (all $p<0.001$). Accounting for COVID-19 stressors, for younger children, engaging in 7 (versus 0) days/week of PA was associated with lower externalizing symptoms ($\beta = -1.95$, $p<0.001$). For older children, engaging in any days of PA (versus 0) was associated with lower total difficulties, externalizing, and internalizing symptoms (all $p<0.001$). More ST was correlated with higher total difficulties, externalizing, and internalizing symptoms (all $p<0.05$). **Conclusions:** Children are engaging in suboptimal amounts of PA and ST. More PA and less ST are associated with better mental health for children, even when accounting for COVID-19 stressors. **Funding:** Study funded by Seattle Children's Research Institute, Research Integration Hub.

Keywords: Screen Time, Mental Health, COVID-19

Oral Presentation C8.6 Do all "Canadians" have equal access to outdoor physical activity during the COVID-19 pandemic?

2:35 pm - 2:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Immigrants may face different challenges in participating in social and health-related activities, including physical activity (PA), during the COVID-19 pandemic, particularly with the upsurge of violence towards immigrant and racialized communities. **Purpose:** To examine the associations between social class and outdoor and indoor PA, with the immigrant status as the key variable. **Methods:** National-level, cross-sectional data from 4,052 Canadians aged 25+ yrs (50.7% women) who participated in the Canadian Perspective Survey Series—Impacts of COVID-19 were used. Exposures included immigrant status, educational attainment, employment status, and financial impacts due to COVID-19. Outcomes were outdoor/indoor PA. Covariates included sex, age, household size, presence of a child <18 yrs, and marital status. Decision tree analyses and logistic regressions were used. **Results:** Regardless of education and employment, immigrants to Canada were far less likely to participate in outdoor PA than their Canadian counterparts during COVID-19 (72% vs 52%). Furthermore, immigrant status appears to be compounded with no employment status due to COVID-19 in participating in outdoor PA. For both outdoor and indoor PA, no post-secondary education appears to serve as a deterrent among Canadian-born individuals only. **Conclusions:** This study highlights the complexity of how social class variables intersect and manifest in PA participation. Disparities may exist in accessing outdoor spaces for PA across different social class groups during COVID-19, particularly among those who immigrated. Within the Canadian-born population group, disparities existed by educational attainment. Future research should investigate ways that could equitably promote access to PA during and beyond the pandemic era. **Funding:** The author(s) received no financial support for the research, authorship, and/or publication of this work.

Keywords: Intersectionality, Social Determinants of Health, Anti-Immigrant, Exercise, SARS-Cov-2

Oral Presentation C8.7 Impact of COVID-19 on physical activity behaviour and cognitions of Canadian adolescents: A longitudinal analysis

2:45 pm - 2:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: To prevent the spread of COVID-19, Canada imposed restrictions requiring physical distancing, limiting social gatherings, and closing recreational amenities, likely leading to significant changes in the daily lives of many. While some evidence

suggests that COVID-19 has had a negative impact on youth physical activity (PA) behaviour, less research has examined how COVID-19 has impacted PA cognitions. **Purpose:** To investigate the impact of COVID-19 restrictions on adolescents' PA behaviour and PA cognitions based on the Multi-Process Action Control (M-PAC) framework. **Methods:** Our sample included late adolescents recruited from a large school board in Southern Ontario (N=1238, $M_{age}=15.91\pm 0.50$ years, 53% female) who completed data collection in the Fall prior to and during the COVID-19 pandemic as part of the ADAPT study. Participants completed questionnaires that included self-reported measures of moderate-to-vigorous PA and variables derived from the M-PAC model. Mixed effects models were conducted with individuals nested within schools to examine changes in PA behaviour and cognitions. **Results:** After adjusting for potential cofounders, results demonstrated a significant decline in PA (Estimate=-56.62, $p<.01$). Correspondingly, there were significant declines (all $p's<.01$) for most PA cognitions examined, including intentions (Estimate=-.35), perceived opportunity (Estimate=-.16), identity (Estimate=-.19), and habit (Estimate=-.20), whereas increases in action planning (Estimate=.14) and coping planning (Estimate=.22) were observed. **Conclusions:** Findings suggest that PA behaviour and cognitions of Canadian adolescents were impacted by COVID-19 restrictions. These PA cognitions may be targets for intervention during major life disruptions and may have broader implications during the transition into emerging adulthood. **Funding:** The ADAPT study is funded by an Insight Grant from the Social Sciences and Humanities Research Council of Canada.

Keywords: Physical Activity, Adolescence, M-PAC, COVID-19

Oral Presentation C8.8 Exploring QOL while working from home in the US by age, gender and race

2:55 pm - 3:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

Michelle Lee D'Abundo¹, Paul Franco¹, Deborah Deluca¹

¹Seton Hall University

Background: Working from home is becoming more common, but little is known about quality of life (QOL) and the remote working experience. QOL is frequently applied to understanding the well-being of individuals, but there is little agreement about how to define and measure QOL particularly in terms of the home-workplace. **Purpose:** The purpose of this study was to explore QOL while working from home in the US participants by age, gender and race. **Methods:** The comments of 169 online US respondents to the Quality of Life Home Workplace Questionnaire (QOLHWQ) were analyzed illustrating contributing factors associated with QOL while working from home. A qualitative study using the Quality of Life Home Workplace Questionnaire (QOLHWQ) was conducted online via SurveyMonkey® between July-September 2020. The instrument consisted of demographic items and 11 open-ended questions including the following, which is the focus of this abstract: Please describe your current quality of life and how it relates to working from home. Data were exported into Excel for data analysis including preparing data, open-coding, sorting codes, and organizing themes. **Results:** Preliminary coding indicated more participants (68) felt working from home increased QOL, 39 described decreased QOL, 27 cited pro/cons, 7 wrote fine, basic, or ok, 6 reported QOL was the same, 1 stated no relationship, and 20 comments were categorized as other. There were a variety of reasons for increased QOL (more time, less stress, decreased commute) and decreased QOL was primarily due to a lack of socializing. After coding is refined, the associations of age, gender, and race with QOL while working from home will be presented. **Conclusions:** If the trend of more people working from home continues, home-workplace QOL will likely play an essential role in health promotion in the US. Understanding what promotes QOL at home could aid in creating evidenced-based programs that could optimize the home-workplace for both employees and employers. For example, if the issue of socializing could be addressed for people working from home, it seems that QOL could be improved. Furthermore, understanding the relationship between age, gender, and race could further inform tailoring of home-workplace initiatives to create more effective measurement and programming. **Funding:** N/A.

Keywords: Quality of Life, Working From Home, Qualitative, Age, Gender, Race

Oral Presentations Session C9

Oral Presentation C9.1 Longitudinal associations between infant tummy time and development

1:45 pm - 1:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: National and international guidelines recommend tummy time as a form of physical activity for infants who are not yet mobile but evidence gaps exist. **Purpose:** Examine the longitudinal associations of tummy time with development and the acquisition of gross motor milestones in the first 18 months of life. **Methods:** Participants were 411 parents of infants from the Early Movers project in Edmonton, Canada. Tummy time was measured using a questionnaire and the Ages & Stages Questionnaire (ASQ-3) developmental screening tool was administered at 2, 4, and 6 months. In a subsample (n=127), tummy time was measured using a time-use diary at the same time points and gross motor development was assessed using the Alberta Infant Motor Scale (AIMS) at 6 months. Parents reported when six major gross motor milestones were acquired according to World Health Organization criteria. Linear mixed models were conducted. **Results:** Higher questionnaire and time-use diary measures of tummy time overtime were significantly associated with higher ASQ-3 and AIMS scores as well as earlier acquisition of crawling, independent standing and walking milestones. Higher tummy time, as measured by the questionnaire, was also significantly associated with better personal-social development and earlier acquisition of independent sitting and assisted standing and walking milestones. **Conclusions:** Tummy time in the first 6 months of life was consistently associated with more advanced gross motor development. **Funding:** Canadian Institutes of Health Research, Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute, and the University of Alberta.

Keywords: Infant, Tummy Time, Development

Oral Presentation C9.2 Demographic correlates of movement behaviours in infants

1:55 pm - 2:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Demographic correlates of movement behaviours in infants are unclear. **Purpose:** Examine the longitudinal associations between demographic correlates and movement behaviours (i.e., tummy time, restrained time, reading time, screen time, sleep time) in infants. **Methods:** Participants were 411 parents of infants from the Early Movers project in Edmonton, Canada. Movement behaviours, infant and parental age, and non-parental care time were assessed using a parental questionnaire at 2, 4, and 6 months of age. Other infant and parental demographic variables were assessed at 2 months of age. Linear and generalized linear mixed models were conducted. **Results:** Infant age (days) or age² was positively with tummy time, reading time, and screen time as well as negatively associated with sleep time. Caucasian infants and those with older parents had less tummy time and an increased likelihood of having reading time. Infants of the most educated parents also had lower tummy time. Higher parent education and more siblings were associated with no screen time and longer sleep in infants. Infants with immigrant parent(s) were less likely to have reading time. No associations were found for infant sex, non-parental care, and parental marital status. **Conclusion:** Movement behaviours changed throughout infancy and no single demographic group had healthy patterns for all movement behaviours. Therefore, a healthy balance of movement behaviours should be promoted in all infants. **Funding:** Canadian Institutes of Health Research, Stollery Children's Hospital Foundation through the Women and Children's Health Research Institute, and the University of Alberta.

Keywords: Infant, Correlates, Movement Behaviours

Oral Presentation C9.3 Examining differences in achievement of physical activity best practices between urban and rural child care facilities by age

2:05 pm - 2:15 pm (Vancouver, Canada, Thursday, October 14, 2021)

Danae Dinkel¹, John P. Rech¹, Yage Guo², Matthew Bice³, Emily Hulse⁴, Donnia Behrends⁵, Christina Burger⁶, Dipti Dev⁷

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Background: The Nutrition and Physical activity Self-Assessment in Child Care (Go NAP SACC) is an evidence-based intervention developed to positively impact childhood obesity in early childhood education (ECE) facilities. One focus of Go NAP SACC is the development of physical activity best practices. However, little research has examined differences in achievement of best practices based on age of child and geographic location. **Purpose:** To examine differences in the achievement of physical activity best practices between urban and rural childcare facilities by age-specific recommendations (infants, toddlers, and preschoolers) and in the overall physical activity environment. Urban (n=207) and rural (n=218) ECE facilities completed the Go NAP SACC process. Scores of the post intervention self-assessment were used for comparison. Data were analyzed using an ANCOVA. **Results:** A majority of facilities reported exceeding best practices (79.5%). Of the 45 items assessed, significant differences were found for 18 best practices with urban facilities outscoring their rural counterparts on 17 of these items. A comparison by age found that urban facilities reported higher achievement of best practices among infants (60%) in comparison to toddlers (40%) or preschoolers (30%). **Discussion:** Urban ECE facilities scored significantly higher than their rural counterparts on 40% of the items assessed. Thus, there is a need to develop and identify relevant resources for continued improvement of best practices based on geographical location. Future studies should continue to explore the rural-urban context of physical activity practices across the early childhood age groups to ensure healthy physical development of children. **Funding:** This project was supported by the Cooperative Agreement Number NU58DP004819, funded by the Centers for Disease Control and Prevention. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention or the Department of Health and Human Services. This work was also supported by a Nebraska Department of Health and Human Services Child Care and Development Fund, USDA Nebraska Team Nutrition, and a Title V Maternal and Child Health Block Grant.

Keywords: Physical Activity, Rural, Early Childhood, Child Care

Oral Presentation C9.4 Are preschoolers most active during the first ten minutes of outdoor play at childcare?

2:15 pm - 2:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

Brianne A. Buijns¹, Leigh M. Vanderloo¹, Brian W. Timmons², Patricia Tucker¹

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Background: Moderate-to-vigorous physical activity (MVPA) provides preschoolers (2.5-5y) with many health benefits, and at childcare time spent this behaviour is primarily accrued outdoors. **Purpose:** The purpose of this cross-sectional analysis of the Supporting Physical Activity in the Childcare Environment (SPACE) study was to examine the influence of varying outdoor play schedules (2 x 60-minute versus 4 x 30-minute sessions) on preschoolers' activity levels outdoors. **Methods:** Preschoolers wore an Actical accelerometer for 5 days during childcare for the final week of the SPACE intervention; outdoor times were logged by staff.

Separate linear mixed effects models were performed to assess the effect of the SPACE intervention on preschoolers' outdoor physical activity (total, MVPA) and sedentary time, with sex entered as an interaction effect. **Results:** Preschoolers ($n = 292$) were significantly more active within the first 10 minutes of outdoor play compared with remaining time ($p < .0083$). Across total outdoor time, preschoolers in the experimental group were significantly less sedentary than those in the control group ($p < .017$), and boys and girls in the experimental group engaged in greater MVPA than their counterparts in the control group ($p < .017$). **Conclusions:** Findings provide support for scheduling shorter, more frequent outdoor play periods to increase physical activity and decrease sedentary time among preschoolers. **Funding:** Canadian Institutes of Health Research.

Keywords: Childcare, Preschoolers, Physical Activity, Sedentary Behaviour

Oral Presentation C9.5 Implementation adherence and perspectives of the Childcare Physical Activity (PLAY) Policy

2:25 pm - 2:35 pm (Vancouver, Canada, Thursday, October 14, 2021)

Monika Szpunar¹, Molly Driediger², Andrew M. Johnson^{1,3}, Leigh M. Vanderloo^{1,4}, Shauna M. Burke^{1,3}, Jennifer D. Irwin^{1,3}, Jacob Shelley^{1,3,5}, Brian W. Timmons⁶, Patricia Tucker^{1,7}

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Purpose: The importance of routine, physical activity on healthy development during the early years is widely acknowledged. The purpose of this pilot study was to conduct a process evaluation exploring Early Childhood Educators' (ECEs') perspectives of the feasibility and appropriateness of an evidence-informed, 8-item institutional-level policy document targeting children's physical activity, outdoor play, and sedentary behavior. **Methods:** A cluster, randomized controlled trial with 9 childcare centres in London, Ontario was conducted. Centres in the intervention condition ($n = 5$) implemented the evidence-based policy for 8 weeks. Intervention group ECEs ($n = 22$) recorded their daily compliance with the written policy in implementation logs for the duration of the intervention. Additionally, program evaluation surveys ($n = 21$) and interviews ($n = 10$) were completed post-intervention to assess barriers/facilitators, feasibility, enjoyment, and likelihood of future implementation. Descriptive statistics and thematic analysis were conducted. **Results:** ECEs perceived the PLAY intervention to be both enjoyable and effective at increasing preschoolers' physical activity. Adherence to policy items ranged from 16.5% (for delivery of shorter, more frequent outdoor periods) to 85.9% (for delivery of unstructured/child-directed play). ECEs reported their likelihood to continue implementing policy components, excluding frequent outdoor periods (0 = not at all likely to 5 = extremely likely; $M = 2.19$; $SD = 1.21$). Results from the program evaluation survey showed ECEs found the policy to be appropriate for implementation in childcare settings. Barriers to implementing the policy included extreme weather, difficulty with transitions, and lack of physical activity-related training. Providing verbal prompts and engaging in activity alongside children were noteworthy solutions. **Conclusion:** The results of this study demonstrate the feasibility of a physical activity and sedentary time policy from an ECE lens. Findings from this process evaluation indicate that ECEs found the policy feasible for implementing in centre-based childcare. Additional investigation is needed to explore how such a policy can be modified for future use.

Keywords: Children, Physical Activity, Policy, Childcare, Early Childhood Educators

Oral Presentation C9.6 How does the outdoor play space afford aspects of physical literacy development?

2:35 pm - 2:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

Nila Joshi^{1,2,3}, Daniel Rainham^{1,2,3}, Becky Spencer^{1,2,3}, Joan Turner⁴, Son Truong^{1,2,3}, Michelle Stone^{1,2,3}

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Background: Unstructured play is essential to children's health and development and affords them the opportunity to develop physical literacy (PL): the motivation, confidence, physical competence, knowledge and understanding to be active for life. **Purpose:** The purpose of this project is to explore how the outdoor play space with loose parts (LP) (e.g. wood, crates, buckets) affords aspects of PL development in children attending before and after school programs in Nova Scotia, Canada. **Methods:** Using a quasi-experimental, multi methods design, LP will be integrated in an intervention site with a control site set as a comparison. Children's PL will be captured through the process of behavioural mapping (BM). Using BM, children's fundamental movement skills and physical activity behaviour will be observed and recorded, comparing the observations pre-post the implementation of the LP intervention, and to the control site. At the end of the intervention, go-along interviews will be conducted with children at the intervention site to capture the affective components of PL. **Anticipated Results:** Preliminary findings from our previous work (PLEY project) demonstrates that outdoor LP play diversifies children's movements. Similar findings are expected for this project. **Conclusions:** To date, aspects of PL in the context of outdoor LP play have not been explored using BM. This project will be a critical step to understanding how we can support quality outdoor play experiences for children while optimizing their health and wellness. **Funding:** This project is funded by Research Nova Scotia.

Keywords: Children, Physical Literacy, Outdoor Play, Behavioural Mapping

Oral Presentation C9.7 Building healthy schools through technology-enabled citizen science: A Participatory Action Model in schools from Bogotá, Colombia

2:45 pm - 2:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: The physical and social environment of school settings are important for health promotion among children and adolescents. Efforts to create supportive environments at the school level can benefit from including community engagement and empowerment processes to advocate for health promotion. The *Our Voice* model presents a unique opportunity for Latin American students to improve their school environments. **Purpose:** The objective of this study was to engage and empower students from five schools in Bogotá, Colombia to use the *Our Voice* model to assess and seek to improve their local school environments. **Methods:** This study employed *Our Voice*'s 'citizen science by the people' method and a mobile application for data collection. The *Our Voice* method included the following four phases: 1) Design, planning and recruitment; 2) Data collection; 3) Community meetings for thematic analysis, priority setting and initial design of feasible solutions; and 4) Community meetings with relevant decision-makers to advocate for specific and realistic changes. **Results:** 39 children and adolescents were enrolled as citizen scientists and were trained to: 1) use mobile-based technologies to collect data about key factors from the physical and social environments that influence the engagement in healthy behaviors at their schools; 2) analyze their information, establish priorities, and collectively identify potential solutions; 3) make their voices heard by relevant policymakers at the school level; and 4) establish commitments and facilitate actions to improve the physical and social environments to promote health at schools. The students identified and advocated for safer physical activity-supportive environments and healthier food and drinks availability. **Conclusions:** This study allowed children and adolescent citizen scientists to make their voices heard by policymakers and empowered them as agents of change in the process of building healthier schools. **Funding:** This work was supported by the Colombian Administrative Department of Science, Technology and Innovation-Colciencias [grant numbers 726-2016 to S.A.G, M.A.R., C.T.] and partially supported by CRDF Global agreement OISE-20-66868-, and by the Robert Wood Johnson Foundation Grant ID#7334 (awarded to A.C.K.).

Keywords: Citizen Science, School, Healthy Habits, Environment, Participatory Action Model

Oral Presentation C9.8 A whole-school approach to primary school physical activity: The PESSPA toolkit

2:55 pm - 3:05 pm (Vancouver, Canada, Thursday, October 14, 2021)
Gareth Jones¹, Stephen Betts², Adam Fuller³, Emma Banks⁴, Sarah Willaims¹

¹Sheffield Hallam University, ²Learn Sheffield, ³Archers School Sport Partnership, ⁴Sheffield City Council

Background: The link between physical activity (PA) and cognitive function, behaviour, academic achievement and wellbeing in children is strong. Data, however, suggests that children and young people do not meet PA guidelines. **Purpose:** To gain a school's perspective on the implications and utility of a whole-school approach to physical activity in a primary school setting. **Methods:** The PESSPA (Physical Education, School Sport, Physical Activity) toolkit was designed by primary school professionals and researchers to demonstrate the importance and best practice for PESSPA. A qualitative design (interviews) was utilised with primary school staff to understand the school PA culture and initial impressions of a whole-school approach to PA, PESSPA toolkit. Data were analysed thematically. Participants ($N = 13$) were primary school PE leads ($n = 10$) and senior leadership team members ($n = 3$). Interviews utilised face-to-face and telephone methods, followed a semi-structured interview schedule, and averaged 41.76 minutes in length. **Results:** Analysis revealed that schools saw the importance of an active school, highlighted both facilitators and barriers to supporting child PA, and evaluated the PESSPA toolkit positively. Overarching themes and implications of a whole-school approach to PA will be discussed. **Conclusions:** The PESSPA toolkit was well received by primary school staff, highlighting the utility of a whole-school approach to support a positive PA structure at school. The next stage of the project includes investigation of the long-term tool impact on primary school PESSPA provision. **Funding:** Local funding: National Centre for Sport and Exercise Medicine.

Keywords: Physical Activity, Children and Young People, Whole-School Approach, Physical Education, School Sport

Oral Presentations Session C10

Oral Presentation C10.1 Prospective cohort study of pre- and post-diagnosis physical activity and Endometrial Cancer survival

1:45 pm - 1:55 pm (Vancouver, Canada, Thursday, October 14, 2021)
Christine M. Friedenreich^{1,2,3}, Linda S. Cook⁴, Qinggang Wang¹, Renee Kokts-Porietis^{1,3}, Jessica McNeil¹, Charlotte Ryder-Burbidge¹, Kerry S. Courneya⁵

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Background: Physical activity (PA) improves survival outcomes for several cancer sites, but few studies have examined the relationship with endometrial cancer (EC). **Purpose:** To evaluate associations between overall and disease-free survival with pre- and post-diagnosis PA by domain, intensity and dose (metabolic-equivalent task [MET]-hours/week/year). **Methods:** A prospective cohort study was conducted in Alberta of 425 women diagnosed with histologically-confirmed invasive EC between 2002-6 and followed to 2019. The interviewer-administered Lifetime Total Physical Activity Questionnaire recorded pre-diagnosis and post-diagnosis PA (~3.5 years after diagnosis). The association between PA and overall and disease-free survival was assessed with

Cox-proportional hazard models adjusted for age, stage, grade, treatments, body mass index, menopausal status, hormone therapy use, family history, co-morbidities. **Results:** Median follow-up time was 14.5 years, during which 60 overall deaths and 80 EC recurrences/progressions or deaths occurred. Greater pre-diagnosis recreational PA was associated with improved disease-free survival (>14 vs ≤ 8 MET-hours/week/year; HR=0.54; 95% CI: 0.30-0.96; $P_{\text{trend}}=0.04$) and overall survival (HR=0.56; 95% CI: 0.29-1.07; $P_{\text{trend}}=0.06$). Post-diagnosis recreational PA was strongly associated with improved disease-free and overall survival (>13 vs ≤ 5 MET-hours/week/year; HR = 0.33, 95% CI: 0.17-0.64, $P_{\text{trend}}=0.001$; HR = 0.33, 95% CI: 0.15-0.75, $P_{\text{trend}}=0.007$). When participants maintained their recreational PA at the highest levels from pre- to post-diagnosis, they had high overall (HR = 0.43, 95% CI: 0.20-0.94) and disease-free survival (HR = 0.35, 95% CI: 0.18-0.69). **Conclusions:** Recreational PA may help to improve survival outcomes in EC survivors. **Funding:** Canadian Cancer Society Grants.

Keywords: Endometrial Cancer, Survival, Mortality, Physical Activity, Cohort Study

Oral Presentation C10.2 Sex-differences in physical activity levels, knowledge, outcome expectations and task self-efficacy in atrial fibrillation patients

1:55 pm - 2:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Canadian physical activity (PA) guidelines recommend moderate-to-vigorous PA (MVPA, ≥ 150 min/wk) and strength training (≥ 2 d/wk). The PA levels, knowledge, outcome expectations (e.g. walking will make me feel better) and task self-efficacy (i.e. confidence in doing PA) of females and males with atrial fibrillation (AF), a burgeoning patient population, are unknown. **Purpose:** To examine sex-differences in MVPA levels, % of AF patients meeting the PA guidelines; and their associations with PA knowledge, outcome expectations and task self-efficacy. **Methods:** In this observational cohort study AF patients completed questionnaires including the Short-Form International Physical Activity Questionnaire. Responses were compared between sexes with Mann-Whitney-U and chi-square tests. Spearman correlations were used for sex-specific associations. **Results:** Of 621 patients, 33% were female. No sex-differences were observed in MVPA (median [95% CI], F:60 [0, 142], M:120 [90, 155] min/wk, $p=0.132$). Many did not meet the MVPA (F:57%, M:54%, $p=0.430$) or strength training (F:84%, M:75%, $p=0.018$) targets. Few patients knew the MVPA (F:14%, M:13%, $p=0.230$) or strength training (F:40%, M:36%, $p=0.151$) guidelines. Some patients (F:45%, M:35%, $p=0.066$) felt PA was unsafe if their heart rate became too fast, which was negatively associated with MVPA in males ($p=-0.155$, $p=0.006$), not females ($p=0.052$). More females did not feel confident doing moderate PA (F:33%, M:21%, $p=0.011$) or strength training (F:45%, M:32%, $p=0.036$), which were significantly associated with MVPA (F: $p=0.464$, M: $p=0.426$) and strength training (F: $p=0.507$, M: $p=0.572$). **Conclusions:** Most AF patients did not meet/know the PA guidelines; strategies to increase knowledge translation of the guidelines and patients' PA confidence are needed. **Funding:** Servier Inc, Canada.

Keywords: Physical Activity, Exercise, Atrial Fibrillation, Sex, Gender

Oral Presentation C10.3 White matter microstructure is related to aerobic fitness in treatment-resistant schizophrenia

2:05 pm - 2:15 pm (Vancouver, Canada, Thursday, October 14, 2021)

Peter Senften¹, Melissa Woodward², Adam Dvorak^{3,4}, Shannon Kolind^{1,3,5,6}, Cornelia Laule^{1,3,6,7}, Henry P. H. Lai^{8,4}, Kai L. Kaufman^{8,4}, Darren E. R. Warburton^{8,4}, Kristina Gicas⁹, David D. Kim¹⁰, Wayne Su², William Honer², Alexander Rauscher^{1,3,11}, Donna J. Lang¹

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Background: Aerobic fitness may benefit brain white matter (WM) microstructure, which is known to be adversely affected in schizophrenia. **Purpose:** To examine the relationship between aerobic fitness ($VO_{2\text{max}}$) and WM integrity in treatment-resistant schizophrenia. **Methods:** Measurements of $VO_{2\text{max}}$ and magnetic resonance imaging markers for myelin (myelin water fraction (MWF), radial diffusivity (RD), and axons (fractional anisotropy (FA), axial diffusivity (AD)) were obtained from exercise naïve volunteers ($n = 15$ =schizophrenia/schizoaffective disorder patients, $n = 10$ healthy age, sex and education matched volunteers). **Results:** MWF and FA were significantly reduced, and RD was significantly increased in the WM of patients relative to controls. Patient $VO_{2\text{max}}$ was significantly associated with MWF, FA, and RD in frontal and temporal WM ($r = 0.14 - 0.16$, $p < 0.001$). No associations between WM microstructure and $VO_{2\text{max}}$ were seen, except in the splenium of healthy volunteers ($r = 0.22$, $p = 0.02$). **Conclusion:** Abnormal WM microstructure in patients appears to be more responsive to exercise intervention in comparison to healthy volunteers, as healthy volunteers may already have optimized WM. Our results suggest that investigating ways to increase aerobic fitness in schizophrenia patients may be a low-risk intervention to improve WM tissue health in treatment-resistant schizophrenia patients. **Funding:** Grant operating funds to DJL for this study were provided by the Canadian Institutes for Health Research (Grant # 231233-BSB) and the BC Mental Health Authority Research Services.

Keywords: Aerobic Fitness, Schizophrenia, White Matter, Myelin Water Fraction, Fractional Anisotropy

Oral Presentation C10.4: The effect of interrupting prolonged sitting with frequent bouts of light-intensity standing exercises

on blood pressure and postprandial glucose response in stroke survivors: A dose-escalation trial

2:15 pm - 2:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

Paul Mackie^{1,2}, Gary Crowfoot^{1,2,3}, Prajwal Gyawali^{4,5}, Heidi Janssen^{1,2,6}, Elizabeth Holliday⁷, David W. Dunstan^{8,9}, Coralie English^{1,2}¹School of Health Sciences and Priority Research Centre for Stroke and Brain Injury, University of Newcastle, Newcastle, Australia,²Centre for Research Excellence in Stroke Recovery and Rehabilitation, Florey Institute of Neuroscience, Melbourne, Australia, ³School of Nursing and Midwifery and Priority Research Centre for Stroke and Brain Injury, University of Newcastle, Newcastle, Australia,⁴School of Biomedical Science and Pharmacy and Priority Research Centre for Stroke and Brain Injury, University of Newcastle, Newcastle, Australia, ⁵Hunter Medical Research Institute Newcastle, Australia, ⁶Hunter Stroke Service, Hunter New England Local Health District, Newcastle, Australia, ⁷School of Medicine and Public Health University of Newcastle, Newcastle, Australia, ⁸Baker Heart and Diabetes Institute, Melbourne, Australia, ⁹Mary MacKillop Institute for Health Research, Australian Catholic University, Melbourne, Australia

Background: Interrupting prolonged sitting can acutely lower blood pressure and postprandial glucose responses in overweight adults. However, the dose-response effect in stroke survivors is unknown. **Purpose:** To investigate different doses of light-intensity standing-based exercises that interrupts prolonged sitting and i) reduces blood pressure immediately and over 24 hours, and ii) attenuates postprandial glucose response in stroke survivors. **Methods:** Within-participant, laboratory-based, dose-escalation trial. Participants completed three 8-hour conditions: prolonged sitting and two experimental conditions. Experimental conditions involved light-intensity standing-based exercises of increasing frequency ($2 \times 5 \text{ min}$ to $6 \times 5 \text{ min}$ bouts). **Results:** Twenty-nine stroke survivors (aged 66 ± 12 years) participated. Frequent bouts of standing-based exercises lowered mean systolic blood pressure following the $4 \times 5 \text{ min}$ (-2.1 mmHg [95% CI $-3.6, -0.6$]) and $6 \times 5 \text{ min}$ condition (-2.3 mmHg [95% CI $-4.2, -0.5$]) compared with prolonged sitting. Diastolic blood pressure was lowered following the $6 \times 5 \text{ min}$ condition (-1.4 mmHg [95% CI $-2.7, -0.2$]). Twenty-four-hour systolic blood pressure increased following the $2 \times 5 \text{ min}$ condition (6.9 mmHg [95% CI $3.1, 10.6$]). Postprandial glucose was attenuated following the $4 \times 5 \text{ min}$ condition (iAUC; $-1.1 \text{ mmol/L}\cdot\text{hour}$ [95% CI $-2.0, -0.1$]) compared with prolonged sitting. **Conclusion:** Interrupting prolonged sitting with more frequent bouts of standing-based exercises lowers systolic and diastolic blood pressure and postprandial glucose in stroke survivors. However, reductions in blood pressure may only be short-term and investigations on sustained effects are warranted. **Funding:** Hunter Medical Research Institute project grant (2016) and Heart Foundation Vanguard Grant (2017 - #101727).

Keywords: Sitting, Stroke, Metabolic Health, Physical Activity, Blood Pressure**Oral Presentation C10.5 Associations of genetic risk and adherence to a healthy lifestyle with incidence of Stroke and Coronary Heart Disease in individuals with Hypertension: The UK Biobank Study**

2:25 pm - 2:35 pm (Vancouver, Canada, Thursday, October 14, 2021)

Mengyao Wang¹, Shiu Lun Au Yeung¹, Shan Luo^{1,2}, Youngwon Kim^{1,3}¹School of Public Health, Li Ka Shing Faculty of Medicine, University of Hong Kong, Hong Kong, ²MRC Integrative Epidemiology Unit, Population Health Sciences Institute, University of Bristol, Bristol, UK, ³MRC Epidemiology Unit, University of Cambridge School of Clinical Medicine, UK

Background: Individuals with hypertension have increased risk of coronary heart disease (CHD) and stroke. A key prevention strategy for CHD and stroke in hypertensive individuals has been promotion of a healthy lifestyle. However, whether a healthy lifestyle acts as a potential effect modifier in the association between genetic susceptibility and risk of CHD and stroke in hypertensive individuals remains unknown. **Purpose:** This study explored the associations of genetic risk for CHD and stroke and adherence to a healthy lifestyle with incident CHD and stroke in hypertensive individuals. **Methods:** This study included 260,037 hypertensive individuals of European ancestry without CHD and stroke at baseline from UK Biobank. Each individual's genetic risk for CHD and stroke was estimated through quantification of weighted polygenic risk scores calculated based on uncorrelated 300 and 87 single nucleotide polymorphisms (SNPs), respectively. Three categories of genetic risk (low, middle and high) were generated according to the tertiles of calculated polygenic risk scores. Following an established methodology, we used 4 healthy lifestyle components (no obesity [BMI $<30 \text{ kg/m}^2$], no current smoking, regular physical activity [≥ 150 minutes/week of moderate, ≥ 75 minutes/week of vigorous physical activity or an equivalent combination of both] and a healthy diet [sufficient vegetable, fruit and fish intake, and appropriate processed and red meat intake]) to define compliance with a healthy lifestyle. Three categories of adherence to a healthy lifestyle (favorable [3-4 healthy lifestyle factors], intermediate [2 healthy factors] and unfavorable [0-1 healthy factor]) were then created. Incidence of CHD ($n=7,867$) and stroke ($n=5,031$) was defined based on death and hospital admission records accrued over a median 11.9 and 12.0 years of follow-up, respectively. Cox regression models using age as the underlying timescale were used to estimate hazard ratio (HR) for incident CHD and stroke, and multiplicative interaction between genetic risk and adherence to a healthy lifestyle. **Results:** Hypertensive individuals with high genetic risk for CHD and stroke had 107% (HR: 2.07; 95%CI: 1.95-2.19) and 28% (HR: 1.28; 95%CI: 1.20-1.37) higher hazards of CHD and stroke, respectively, compared with those with low genetic risk, after adjusting for all confounders. A favorable lifestyle was associated with 37% (HR: 0.63; 95% CI: 0.59-0.68) and 34% (HR: 0.66; 95% CI: 0.60-0.73) lower hazards of CHD and stroke, respectively, compared with an unfavorable lifestyle after adjusting for genetic risk and confounders. At all genetic risk strata, a favorable lifestyle had consistently lower hazards of CHD and stroke, compared with an unfavorable lifestyle. There was no evidence of interaction between genetic risk and adherence to a healthy lifestyle for CHD (p -value= 0.526) and stroke (p -value= 0.078). Estimates of 12-year absolute risk were lower for hypertensive individuals with high genetic risk but a favorable lifestyle (3.19% for CHD; 1.66% for stroke), compared with those with high genetic risk and an unfavorable lifestyle (6.46% for CHD; 2.50% for stroke). **Conclusions:** Hypertensive individuals who adhered to a more favorable lifestyle had reduced risk of developing CHD and stroke, regardless of their genetic susceptibility. Our study informs implementation of clinical trials aimed at promoting a healthy lifestyle for prevention of cardiovascular events through early identification of and interventions with hypertensive individuals whose genetic risk is high. **Funding:** Strengthened Start-up Funds for New Staff at The University of Hong Kong Li Ka Shing Faculty of Medicine. This research has been conducted using the UK Biobank Resource under Application Number

43528.

Keywords: Healthy Lifestyle, Genetic Risk, Hypertension, Stroke, Coronary Heart Disease, UK Biobank

Oral Presentation C10.6 Physical activity, sedentary time and cardiorespiratory fitness in patients with heart failure: Isotemporal substitution analysis

2:35 pm - 2:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Previous work has demonstrated that patients with heart failure with preserved ejection fraction (HFpEF) have low physical activity (PA) and high sedentary time (ST), which are associated with cardiorespiratory fitness (CRF). **Purpose:** To examine the effects of replacing 30 min of ST with light intensity PA (LPA) and moderate- to vigorous- intensity PA (MVPA) on CRF in patients with HFpEF. **Methods:** Ten patients with HFpEF (mean age 59.1 y, mean BMI 41.4 kg/m², 40% Black, 100% Women) underwent symptom-limited cardiopulmonary exercise testing on a treadmill. Free-living PA was objectively measured using a waist-worn ActiGraph GT9X accelerometer. Effects of replacing 30 min ST with 30 min LPA or 30 min MVPA on V₂O₂peak (L/min) were assessed via isotemporal substitution analysis before and after adjusting for age and race. **Results:** Substituting 30 min ST with 30 min of MVPA resulted in a positive trend for increased V₂O₂peak but did not reach statistical significance (unadjusted model: 1.57 L/min, $p = 0.085$; adjusted model: 1.22 L/min, $p = 0.074$). The magnitude of change in V₂O₂peak was higher when MVPA was substituted for ST rather than LPA. **Conclusions:** Results of this preliminary analysis suggest that replacing ST with MVPA has a greater effect on V₂O₂peak compared to substitution with LPA. Randomized controlled trials and studies with larger samples are needed to elucidate the effects of replacing ST with PA on CRF in this population. **Funding:** Career Development Award (19CDA34660318) from the AHA (Salvatore Carbone); NIH CTSAP (UL1TR002649) at VCU.

Keywords: Accelerometry, Isotemporal Substitution, HFpEF

Oral Presentation C10.7 A group dance intervention engaging breast cancer survivors in physical activity in a middle-income country

2:45 pm – 2:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

María Alejandra Rubio¹, Carlos M. Mejía-Arbeláez¹, María A. Wilches-Mogollon², Carolyn Finck³, Santiago Cabas¹, Oscar Rubiano⁴, Alberto Flórez⁵, José Gabriel León⁶, Lisa G. Rosas^{7,8}, Robert Haile⁹, Olga L. Sarmiento¹, Abby C. King^{7,10}

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Background: Interventions to promote physical activity (PA) among women breast cancer survivors (BCS) tailored to real-world contexts within low to middle-income countries are limited. **Purpose:** The aim of this study was to assess the uptake and effect of “My Body”, a theory-driven intervention co-created through cross-sectoral cooperation to promote PA among BCS in Bogotá, Colombia. **Methods:** We conducted a quasi-experimental pilot study employing a mixed-methods approach to assess the 8-week, 3 times/week group dance PA intervention. The effect on participants' PA levels (measured by accelerometry), motivation to engage in PA, and quality of life was evaluated using a difference-in-difference analysis. The qualitative method included semi-structured interviews thematically analyzed to evaluate the uptake. **Results:** Based on real-world setting conditions, 64 BCS were allocated on the intervention (N=31) and the control groups (N=33). In the PA arm, 84% attended $\geq 60\%$ of PA sessions, and percent of women meeting ≥ 500 metabolic equivalents/week (METs) (≥ 150 mins/week) increased from 43.7% to 75% (increase in controls=0%). PA participants significantly increased ratings of motivation (change score=0.45, vs. control -0.05; $P=0.03$), and reported improvements in perceived behavioral capabilities to be active. **Conclusions:** The dancing intervention showed promise for improving PA and should be tested in a larger crossover trial. The high attendance, behavioral changes, and successful cross-sectoral delivery indicate the potential effectivity, feasibility, and scalability of the intervention for BCS in Colombia. Culturally appropriate PA programs tailored to real-context community settings have the potential of generating behavioral changes among BCS in middle-income countries. **Funding:** National Institutes of Health [Award 5P20CA217199-02], the CRDF Global [Agreement OISE-19-66198-1].

Keywords: Breast Cancer Survivors, Physical Activity, Behavior Change Intervention, Community-Based Program, Mixed-Methods Assessment

Oral Presentation C10.8 Physical activity and chronic back disorders: A comparison between self-reported and accelerometer-measured physical activity

2:55 pm - 3:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Santander, Colombia, ³Canadian Centre For Health and Safety, University of Saskatchewan, Canada, ⁴Division of Ergonomics, School of Engineering Sciences in Chemistry, Biotechnology and Health, KTH Royal Institute of Technology, Stockholm, Sweden, ⁵Faculty of Kinesiology and Health Studies, University of Regina, Canada, ⁶School of Human Kinetics and Recreation, Memorial University, Canada, ⁷School of Rehabilitation Science, University of Saskatchewan, Canada

Background: Imprecise measurement of PA might distort estimates of the effects of regular PA on musculoskeletal health. **Purpose:** To explore the relationship between physical activity [PA] and chronic back disorders [CBD] in Canadian adults using either accelerometer-based or self-reported PA measures. **Methods:** Using cross-sectional data from Canadian adults [18-75 years] from the 2014/15 and 2016/17 Canadian Health Measures Survey [CHMS], we compared the relationship between CBD and meeting the Canadian PA guidelines of '150 min/week or more of moderate-to-vigorous PA' using both accelerometer-based and self-reported PA measures. Two models were fitted: one containing self-reported PA, and another containing accelerometer-based PA, each model adjusted for several covariates. The beta coefficients obtained were evaluated using the Z test for equality of coefficient and a newly developed bias attributable to PA measurement [BAPAM] indicator. **Results:** The percentage of participants meeting the Canadian PA guidelines was 57.3% using the self-reported and 17.0% using the accelerometer-based PA measures, respectively. Meeting the Canadian PA guidelines was not associated with CBD, whether PA was measured by an accelerometer or by self-report. The Z test [$p=0.962$], and the BAPAM indicator = 0.038 [95% CI -2.42, 2.49; $p=0.443$] showed that the coefficients of the association under study were not significantly different. **Conclusions:** A BAPAM indicator between 0 and 1 suggested a potential bias to the null hypothesis of no association; however, this bias was not statistically significant. **Funding:** This work was supported in part by the Canada Research Chairs program [#228136], the University of Saskatchewan, Canada, and the Universidad de Santander, Colombia.

Keywords: Adults, Physical Activity, Questionnaire, Accelerometry, Back Pain

Oral Presentations Session C11

Oral Presentations C11.1 Associations between screen time and cognitive development in preschoolers

1:45 pm - 1:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

Zhiguang Zhang¹, Kristi B. Adamo², Nancy Ogden³, Gary S. Goldfield⁴, Anthony D. Okely⁵, Nicholas Kuzik¹, Mitchell Crozier², Stephen Hunter¹, Madison Predy¹, Valerie Carson¹

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Background: Excessive screen time may impede cognitive development in early childhood. **Purpose:** To examine the cross-sectional associations between screen time and expressive language, as well as working memory, in preschoolers. **Methods:** Participants were 97 preschoolers (36-60 months) in Alberta and Ontario, Canada in the supporting Healthy physical Active Childcare setting (HATCH) study. The time that children spent on watching television, videos or DVDs (television time) or playing video or computer games (video game time) on a television, computer, or portable device were assessed using a parental questionnaire. Total screen time and adherence to the screen time recommendation (≤ 1 h/d) of the Canadian 24-Hour Movement Guidelines were calculated. Expressive vocabulary and working memory were assessed using the Early Years Toolbox. Due to the distribution, working memory was categorized as a binary variable based on the median score. The associations between screen time and cognitive development were examined using mixed models (expressive vocabulary) or generalized mixed models (working memory). **Results:** Preschoolers who had higher total screen time were less likely to have better working memory (OR=0.53;95%CI:0.31,0.89). Adherence to the screen time recommendation tended to be associated with better working memory (OR=3.35;95%CI:1.05,11.36), compared to non-adherence. Screen time was not associated with expressive vocabulary. **Conclusion:** Limiting total screen time to no more than one hour per day may facilitate executive function development in preschoolers. Screen time may be unrelated to expressive language development in this age group. **Funding:** Canadian Institutes of Health Research.

Keywords: Screen Use, Early Childhood, Executive Function

Oral Presentation C11.2 Prevalence and correlates of excessive recreational screen time among Colombian children and adolescents

1:55 pm - 2:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

Silvia A. González^{1,2}, Olga L. Sarmiento³, Alberto Florez⁴, Peter T. Katzmarzyk⁵, Jean-Philippe Chaput^{1,2}, Mark S. Tremblay^{1,2}

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Background: Excessive recreational screen time (RST) is associated with detrimental effects for physical, psychological and cognitive development. **Purpose:** This study aimed to describe the prevalence of RST time among Colombian preschoolers, children and adolescents and explore associated factors within a socioecological framework. **Methods:** We analyzed data from the Colombian National Survey of Nutrition 2015. The sample included 4,503 preschoolers, 5,333 school-aged children and 6,623 adolescents. Excessive RST was defined as engaging in >1 hour of RST among children under 5 years and >2 hours of RST among 5-year-olds and older. Poisson regression models with robust variance were conducted to estimate prevalence ratios and determine correlates

of excessive RST. **Results:** Fifty percent of preschoolers, 61% of school-aged children and 73% of adolescents in Colombia had excessive RST. Positive associations were observed with availability of TV in the child's bedroom, availability of video games at home, and eating while using screens. A negative association with rural area was observed for all age groups. **Conclusions:** The majority of Colombian children and adolescents have excessive RST. Younger preschoolers, older school-aged children, wealthiest children and those from urban areas should be targeted by interventions to decrease RST. These interventions should promote limiting the availability of electronic devices in children's bedrooms and not eating in front of screens. **Funding:** SAG was funded by the Government of Ontario and the University of Ottawa through the Ontario Trillium Scholarship for doctoral studies.

Keywords: Sedentary Behaviours, Surveillance, Screen Time, Children, Adolescents

Oral Presentation C11.3 Examining parent's perspectives on swimming lessons for children with autism spectrum disorders

2:15 pm - 2:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

Larissa Lobo¹, Serene Kerpan²

¹Ontario Tech University, ²Faculty of Health Sciences, Ontario Tech University

Background: Swimming is a favourable activity for many children with autism spectrum disorders (ASD) that can increase physical activity (PA); this is important because children with ASD often have lower rates of PA. However, children with ASD experience higher risk of drowning; 91% of U.S. deaths for children age 0-14 with ASD are attributed to drowning. Research indicates adapted swimming lessons can improve aquatic and social skill acquisition for children with ASD. Information is missing on the real-world efficacy of these lessons. Examining parents' beliefs and perceived outcomes is important because many children with ASD struggle with generalization and parents can provide insights into swimming lesson outcomes. **Purpose:** The purpose of this research was to examine the perspectives of parents of children with ASD regarding their child's swimming lessons. **Methods:** Through phenomenological qualitative methodology, semi-structured individual interviews were used with 12 parents. **Results:** Themes included making lessons accessible, focus on skills and safety, teach the teacher, and the impact on pride and independence. Findings suggest participation in swimming lessons can cultivate numerous positive outcomes and the skills acquired in swimming lessons may transfer beyond the swimming lesson environment. Participants also identified numerous barriers to accessing aquatic programming for children with ASD and identified many areas for program improvement. **Conclusion:** Given the increasing rates of ASD, coupled with the drowning rates for children with ASD swimming lessons should be considered a public health intervention of importance. The findings from this work may help inform swimming lessons for children with ASD.

Keywords: ASD, Swimming Lessons, Caregiver, Qualitative, Phenomenology

Oral Presentation C11.4 Characterizing physical activity in children with ADHD and comparing subjective report to actigraphy

2:15 pm - 2:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

Deirdre Wholly¹, Nguyen Tran¹, Erin Schoenfelder-Gonzalez¹, Michelle Kuhn¹, Albert Hsu¹, Cindy Ola¹, Mark Stein¹, Tyler Sasser¹, Jason Mendoza¹, Pooja Tandon¹

¹Seattle Children's Research Institute

Background: Physical activity (PA) is recommended for children with ADHD to improve symptoms and reduce risk of negative health outcomes. Many studies use subjective report of PA for convenience, but there is limited understanding of how these measures compare to objective measures in children with ADHD. **Purpose:** To characterize the PA of a sample of children with ADHD who participated in a clinical trial on behavioral parent training and compare parents' reports of children's PA to accelerometry. **Methods:** The sample includes 71 (31 female, mean age 7.9) children with ADHD who met inclusion criteria for the trial (parent-reported <5 days/week of ≥60 mins of MVPA). Children's PA was assessed by parent report and measured by hip-worn Actigraph accelerometers. **Results:** Mean MVPA was 52.9 mins/day (via accelerometers), mean days/week with ≥60 mins of MVPA was 2.72 days. 5.6% of children attained the recommended 7 days/week of ≥60 mins of MVPA. Daily MVPA did not differ by child gender, ADHD medications, or family income. For families with parent-reported PA data (n=59), report of days with ≥60 mins of MVPA (M=2.0 days/week) was different (p=0.018) from accelerometer measures. 51% of parents under-reported days/week with ≥60 mins/day of MVPA compared to accelerometer measure. **Conclusions:** Children with ADHD in this sample attained suboptimal daily MVPA, but PA was not different by gender, medication use, or family income. On average, parents' reports underestimated child PA. **Funding:** Study funded by NIH R21 and R33 Grants for the LEAP Study.

Keywords: Children, ADHD, Physical Activity, Accelerometry

Oral Presentation C11.5 Using the Delphi Method to develop content for a physical activity and sedentary behaviour e-Learning course for pre-service Early Childhood Educators

2:25 pm - 2:35 pm (Vancouver, Canada, Thursday, October 14, 2021)

Brianne A. Buijns¹, Andrew M. Johnson¹, Patricia Tucker¹

¹Faculty of Health Sciences, University of Western Ontario, London, Canada

Background: Early childhood educators (ECEs) play an important role in promoting healthy physical activity (PA) and sedentary behaviour (SB) in childcare, but have reported lacking appropriate training in this area. **Purpose:** The purpose of this Delphi study was to develop consensus on content to include in a PA and SB e-Learning course for pre-service ECEs. **Methods:** Two expert panels (PA/SB [n = 26] and ECE [n = 35]) were formed via purposeful sampling of Canadian/international researchers. PA/SB experts were asked to propose topics for the course via online survey. Topics were pooled (n = 19), and in a second survey, both expert panels rated their importance (0 = unimportant to 5 = very important). Mean ratings were ranked by panel, and then pooled to

generate an overall ranked list of content areas. Inter-panel agreement of rankings was quantified using Spearman's rho. **Results:** *Outdoor Play* was the top-rated content area ($M = 4.77 \pm .64$), while *Monitor PA and Sedentary Time within Your Classroom* scored the lowest ($M = 3.77 \pm 1.44$). Content area importance rankings showed moderate-to-strong inter-panel agreement ($r_s = 0.60$, 95% CI: 0.20 to 0.83). **Conclusions:** Providing pre-service ECEs with PA/SB training is a proactive way to ensure they prioritize healthy PA/SB in childcare. The results of this study provide a solid foundation for the development of this training – and this expert endorsement should facilitate its implementation within ECE programs. **Funding:** Social Sciences and Humanities Research Council of Canada.

Keywords: Early Childhood Education, e-Learning, Physical Activity, Sedentary Behaviour

Oral Presentation C11.6 Pre- and in-service Early Childhood Educators' knowledge, self-efficacy, and intentions following an e-learning course in physical activity and sedentary behaviour

2:35 pm - 2:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

Patricia Tucker¹, Brianne A. Buijns¹, Leigh M. Vanderloo¹, Kristi B. Adamo², Shauna M. Burke¹, Valerie Carson³, Rachel Heydon¹, Andrew M. Johnson¹, Jennifer D. Irwin¹, Patti-Jean Naylor⁴, Brian W. Timmons⁵

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Background: Early childhood educators (ECEs) are important daytime role models for young children; they program and lead physical activity (PA) and sedentary behaviour (SB) opportunities in childcare. Despite this important role, ECEs have noted receiving little PA and SB-related training during their pre-service schooling. **Purpose:** The purpose of this pilot study was to examine the influence of an e-Learning course in PA and SB on pre- and in-service ECEs' knowledge, self-efficacy, behavioural intention, and perceived behavioural control. **Methods:** A pre-post pilot study, part of the larger Training pre-service EARly CHildhood educators (TEACH) study, was conducted with pre-service ECEs recruited from three Canadian colleges, while in-service ECEs were recruited via social media. ECEs completed an online survey via Qualtrics prior to, and immediately following the completion of the e-Learning course (~5 hours). McNemar Chi-Square tests and paired samples *t*-tests were used to examine changes in ECEs' question-specific, and total knowledge scores, while Wilcoxon Signed Ranks tests were run to examine changes in self-efficacy, behavioural intention, and perceived behavioural control. **Results:** A significant increase in both pre- ($n = 32$) and in-service ($n = 121$) ECEs' knowledge from pre- to post-course completion was observed. Additionally, significant positive changes across self-efficacy, behavioural intention, and perceived behavioural control items were displayed by in-service ECEs, while pre-service ECEs exhibited significance for these tools for select items only. **Conclusions:** These findings offer preliminary evidence of the appropriateness of an e-Learning course for improving ECEs' knowledge, self-efficacy, behavioural intention, and perceived behavioural control to support physical activity and minimize sedentary time in childcare. **Funding:** Social Sciences and Humanities Research Council.

Keywords: Early Childhood Education, E-Learning, Physical Activity, Sedentary Behaviour, Childcare

Oral Presentation C11.7 Implementing movement integration in elementary schools through a job-embedded professional development intervention for teachers

2:45 pm - 2:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

Kristina Maria Sobolewski¹, Serene Kerpan¹

¹Ontario Tech University

Background: Movement integration (MI) is a method to increase school-based physical activity (PA). MI helps teachers work towards connecting and meeting diverse education outcomes by infusing PA with a variety of academic subject areas (e.g., math); thus, addressing some time constraint challenges that teachers face increasing children's PA at school. This approach to integrating PA throughout the school day supports integrative public health aligned physical education, where broad-based PA promotion is designed to extend PA opportunities in schools while supporting diverse education outcomes. Despite documented benefits in PA levels and academic achievement, implementation is low. **Purpose:** The purpose of this pilot study was to investigate the effects of a job-embedded professional development (JEPD) intervention on teachers' MI barriers and implementation. An implementation science approach was used to assess the ability of a novel teacher professional development intervention to help close to research to practice gap. **Methods:** The professional development intervention was developed and delivered through six procedures developed from The Consolidated Framework for Implementation Research and previous MI research. Mixed-methods data was used to develop the intervention and assess outcomes. The intervention was delivered over three weeks to 12 participants. **Results:** Results indicated a significant increase in teachers self-reported MI use from pre- to post-implementation ($Z = -2.138$, $p = 0.0165$, $r = 0.6$), improved confidence ($p = 0.048$), and a strong, positive correlation ($\tau_b = 0.627$, $p = 0.018$) between confidence and competence. **Conclusion:** JEPD may be an effective strategy to support teachers level behaviour change in implementing MI. **Funding:** This research was supported through a Social Sciences and Humanities Research Council of Canada Master's Program Graduate Scholarship.

Keywords: Movement Integration, Teacher Professional Development, Behaviour Change, Implementation Science

Oral Presentation C11.8 Central American parents' preferences for the development of a home-based intervention to promote healthful energy balance-related behaviors in their preschool-age children

2:55pm - 3:05pm (Vancouver, Canada, Thursday, October 14, 2021)

Elizabeth N. Diaz¹, Joanna A. Pineda¹, Qun Le², Ana Cristina Lindsay¹

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Background: Latinx children are disproportionately affected by overweight and obesity. Parents play a central role on children's development of early healthy behaviors that ultimately impact weight status. To date the majority of available childhood obesity prevention research in the United States (US) among Latinx has focused on Mexican Americans and Mexican immigrants. Central Americans from the northern triangle countries (Guatemala, El Salvador, and Honduras) represent a growing population in the US and there is a lack of research focused on Central American children. **Purpose:** To assess Central American parents' perceptions of importance, interest, and preferences (content and delivery) for the development of a home-based intervention designed to promote healthful energy balance-related behaviors (EBRBs) in their preschool-age children. **Methods:** Cross-sectional survey. **Results:** Seventy-four Central American parents, majority immigrants (59.5%) and low acculturation level (60.8%) participated. Approximately half were fathers (51.5%), and parents' mean age was 31.6 years. The majority was married (81.1%), low-educational level (< high school; 63.5%). Approximately 44% of mothers and 21% of fathers self-reported being overweight. Overall, parents perceived being physically active (PA), achieving healthy sleep (10 hours/night), and reducing consumption of unhealthy foods as the top three most important EBRBs. Moreover, all parents reported being very interested in participating in interventions designed to address these behaviors. The majority of fathers reported preference for remote delivery – text or SMS, WhatsApp, and e-mail as top choices, whereas most mothers preferred both remote delivery – text or SMS and e-mail, and in-person, interactive intervention modalities – group sessions delivered by peer-parents and community health workers (aka “promotoras”). **Conclusions:** Findings have implications for the design of culturally sensitive interventions designed to promote early EBRBs tailored to meet the specific needs of Central American families in the US. **Funding:** Research was supported in part by the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institute of Health under award number R25HD090723-02 (Student: Elizabeth N. Diaz; Mentor: Ana Cristina Lindsay) and the Beacon Student Success Fellowship, University of Massachusetts Boston (Student: Joanna A. Pineda; Mentor: Ana Cristina Lindsay).

Keywords: Central American, Immigrant, Preschool, Children, Parents, Physical Activity, Sleep

Oral Presentations Session C12

Oral Presentation C12.1 Barriers and correlates of physical activity in rural and urban Canada

1:45 pm - 1:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

Chelsea Pelletier¹, Nicole White¹, Annie Duchesne¹, Larine Sluggett¹

¹University of Northern British Columbia

Background: There is limited evidence about how social-ecological factors impacting physical activity differ based on rural-urban location or manifest as barriers to physical activity. **Purpose:** To compare barriers and correlates of physical activity between adults living in rural and urban areas of Canada and to explore interactions between socio-demographic factors and rural-urban location. **Methods:** We completed a cross-sectional analysis of the 2017 Canadian Community Health Survey Barriers to Physical Activity Rapid Response, with a final weighted sample of 24,499,462 (unweighted n=21,967). Nine barriers were classified as individual motivation-related, individual resource-related, and environmental (social and built). **Results:** Rural residents had higher odds of reporting barriers to facility access (OR=4.15 [3.58, 4.83]) and lack of social support (OR=1.17 [1.04, 1.32]) compared to urban residents. In the absence of any environmental barriers, rural residents were more likely to meet physical activity guidelines (OR=1.32 [1.10, 1.59]). Social support barriers were associated with lower odds of meeting physical activity guidelines for self-identified females and not males (OR=0.79 [0.66, 0.94]). There was no effect of location on the odds of reporting an individual resource-related variable (e.g., time, energy). **Conclusions:** Rural and urban residents were equally likely to report individual-level barriers to physical activity, however, rural residents reported increased environmental barriers. It is important to consider place and gender when characterizing barriers to physical activity. **Funding:** University of Northern British Columbia Research Data Centre.

Keywords: Rural-Urban Disparities, Physical Activity, Social-Ecological Model, Built Environment

Oral Presentation C12.2 Lessons Learned: Accelerometer and GPS data collection in rural communities

1:55 pm - 2:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

Amanda Gilbert¹, Alan Beck¹, Natalicio Serrano¹, Dixie Duncan¹, Fatemeh Naghiloo¹, Ross Brownson^{1,2}

¹Brown School at Washington University in St. Louis, ²Siteman Cancer Center at Washington University School of Medicine.

Background: Rural residents have lower levels of physical activity (PA) and higher rates of cancer than non-rural residents. Promoting PA is important for cancer prevention but requires reliable and valid measurement of PA. However, little is known about effectively collecting objective PA data in rural communities. **Purpose:** We used data from a randomized controlled trial (*Heartland Moves*), which aims to increase PA in rural Missouri to explore factors associated with successful objective PA data collection and present lessons learned. **Methods:** Baseline survey and accelerometry data was collected through *Heartland Moves* (n=368) from August 2019-February 2021. Descriptive statistics, chi-squared, and logistic regression analyses were used to explore factors associated with valid wear of objective PA devices. **Results:** Overall, 77% had valid wear-time. We found associations with valid wear-time for marital status ($\chi(5) = 16.23, p = 0.01$), living situation ($\chi(2) = 8.13, p = 0.02$), meeting self-reported PA guidelines ($\chi(1) = 4.39, p = 0.04$), and receiving SMS reminders ($\chi(1) = 22.27, p < 0.001$). Of recruited participants, 33% were consented for device wear, 69% of whom obtained valid wear-time. On average, participants with invalid wear-time had devices for 36 days, 19 days longer than participants with valid wear-time. **Conclusions:** Results support three lessons learned (importance of communication, strategies for hard-to-reach groups, and importance of adapting during data collection) for PA data collection in rural communities. **Funding:** Study funded by the National Institutes of Health and National Cancer Institute (grant

number R01CA211323-01) and Centers for Disease Control Prevention Research Center (grant number 448DP006395).

Keywords: Physical Activity, Rural, Objective Measurement, Process Evaluation

Oral Presentation C12.3 Built environment in programs promoting physical activity among youth in the U.S. and Latin America

2:05 pm - 2:15 pm (Vancouver, Canada, Thursday, October 14, 2021)

Olga L. Sarmiento¹, María Alejandra Rubio¹, Abby C. King^{2,3}, Natalicio Serrano⁴, Adriano Akira F. Hino⁵, Ruth F. Hunter⁶, Nicolas Aguilar-Farias⁷, Diana C. Parra⁸, Deborah Salvo^{4,9}, Alejandra Jáuregui⁹, Rebecca E. Lee¹⁰, Bill Kohl¹¹

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Background: To prevent obesity among Latino children and youth living in the U.S. and in Latin America, it is necessary to understand the specific context of the interplay of physical activity (PA) and the built environment (BE). **Purpose:** To contribute to advancing the research agenda of BE and PA for obesity prevention among Latino youth in the U.S. and Latin America by 1) identifying environmental indicators to inform the design of interventions and policy; 2) identifying interdisciplinary methodological approaches for the study of the complex association between BE and PA; and 3) presenting case studies of physical activity-promoting BE-programs. **Methods:** A group of U.S. and Latin American scientists collaboratively worked to propose innovative indicators of the BE, methodological approaches for the study of the complex association between BE and PA and review case studies of physical activity-promoting BE programs in both regions. **Results:** The results include identified gaps in knowledge, proposed environmental indicators (e.g., landscape, street design, parks and green space, mobility patterns, crime and safety), reviewed methodological approaches (social network analysis, citizen science methods) and case studies illustrating physical activity-promoting BE-programs (i.e., play streets, active school transport, and school setting interventions). **Conclusions:** The prevention of obesity among Latino and Latin American youth requires to advance research on BE and PA addressing context-specific priorities and exchanging side-by-side lessons learned. **Funding:** CRDF Global agreement OISE-20-66868-1.

Keywords: Built Environment, Latin American Youth, Latino Children and Adolescents, Physical Activity

Oral Presentation C12.4 Associations between neighbourhood walkability and health-related fitness in adults

2:15 pm - 2:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Improving physical fitness lowers the risk of chronic disease. Evidence suggests the neighbourhood built environment is important for physical activity however, few studies have investigated the contribution of the built environment to fitness levels. **Purpose:** To estimate associations between objectively-determined and self-reported neighbourhood walkability and overall and specific components of perceived health-related fitness (cardiorespiratory, muscular strength, and flexibility). **Methods:** We recruited a random sample of adults (n=592) from two adjacent southeast neighbourhoods and nine adjacent southwest neighbourhoods in Calgary (Canada). Participants completed an online questionnaire that captured perceived cardiorespiratory fitness (CRF), muscular strength (MSt), flexibility, moderate-to-vigorous physical activity (MVPA), strength training, and sociodemographic characteristics. Participant's perceptions of neighbourhood walkability (Physical Activity Neighborhood Environment Scale; PANES) and physical activity supportiveness of neighbourhood parks (Park Perceptions Index; PPI) were also captured. Walk Score® was linked to participant's household addresses. Covariate-adjusted linear regression estimated the associations between Walk Score®, PANES, and PPI and CRF, MSt, flexibility, and overall fitness. **Results:** The average age of participants was 46.6±14.8 years. Participants, on average, participated in at least 30-minutes of MVPA on 3.4±2.1 days/week and undertook strength training 2.0±1.8 days/week. Walk Score® was not associated with any fitness variables. The PANES was positively associated (p<.05) with CRF, MSt, flexibility and overall fitness. The PPI was positively associated (p<.05) with all fitness variables except MSt. **Conclusions:** Our findings suggest the neighborhood built environment may be important for supporting health-related fitness levels. **Funding:** Canadian Institutes of Health Research Foundations Scheme Grant (FDN-154331).

Keywords: Fitness, Walkability, Parks, Environment

Oral Presentation C12.5 ShineLA: How diverse Los Angeles communities are addressing urban safety challenges in public recreation spaces

2:25 pm - 2:35 pm (Vancouver, Canada, Thursday, October 14, 2021)

Laurel Finster¹, Celina H. Shirazipour¹, Hayden Hutchison¹, Gillian Gresham¹, Zul Surani¹, Vicki Israel², Michael A. Shull², Sarah-Jeanne Salvy¹, Robert W. Haile¹

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Background: Safe recreation spaces are essential for a community's physical, social, and mental health. Across North America, urban safety challenges (e.g. public drug use, unhoused individuals, gang activity) are significant barriers to promoting usage of recreation and parks (RAP) spaces, often limiting a neighborhood's physical activity (PA) and community engagement. **Purpose:** To explore how Los Angeles (LA) RAP centers, each serving diverse communities, promote park usage and PA programming, withstanding urban safety challenges and the city mandate to increase PA participation in the lead up to the 2028 LA Olympic and Paralympic Games. **Methods:** We conducted qualitative case studies of seven LA RAP centers, across the social gradient, interviewing two to three staff at each center. We performed a reflexive thematic analysis to explore approaches in promoting engagement, as well as compared strategies for addressing urban safety challenges based on neighborhood characteristics. **Results:** Findings highlight key strategies used by RAP centers, including (a) multisectoral partnerships (e.g. city departments, schools, local businesses, and corporate sponsorships); (b) investing in equipment to promote family involvement; (c) verbal and non-verbal understandings with individuals (e.g. gang members) who influence perceptions of safety; and (d) hosting community events. However, while some centers are finding success, others face difficulties based on location and neighborhood demographics (e.g. socioeconomic status, changing cultural climates). **Conclusions:** Best practices must be shared across communities so all may benefit from improved engagement in recreation programming, in particular as increased PA and park usage are emphasized as preparation for the 2028 LA Olympics and Paralympics begin.

Keywords: Community, Physical Activity, Population Health, Recreation, Safety

Oral Presentation C12.6 Socioeconomic differences in associations between the built environment and walking following residential relocation

2:35 pm - 2:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Socioeconomic status (SES) may modify associations between the neighborhood built environment and physical activity, however, study results are contradictory. **Purpose:** The study aims were to: 1) estimate the associations between changes in overall neighborhood walkability and individual built characteristics with changes in walking, and 2) test for effect modification by individual-level SES indicators (education and household low-income status). **Methods:** We linked two waves of data from 703 adults who had relocated neighborhood (Alberta's Tomorrow Project; 2008-2015) with neighborhood built environment data. We created a walkability index from population counts, street connectivity, and destination diversity within 400m of participant's homes. Items from the International Physical Activity Questionnaire (IPAQ) measured walking. Fixed-effects linear regression models estimated the associations between changes in walkability or individual built characteristics and changes in minutes walked per week. We also assessed whether SES modified these associations. **Results:** Percent change in walkability was positively associated with change in minutes walked per week ($b = 0.003$, 95% CI: 0.00, 0.01). There were no statistically significant associations between changes in individual built characteristics and changes in walking for the overall sample. However, relocating to a neighborhood with greater destination diversity was associated with a decrease in walking among adults from low-income households ($b = -25.53$, 95% CI: -45.61, -1.45). **Conclusions:** Our results suggest relocating to a neighborhood with greater destination diversity may negatively affect walking among socioeconomically disadvantaged populations. Further longitudinal research is needed. **Funding:** This work was supported by the Canadian Institutes of Health Research.

Keywords: Walkability, Walking

Oral Presentations Session C13

Oral Presentation C13.1 Trends and inequalities of leisure-time physical activity among 535,145 adults from six South American countries

1:45 pm - 1:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

André Oliveira Werneck¹, Luciana Barboza², Raphael Araujo³, Ellen Silva³, Danilo Rodrigues Silva⁴

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Background: The surveillance of leisure-time physical activity (LTPA) is highlighted, considering its protective association with different chronic diseases and mental disorders. **Purpose:** To explore time trends and sociodemographic inequalities of LTPA among adults from six South American countries. **Methods:** We used data from 18 nationally representative surveys from six South American countries (Argentina: 2009, 2013 and 2018; Bolivia: 2008 and 2016; Brazil: 2008, 2013, 2015 and 2019; Chile: 2003, 2009 and 2016; Colombia: 2005, 2010 and 2015; Peru: 2007, 2009 and 2011), comprising 535,145 participants (18-64 years). Data on LTPA practice (yes or not) as well as education (categorized into quintiles), gender (male or female) and age group (18-34, 35-49 or 50-64 years) were collected through self-reported questionnaires. Specific sampling weights were used in all analyzes. **Results:** In general, the prevalence of LTPA increased over the years, with the highest increases in Brazil (2008:27.2%; 95%CI:26.9-27.5 vs. 2019:42.9%; 95%CI:42.3-43.6) and Peru (2007:24.0%; 95%CI:23.0-25.0 vs. 2011:40.4%; 95%CI:39.0-

41.7). However, the highest increases were among people in the quintiles 4 and 5 of education, which consequently increased the inequalities in LTPA, and the highest increases were in Chile (Q5-Q1: 2003:16.7pp vs. 2009:31.6pp). The inequalities for gender and age group were relatively stable, with a higher practice among men and younger adults. **Conclusions:** While LTPA increased over the years, the inequalities increased or persisted. Policies for the stimulation of LTPA focused on risk groups are warranted to decrease the inequalities of LTPA practice in South American countries. **Funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. AW is supported by the São Paulo Research Foundation (FAPESP) with a PhD scholarship (FAPESP process: 2019/24124-7). RA is supported by the Coordination for the Improvement of Higher Education Personnel (CAPES) with a PhD scholarship (CAPES process: 88887.605034/2021-00).

Keywords: SAPASEN, Secular Trends, Exercise

Oral Presentation C13.2 Association between MIMS/day and metabolic syndrome risk factors: NHANES 2011-2014

1:55 pm - 2:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

Elroy J. Aguiar¹, James Pleuss², Dusty Turner³, Peixuan Zheng¹, Scott W. Ducharme⁴

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Background: The US National Health and Nutrition Examination Survey (NHANES) Physical Activity Monitor (PAM) data for 2011–2014 were recently released. Therein, physical activity was reported as a novel PAM metric known as Monitor Independent Movement Summary (MIMS) units. Currently, limited information exists regarding the relationship between daily MIMS and cardiometabolic risk factors. **Purpose:** To determine the association between MIMS/day and Metabolic Syndrome (MetS) risk factors using a nationally representative dataset for US adults aged 18-65 years. **Methods:** NHANES PAM data were collected using a tri-axial accelerometer (ActiGraph GT3X+; 80Hz, 24/7 wear-time protocol on non-dominant wrist). Valid wear-time was considered ≥ 10 h/day and ≥ 4 valid days. MetS risk factors included: waist circumference, triglycerides, HDL-C, blood pressure, fasting glucose. Simple linear regression (accounting for survey sample weights) was performed to determine the relationship between increasing number of risk factors and MIMS/day. **Results:** The analytical sample comprised $n=4578$ individuals with valid wear-time (mean \pm SD; 22.1 \pm 1.9 h/day, 6.7 \pm 0.7 days). MIMS/day was negatively associated ($p<0.001$) with increasing number of risk factors. Physical activity level decreased -557 MIMS/day (β -coefficient) for every one-unit increase in the number of risk factors. Mean [95%CI] for risk factor levels were: no risk factors (13792 [13643–14358]); 3 risk factors (11863 [11709–12312]), all 5 risk factors 10425 [10159,11771] MIMS/day. **Conclusions:** Higher MIMS/day values were associated with absence of risk factors, with a progressive decline as number of MetS risk factors increased. These MIMS/day values may be considered preliminary benchmark values associated with cardiometabolic risk for the US adult population.

Keywords: Physical Activity, Health, Metabolic Health, Accelerometer

Oral Presentation C13.3 Is the impact of adiposity on taste perceptions moderated by chronic physical exercise? An overview of the data from NHANES 2013-2014.

2:05 pm - 2:15 pm (Vancouver, Canada, Thursday, October 14, 2021)

Alexandre-Charles Gauthier¹, Johannes Frasnelli², Vicky Drapeau³, Miguel Chagnon¹, Marie-Eve Mathieu¹

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Introduction: Taste is a key sensory modulator of eating behaviour and thus energy intake. The effect of acute exercise has recently been confirmed especially regarding sweet and salty taste qualities. Physical activity is a safe and effective countermeasure to certain types of chemosensory loss, especially in older populations. Knowing that taste can be impaired with increased adiposity, it is unknown if the adoption of an active lifestyle on a regular basis can mitigate such impairments. **Methods:** Data were extracted from NHANES 2013-2014 database. Perception of salt and bitter taste for Tongue Tip Test and Whole Mouth Test, physical activity levels over an 8-9-day period and adiposity were analyzed. Moderation analyses were used to study the impact of adiposity on taste perceptions, with physical activity level as the moderator. **Results:** The 197 participants (130 males) included in this project had a mean \pm standard deviation age of 49.1 \pm 5.2 years, a mean body fat percentage of 31.7 \pm 7.6% and mean daily physical activity levels of 11 084 \pm 3531 MIMS. The positive association between adiposity and both bitter Tongue Tip Test and overall result (salt+bitter) of Tongue Tip Test were moderated by the adoption of an active lifestyle, with better taste scores observed in individuals achieving higher physical activity levels. When moderation analysis were stratified for gender, the effect of physical activity was no longer significant. **Perspectives:** This study is the first to evaluate the influence of an active lifestyle to preserve some taste perceptions across a wide range of adiposity levels. While differences in taste can be observed regarding body fat percentage, physical activity moderate that relation only when men and women are analysed together.

Keywords: Exercise, Physical Activity, Taste Perceptions, Adiposity, Chemosensory

Oral Presentation C13.4 Standing time with and without ambulation and mortality over 6 years of follow-up: the WHI OPACH Study

2:15 pm - 2:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Previous studies have shown that self-reported time spent standing is associated with reduced risk of mortality. No previous studies have examined this association using objectively measured standing. **Purpose:** To study the longitudinal relationship between objectively measured standing with and without ambulation and all-cause mortality among older women. **Methods:** This was a prospective cohort study of 5,878 older (median age=80 years), racially diverse, community-dwelling women in the Objective Physical Activity and Cardiovascular Health Study. This study used a valid machine learning algorithm to categorize up to 7 days of ActiGraph GT3X+ accelerometer data into time spent standing with and without ambulation. (1) Multivariable Cox proportional hazards models estimated mortality risk overall and effect modification by age, BMI, MVPA, sedentary time, physical functioning, and race-ethnicity. **Results:** There were 691 deaths in 26,649 person-years of follow-up through March 31, 2018. In fully adjusted models, mortality risk was lower among those with more standing (quartile (Q) 4 vs. Q1 HR=0.63; 95% CI=0.49-0.81, p-trend=0.003) and more standing with ambulation (Q4 vs. Q1 HR=0.50; 95% CI=0.35-0.71, p-trend<0.001). Associations of standing with ambulation and mortality were also stronger only among women with above-median sedentary time (HR=0.51; 95% CI=0.38-0.68) compared to women with below-median sedentary time (HR=0.80; 95% CI=0.59-1.07; p-interaction=0.02). **Conclusions:** Our results suggest that greater time spent standing with or without ambulation is associated with lower risk of mortality among older women. Older women can be encouraged to increase their movement at this end of spectrum. Standing, specifically for older adults, is a safe and feasible behavior that can contribute to a healthy lifestyle and should be promoted as an exercise target. **Funding:** This work was supported by The National Heart, Lung, and Blood Institute provided funding for the OPACH study (grant number RO1 HL105065 to AZL). Funding also came from training grants provided by the National Institutes of Health (grant numbers T32HL079891-11 and TL1TR001443 to JB). The Women's Health Initiative program was funded by the National Heart, Lung, and Blood Institute, National Institutes of Health, US Department of Health and Human Services (contract numbers HHSN268201600018C, HHSN268201600001C, HHSN268201600002C, HHSN268201600003C, and HHSN268201600004C).

Keywords: Epidemiology, Sedentary Behavior, Physical Activity, Accelerometry, Machine Learning

Oral Presentation C13.5 Sex, sexual orientation, and body dissatisfaction: Results from the Canadian Community Health Survey 2017-2018

2:25 pm - 2:35 pm (Vancouver, Canada, Thursday, October 14, 2021)

Mikyung Lee¹, Eun-Young Lee^{1,2}

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Background: Sex differences in body dissatisfaction is well-documented. However, sexual orientation is seldom considered despite its potential influence on body dissatisfaction. **Purpose:** To examine associations between sex, sexual orientation, and body dissatisfaction among young Canadians (15-29 years). **Methods:** Self-reported, cross-sectional data from Canadian Community Health Survey 2017-2018 were used. Exposures included sex (female/male) and sexual orientation (bisexual/heterosexual/homosexual), outcome included body dissatisfaction (dissatisfied/satisfied), and covariates included body mass index and socioeconomic factors. Logistic regressions were performed, and probability survey sampling weights were applied to all analyses. **Results:** Of 4,701 included respondents, 9.9% reported body dissatisfaction, with a stark sex difference (13.7% in females and 6.3% in males). The prevalence of body dissatisfaction among individuals who identify as heterosexual, bisexual and homosexual were 9.0%, 20.1% and 20.6%, respectively. After adjusting for covariates, the odds of being very dissatisfied/dissatisfied were greater in females compared to males (OR 2.81, 95%CI 2.08-3.79). Individuals with non-heterosexual orientation (bisexual: OR 2.35, 95% CI 1.24-4.45, homosexual: OR 4.02, 95%CI 2.12-7.62) were more likely to report body dissatisfaction compared to their heterosexual counterparts. **Conclusions:** Young Canadians who identify as females or members of sexual minority reported higher body dissatisfaction than their counterparts. Given that body dissatisfaction is negatively linked to poor mental health, future health promotion efforts should address body dissatisfaction in these population groups. Furthermore, investigating body dissatisfaction among those who are at the marginalizing intersection between sex and sexual minority (e.g., female who identify as bisexual) would help better identify the population group that are most vulnerable. **Funding:** The authors received no financial support for the research, authorship, and submission of this abstract.

Keywords: Body Image, LGBTQ, Mental Health, Sexuality, Gender

Oral Presentation C13.6 Neoliberal capitalist ideology, climate culpability, physical inactivity, and NCD mortality in 124 countries

2:35 pm - 2:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

Eun-Young Lee^{1,2}, Jeffrey Masuda^{1,3}

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Background: Physical inactivity is known as a top cause of global NCD-mortality. However, physical inactivity may be as much of an outcome of broader structural factors than within individual volitional control. **Objective:** To examine the relationship between neoliberal capitalist ideology (hereafter, neoliberal ideology) and non-communicable diseases (NCD)-mortality in 124 countries, focusing on the degree to which climate culpability and physical inactivity are implicated in explaining that relationship. **Methods:** The economic freedom of the world index of the Fraser Institute (representing neoliberal ideology), CO2 emissions (metric tons/capita) from the World Bank (representing climate culpability), and the World Health Organization's age-adjusted physical inactivity and NCD-mortality data were used. Covariates included gross domestic product (GDP)/capita, the country-level prevalence of obesity, tobacco smoking, and alcohol consumption. **Results:** Neoliberal ideology was positively

associated with NCD, and such association was most pronounced in less culpable countries. Neoliberal ideology was also positively associated with NCD-mortality, after controlling for GDP, climate culpability, and tobacco smoking, regardless of different levels of physical inactivity. However, when alcohol consumption was accounted for, physical inactivity moderated the association between neoliberal ideology and NCD-mortality. **Conclusions:** Neoliberal ideology was consistently associated with NCD-mortality, regardless of physical inactivity. Also, NCD-mortality was also higher in countries that are less culpable for climate change. Our findings offer preliminary evidence-based support for a shift in thinking toward the fundamental determinants of health and calls for an upstream shift in climate change mitigation interventions to improve population health through the creation of equitable global political and economic systems. **Funding:** The authors received no financial support for the research, authorship, and/or publication of this work.

Keywords: Climate Change, Global Warming, Global Health, Non-Communicable Disease (NCD), Physical Activity

Oral Presentations Session C14

Oral Presentation C14.1 Assessing a physical activity intervention in Brazil: are we advancing on physical activity levels?

1:45 pm - 1:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

Thania Mara Teixeira Rezende Faria¹, Stephan Brenner², Andreas Deckert³, Alex Antonio Florindo⁴, Gregore Iven Mielke⁵

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Background: In Brazil, non-communicable diseases were responsible for 75.8% of deaths in 2015, with physical inactivity heavily contributing to increased morbidity and mortality. **Purpose:** To analyze the effect of a community-based physical activity program, the Health Academy Program, on the practice of leisure-time physical activity (LTPA) among the population living at the Brazilian state capitals. **Methods:** We pooled individual data from the National Surveillance for Protective and Risk Factors for Chronic Diseases (VIGITEL) between 2006 and 2016 and estimated odds ratios according to levels of exposure at city-level by using a multilevel logistic regression. Confounding variables included year of survey, sex, age and education. We further performed stratified analyses. **Results:** Total sample was composed of 572,437 individuals. In the initial model, chances of reaching sufficient LTPA was 1.20 times higher among individuals exposed since 2011. In the adjusted analyses, this same likelihood was attenuated to an odds ratio of 1.04. Odds of reaching recommended LTPA was 1.09 times higher among women exposed since 2011 as compared to control. No other statistically significant results were found. **Conclusion:** The Health Academy Program cannot substantially affect whole populations. Yet it is possible to visualize a positive influence in specific subgroups, pointing to the potential to reduce gender inequity in LTPA practice. We recommend more tailored interventions before indistinctly scaling up the program as a health promotion strategy. **Funding:** No specific financial support or funding was received to conduct the current study.

Keywords: Public Health Practice, Physical Activity, Health Promotion, Impact Evaluation

Oral Presentation C14.2 Built to Move - Shaping the future of active design through WELL v2

1:55 pm - 2:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

Vienna McLeod¹

¹International WELL Building Institute, New York, NY

Background: Physical inactivity has been a primary focus within the public health community for decades due to its' contribution to premature mortality and chronic diseases including type II diabetes, cardiovascular disease, depression, stroke, dementia and some forms of cancer. Despite the widely understood benefits of regular physical activity, the most recent global estimates from 2016 show that nearly a quarter (23%) of the adult population are physically inactive. With a rising mantra: "move more, sit less," the buildings in which we spend our time have an essential role in providing opportunities for movement and tackling the pervasive global challenges of physical inactivity. **Description:** The WELL Building Standard version 2™ pilot (WELL v2™) is a premier building certification program that focuses on the intersection of health and the built environment across ten categories: Air, Water, Nourishment, Light, Movement, Sound, Materials, Thermal Comfort, Mind and Community. To date, over 4,000 projects have committed to WELL, encompassing over 500 million square feet across 58 countries. The WELL Movement concept integrates physical activity and movement opportunities into the fabric of our buildings and communities. The 12 features in the Movement concept span ergonomic design to physical activity programs and incentives and from staircase activation to end-of-trip facilities, among others. Collectively, these strategies help to support a culture of movement through both design- and policy-based approaches. Strategies are underscored by a rigorous evidence base, evolving best practice, and emerging/innovative design and programming practices throughout the industry. **Lessons Learned:** During the pilot phase, WELL v2 underwent a 6-month public comment period that allowed the program developers to solicit feedback on the program from project teams and industry experts. During the pilot phase, developers also tracked uptake of WELL features across pilot projects. **Conclusions and Implications:** Standards and rating systems are guiding the future of our built world and how we interact with the spaces in which we spend our time. They must continue to drive innovation and deliver their impact to all people, all buildings, and all communities. In 2020, program developers addressed feedback from the public comment period and prepared to launch an update to WELL v2 that reflects lessons learned.

Oral Presentation C14.3 Mind Fit: Evaluation of a community-based wellness program for adolescents experiencing depression and/or anxiety

2:05 pm - 2:15 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Mind Fit is an 8-week, group-based, physical activity and mental wellness program for adolescents experiencing mild-to-moderate symptoms of depression and/or anxiety in British Columbia, Canada offered by the YMCA of Greater Vancouver. **Purpose:** To conduct an outcome and process evaluation to assess the short-term and 3-month effects on targeted health outcomes and examine the facilitators and barriers related to program implementation. **Methods:** The sample consisted of 184 adolescents from 10 participating sites (64% female; mean age 15 years). Surveys were administered at baseline, post-program, and 3-months. Interviews were conducted with adolescents and staff post-program. Device-based measures of physical activity were collected at select local sites. **Results:** There were significant reductions in depression and anxiety from baseline to post-program and 3-month follow-up [PHQ-9 ($p=.001$; $d=.41$), GAD-7 ($p=.000$; $d=.51$) respectively]. Descriptive statistics demonstrated a greater reduction in PHQ-9 and GAD-7 scores at high-implementation sites. There was no self-reported increase in physical activity. Eighty interviews were conducted with adolescents and staff. Facilitators included: strong motivation and staff buy-in, uniqueness of Mind Fit in the community/organization, social connections among participants, supportive instructors, and comprehensive curriculum. Barriers included: available space and equipment, staff training, and adolescent recruitment. **Conclusions:** Findings demonstrate the effectiveness of community-based, early-interventions delivered 'at-scale' to improve the mental health of teens. Identified facilitators and barriers of program implementation and success can be used to inform future development of similar interventions. **Funding:** YMCA of Greater Vancouver.

Keywords: Adolescent, Physical Activity, Mental Health, Evaluation

Oral Presentation C14.4 Potential benefits of a novel home-based exercise program for inactive older adults

2:15 pm - 2:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: The population is aging and not many older adults are reaching the physical activity guidelines. This study proposed a 3-week home exercise program using a square-stepping exercise (SSE) to help get older adults more active. **Purpose:** To employ a single case study design to determine if a home-based exercise program for inactive older adults would help overcome barriers and stimulate enablers for regular physical activity at the recommended intensity. **Methods:** Using embedded mixed methods, 10 inactive older adults over the age of 65 completed the proposed program in conjunction with follow-up interviews. Participants were deemed inactive if they took less than 10,000 steps/day over one week. A pedometer tracked their physical activity at home. **Results:** Barriers reached during the proposed program were being uncomfortable in a fitness facility and body image. The proposed program enhanced enablers such as the use of home equipment and easy access. The average total steps/day increased by 27% ($p=0.02$) and moderate-intensity was reached by 80% of participants when performing the SSE. **Conclusion:** The exercise program addressed the common barriers to exercise and could increase the physical activity level of inactive older adults especially for those intimidated by a fitness facility setting and concerned with body image. **Funding:** N/A.

Keywords: Aging, Physical Function, Physical Activity, Case Study

Oral Presentation C14.5 "STAND IF YOU CAN": A 22-week, single-blind, randomized controlled trial to evaluate gait speed in residents in a standing intervention in long term care

2:25 pm - 2:35 pm (Vancouver, Canada, Thursday, October 14, 2021)

Danielle R. Bouchard^{1,2}, Kendra Cooling^{1,3}, Molly Gallibois^{1,2}, Martin Sénéchal^{1,2}, Jeff Hebert¹, Chris McGibbon^{1,4}, Emily Read⁵, Pamela Jarret^{6,7}, Linda Caissie⁸, Grant Handrigan³

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Background: Many long-term care residents do not have the physical capacity to participate in structured exercise programs. **Purpose:** To examine the effects of a standing intervention on gait speed in a long-term care setting. **Methods:** Long-term care residents (70% female, 85 ± 7 years) were randomized 1:1 to a control or standing intervention using a cluster of four residences. Participants in the intervention attended 20-minute sessions comprising social interaction with assisted standing, five days per week for 22 weeks- for a goal of 100 minutes weekly. Participants in the control group received equal time in the same social interaction while sitting. The primary outcome was gait speed measured with the 10-metre walking test. ANCOVA adjusted for baseline gait speed was used to assess the impact of the intervention adjusted for baseline walking speed. **Results:** 96 participants completed the intervention with an average of 41.9 ± 30.3 minutes/week in the intervention group and 48.4 ± 22.8 minutes/week in the control group. ANCOVA yielded no significant between-group effect for gait speed when controlling for baseline gait speed in neither the intervention group (0.38 ± 0.14 to 0.37 ± 0.16 m/sec) nor the control group (0.44 ± 0.14 to 0.47 ± 0.22 m/sec). However, 15% of the intervention group exceeded the 0.1m/sec threshold for minimal important change. **Conclusions:** Standing for 48 minutes extra weekly did not increase gait speed in long-term care residents. Future research should examine how to increase attendance or the effects of standing on different outcomes that are relevant for residents in long-term care settings. **Funding:** Canadian Frailty Network.

Keywords: Aging, Gait Speed, Sedentary Behavior

Oral Presentation C14.6 Comparison of a fall prevention exercise program offered online and in-person for older adults

2:35 pm - 2:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: In some cases, older adults have limited access to community programs to reduce the risk of falls. Online delivery increases accessibility, but their effectiveness is unknown. **Purpose:** To compare an online and in-person delivery exercise program offered to older adults aiming to reduce risk of falls. **Methods:** The Zoomers on the Go program is a peer-led exercise program offered for 12 weeks, two times per week to adults age 50+. The program includes resistance exercise, balance, and flexibility. The in-person group completed the intervention in 2017-2018, while the online group did the intervention in 2020-2021. The primary outcomes were lower body strength (30-second chair stand), and the one leg stance balance (seconds). **Results:** A total of 100 participants (66.4 ± 7.4 years old) in the online group and 95 participants in the in-person group (67.1 ± 7.0 years old) attended 17.2 ± 5.9 and 16.2 ± 5.4 sessions (p=0.3). Participants in the in-person and online groups improved lower body strength (pre 14.4 ± 2.8, post 17.0 ± 4.16; p < 0.05 vs. pre 14.1 ± 4.3 post 17.5 ± 5.08; p < 0.05) without any difference between groups (p=0.08). While balance was significantly improved in the in-person group (pre 27.2 ± 14.7 post 32.4 ± 14.6; p < 0.01) and not in the online group pre (36.5 ± 13.7 post 38.0 ± 12.5; p < 0.03) the difference between the group was not significant. **Conclusions:** Online exercise program delivery improves physical function in older adults; however, their functional benefits appear to be similar to in-person delivery. **Funding:** Healthy Seniors Pilot Project- Public Health Agency of Canada.

Keywords: Fall Prevention, Older Adults, Online Delivery

Mini-Oral Presentations Session C1

Mini-Oral Presentation C1.1 A systematic review of the role of religious communities during the early stage of COVID-19

8:35 am - 8:37 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: One of the main avenues that has contributed to outbreaks and community transmissions of COVID-19 is religion, particularly religious communities. At the same time, various religious communities have participated in controlling COVID-19 and mitigating its negative impact on human health and well-being. **Purpose:** To summarize the roles that religious communities played during the early stage of the COVID-19 pandemic. **Methods:** Literature were searched on seven databases between February and July 2020. Exposures considered to be eligible were practices and activities related to religious communities, New Religious Movements (or cults), and/or theology. Empirical studies that report the incidence, outbreak, spread, and/or mitigation of COVID-19 in relation to religious communities, institutions, ritual practices and/or activities were included. **Results:** Out of 64 observations in 54 articles included in this review, 28.1% (n=18) was related to the detrimental role of religion such as contributing to outbreaks of COVID-19 or causing mistrust/misinformation towards science and public health guidelines among religious groups. The majority of articles (71.9%; n=46) have addressed the beneficial roles of religion where different religious communities have contributed to mitigating the infection, adapting safe approaches to practice religious practices, and helping affected people to cope with mental, social, and emotional health during this unprecedented time. **Conclusions:** Religious communities have played both detrimental and beneficial role in dealing with COVID-19 pandemic. Key policy recommendations included cancelling religious gatherings and events to mitigate transmission and collaborating with science and government bodies to develop effective mitigation and adaptation strategies to maintain public health during COVID-19 pandemic. **Funding:** The authors received no financial support for the research, authorship, and submission of this abstract.

Keywords: Coronavirus SARS-CoV-2, Pandemic, Faith Communities

Mini-Oral Presentation C1.2 Pre-pandemic stress and current mood predicts sedentary older adults' social and psychological stress about COVID-19

8:37 am - 8:39 am (Vancouver, Canada, Thursday, October 14, 2021)

Amanda M. Webber¹, Alejandra Contreras¹, Kirsten Milligan¹, Mauricio A. Garcia-Barrera¹

¹University of Victoria

Background: Physical activity (PA) benefits mental health and stress; however, older adults report a reduction in PA during the last year of the pandemic. **Purpose:** Utilizing data from the baseline assessment of a randomized control trial administering physical exercise training, this study examines the impact of mental health, and PA and stress (before and during COVID-19) on the perceived threat (PTC) and psychological impact (PIC) of COVID-19 in Canadian older adults. **Methods:** 58 older adults (M_{age}=68.7; 76% female) reporting lower levels of current PA, were assessed for self-reported stress (before and during COVID-19), depressive symptoms (Geriatric Depression Scale), anxiety (Generalized Anxiety Disorder-7), and PTC and PIC (Social Psychological Measurements of COVID-19). Multivariate multiple regression was used to evaluate the impact of anxiety,

depression, and PA and stress (before and during COVID-19) on PTC and PIC. **Results:** PA (before and during COVID) did not predict PTC or PIC. PIC was predicted by high levels of stress before COVID-19 ($b=0.35$, $p<.01$, $sr^2=.12$) and greater depressive symptoms ($b=.44$, $p<.001$, $sr^2=.16$), accounting for 31% of the variance. PTC was predicted by higher anxiety ($b=.40$, $p<.001$, $sr^2=.14$) and depressive symptoms ($b=.28$, $p=.03$, $sr^2=.06$), accounting for 28% of the variance. **Conclusions:** These results suggest that mental health and stress impact older adults' perceived threat and psychological impact of COVID-19, possibly exacerbated by poor engagement on PA. **Funding:** Study funded by the Natural Sciences and Engineering Research Council (NSERC) and an internal research grant, University of Victoria.

Keywords: Older Adults, Physical Activity, COVID-19, Stress, Anxiety, Depression

Mini-Oral Presentation C1.3 Park's attendance during covid-19 in the Metropolitan Guadalajara Area: perceptions of users and built environment

8:39 am - 8:41 am (Vancouver, Canada, Thursday, October 14, 2021)

Julissa Ortiz-Brunel¹, José Marcos Pérez-Maravilla¹, Cristina Ascanio-Sandoval¹, Rebecca E. Lee², Juan Ricardo López y Taylor¹, Edna Elvira Jáuregui-Ulloa¹

¹University of Guadalajara, ²Arizona State University

Background: Individual perception is an associate factor of the use of parks during the covid-19 pandemic. **Purpose:** To evaluate the park user's perception about their physical activity (PA) and parks' quality after a post-lockdown period in the Metropolitan Area of Guadalajara in Mexico. **Methods:** This is a descriptive and cross-sectional study. We assessed park infrastructure using the Physical Activity Resources Assessment instrument (PARA) and the park users' perception with an exploratory perception questionnaire of COVID-19 and physical activity attitudes. The sample was 11 parks (Parks Without Access Control [PWAC]: $n = 1$, Parks With Access Control [PAC]: $n = 3$, and Linear Parks [LP]: $n = 4$) from the Metropolitan Area of Guadalajara. **Results:** The PARA showed a 66.63% of the parks ($n=11$) have access points and bathrooms. According to the COVID-19 spread prevention strategies, 54.5% of parks did not have a sanitary station at the access points, and only 27.3% have temperature measurement or antibacterial gel application. More than half (66.7%) of the interviewed participants ($n=30$) perceived decreased physical activity levels during the pandemic. On the other hand, 91.2% of users considered it beneficial to be active during the pandemic; nevertheless, 83.3% did not perform physical activity at home. **Conclusions:** People show an interest in parks and their benefits during the pandemic. Therefore, it is necessary to evaluate built environment spaces for PA, like parks, and user's perceptions to create effective PA promotion strategies in secure places. **Funding:** None.

Keywords: Quality Parks, User's Perception, Physical Activity, Covid-19 Prevention Strategies

Mini-Oral Presentation C1.4 Changes in adolescent 24-hour movement guideline adherence and its impact on mental wellbeing during COVID-19

8:41 am - 8:43 am (Vancouver, Canada, Thursday, October 14, 2021)

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¹Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada, ²Department of Family Medicine, McMaster University, Hamilton, Ontario, Canada, ³Behavioural Medicine Laboratory, University of Victoria, Victoria, Canada, ⁴Department of Child and Youth Studies, Brock University, St. Catharines, Canada

Background: Studies have found major changes in movement behaviours and mental health outcomes during COVID-19. Few, however, have been longitudinal, and none has investigated how changes in movement behaviours have impacted mental wellbeing. **Purpose:** This study examines changes in Canadian 24-hour Movement Guideline adherence among adolescents prior to and during COVID-19, and how these changes relate to flourishing, self-esteem, and resiliency. **Methods:** Sample included adolescents ($N=588$; $n=350$ females) that completed data collection during the Fall as part of the ADAPT study. Participants completed self-reported measures of movement behaviours (moderate-to-vigorous physical activity [MVPA], screen time [ST], and sleep) and mental wellbeing. **Results:** Overall, adolescents' adherence to MVPA and ST guidelines decreased 57%-to-45% and 21%-to-12%, respectively, while sleep adherence remained similar (22% versus 23%). Conditional change models demonstrated sustained sleep and MVPA guideline adherence were associated with greater flourishing (Estimate=0.22, SE:0.09 and Estimate=0.14, SE:0.07, respectively), while sustained sleep was related to improved self-esteem (Estimate=0.82, SE:0.40). Sustained MVPA and ST guideline adherence were associated with greater resiliency (Estimate=0.33, SE:0.09, and Estimate=0.32, SE:0.16, respectively). Meeting additional guidelines compared to baseline was associated with higher self-esteem (Estimate= 0.29, SE: 0.13). **Conclusions:** COVID-19 has negatively impacted adolescents' adherence to 24-hour movement guidelines. However, evidence indicates that adolescents who continue to meet guidelines may experience better mental wellbeing; suggesting health behaviour promotion as a priority for youth during COVID-19. **Funding:** The ADAPT study is funded by an Insight Grant from Social Sciences and Humanities Research Council of Canada.

Keywords: Sleep, Physical Activity, Screen Time, Mental Health, Youth

Mini-Oral Presentation C1.5 Demographic, parental, and home environment correlates of traditional and mobile screen time in preschool-aged children

8:43 am - 8:45 am (Vancouver, Canada, Thursday, October 14, 2021)

Jasmine Rai¹, Nicholas Kuzik^{1,2}, Valerie Carson¹

¹University of Alberta, ²Children's Hospital of Eastern Ontario (CHEO) Research Institute, University of Alberta

Background: Research on the correlates of screen time in young children that could be targeted in future interventions to improve

healthy development has primarily focused on TV viewing with little consideration of mobile devices. **Purpose:** The objectives of this study were to examine the associations between a broad range of demographic, parental, and home environment correlates and preschool-aged children's TV/video viewing, video/computer game playing, and total screen time across traditional and mobile devices. **Methods:** The results of this cross-sectional study are based on 106 preschool-aged children (3-5 years) and their parents recruited in 2018 for the Parent-Child Movement Behaviours and Preschool Children's Development study in Edmonton, Canada. Children's demographic information as well as parental demographic information, home characteristics, and information about parental and children's screen time use was measured using a parent questionnaire. Simple and multiple linear regression models were conducted. **Results:** Parental screen time was positively associated with children's screen time across all types of screen time (Model $R^2=13-29\%$). No other demographic variables were significantly associated with children's screen time. Additionally, significant associations of technology interference and presence of electronics in the bedroom with children's screen time were attenuated in the multiple regression models. **Conclusions:** Parental screen time appears important to target in future family-based screen time interventions. Future studies should explore potential mediating or moderating variables between parental screen time and children's screen time. **Funding:** Valerie Carson's internal funding from the Faculty of Kinesiology, Sport, & Recreation at the University of Alberta.

Keywords: Preschoolers, Correlates, Screen Time

Mini-Oral Presentation C1.6 Gender differences in enjoyment for types of physical activity in children

8:45 am - 8:47 am (Vancouver, Canada, Thursday, October 14, 2021)

Katie Burford¹, Yuzi Zhang¹, John Bartholomew²

¹Michael Susan Dell Center for Healthy Living, School of Public Health in Austin, University of Texas Health Science Center at Houston, ²Department of Kinesiology & Health Education, University of Texas at Austin

Background: Children's enjoyment and competence of physical activity is directly associated with their physical activity participation. However, there is little evidence exploring gender differences in enjoyment and competence for types of physical activity in children. **Purpose:** The purpose of this study was to explore children's enjoyment and competence for physical activity types (high intensity, low intensity, and strength) by gender during Physical Education (PE). **Methods:** All students performed 11 types of physical activities during their PE warm-up. Children's enjoyment and competence for each activity were assessed with two items on a 5-point Likert scale (5 = "I enjoyed it a lot," 5 = "I did really well"). Enjoyment and competence scores were generated for each activity type (high, low, strength). A 4 (grade) by 2 (gender) MANCOVA on enjoyment and competence was performed for type of activity. **Results:** Participants were 402, 2nd-5th grade, children from one diverse elementary school (49.4% female, 59.6% white) in central Texas. Girls reported that they enjoyed low intensity activity ($M=4.6$, $SD=0.6$; $d=0.3$) significantly more than boys ($M=4.4$, $SD=0.7$). Boys enjoyed high intensity ($M=4.17$, $SD=0.7$; $d=0.3$) and strength ($M=3.96$, $SD=1.01$; $d=0.30$) activities significantly more than girls ($M=3.95$, $SD=0.75$; $M=3.67$, $SD=1.11$). There were no significant differences across gender for competence with activity types. **Conclusions:** Girls reported greater enjoyment of lower intensity activities while boys reported greater enjoyment of high intensity and strength activities. As girls' enjoyment of PE is lower than for boys, these data highlight the need to consider gender preferences for types of activities (high, low, strength) when designing interventions and PE curriculums for children. **Funding:** No funding to declare.

Keywords: Children, Physical Activity, Enjoyment, Competence, Gender

Mini-Oral Presentation C1.7 Human development and variability in accelerometry- derived physical activity metrics in children

8:47 am - 8:49 am (Vancouver, Canada, Thursday, October 14, 2021)

Peter T. Katzmarzyk¹, Stephanie T. Broyles¹, J. P. Chaput², Mikael Fogelholm³, Gang Hu¹, Estelle V. Lambert⁴, Carol Maher⁵, Jose A. R. Maia⁶, Tim Olds⁵, Vincent Onywera⁷, Olga L. Sarmiento⁸, Martyn Standage⁹, Mark S. Tremblay², Catrine Tudor-Locke¹⁰

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Background: There is a pressing need to develop interventions to increase physical activity and decrease sedentary behaviour in school-aged children. Yet, a better understanding of the degree to which these interventions might be translated across countries at different levels of human development is required. **Purpose:** To examine the association between levels of human development and sources of variability in accelerometry-derived measures of moderate-to-vigorous physical activity (MVPA) and sedentary time (ST) in 6022 children aged 9–11 years from 12 countries ranging widely in environmental and socio-cultural contexts. **Methods:** The study design involved recruitment of students, nested within schools, which were nested within study sites. Total and in-school MVPA and ST were measured by waist-worn accelerometry (Actigraph GT3X+). The Human Development Index (HDI) for each country was obtained from the United Nations Development Programme. **Results:** Associations among the study variables were examined via multi-level models. Across all study sites, the variance in total MVPA and ST explained at the individual level (50.1% to 97.1%) was greater than the variance explained at the school level (2.9% to 49.9%). Similarly, the variance in in-school MVPA and ST explained at the individual level (28.4% to 95.4%) was higher than the proportion of the variance explained at the school level (4.6% to 71.6%). There were negative correlations between HDI and the variance explained by schools for total MVPA (-0.74 ; $p<0.05$), total ST ($r=-0.55$; $p=0.06$), in-school MVPA (-0.58 ; $p=0.05$), and in-school ST (-0.34 ; $p=0.28$). **Conclusions:** The results indicate that higher levels of human development are associated with lower explained variance in total and in-school levels of MVPA and ST. Such findings suggest that school-based physical activity and sedentary behaviour interventions may be less effective in countries with higher levels of human development, and that individual-level interventions may be more effective in

these settings. **Funding:** This study was funded by The Coca-Cola Company. With the exception of requiring that the study be global in nature, the funder had no role in the conduct of the study or interpretation of data.

Keywords: Accelerometry, Human Development, Variability

Mini-Oral Presentation C1.8 Neighborhood safety, school programming, and active transportation to school; findings from the Healthy Communities Study

8:49 am - 8:51 am (Vancouver, Canada, Thursday, October 14, 2021)

Matthew Stewart¹, Alisha Rajbhandari², Ian-Marshall Lang¹, Stephanie Miller¹, Natalie Colabianchi¹

¹University of Michigan, School of Kinesiology, Ann Arbor, MI, ²Battelle Memorial Institute, Columbus, OH

Background: Active transportation to school can be a valuable opportunity for youth to engage in physical activity. **Purpose:** To study the relationship between neighborhood safety and school programming with walking/biking to school. **Methods:** The sample includes 1,883 US youth aged 4-15 years who lived within 3km of their school. The relationship between perceptions of neighborhood safety (collected via questionnaires) and school programming data (collected via interviews with key informants) with self-reported walking/biking to school in the past week was tested using logistic regression. **Results:** Greater neighborhood safety was associated with increased walking/biking to school ($\beta = 0.24, p = .033$). Distance to school was negatively associated, and age and income, positively associated, with walking/biking to school ($\beta = -1.36, p < .001$; $\beta = 0.21, p < .001$; $\beta = 0.43, p = .002$). An interaction between neighborhood safety and school programming was marginally significant ($p = .056$). **Conclusions:** To increase walking/biking to school, communities should address neighborhood safety and school programming. **Funding:** This research was supported by the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH) under award number R01HL137731. The original Healthy Communities Study was funded by the NHLBI of NIH, in collaboration with the Eunice Kennedy Shriver National Institute of Child Health and Development, National Institute of Diabetes and Digestive and Kidney Disorders, National Cancer Institute, and NIH Office of Behavioral and Social Sciences Research; Department of Health and Human Services, under award number HHSN268201000041C.

Keywords: Youth, Physical Activity, Active Transportation

Mini-Oral Presentation C1.9 Efficacy of a student led physical activity coaching program for university students and employees

8:51 am - 8:53 am (Vancouver, Canada, Thursday, October 14, 2021)

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¹Department of Kinesiology, Capilano University, ²Department of Athletics and Recreation, Capilano University

Background: Physical inactivity is a leading risk factor for many of Canada's major chronic diseases. Research shows that physical activity (PA) improves overall health and cognitive functioning, which is important in academia (ParticipACTION, 2021). The purpose of this study was to determine the effectiveness of Move More North Shore, a physical activity program designed to increase PA and decrease sedentary behaviour. **Program Delivery:** Twelve participants were referred from university counselling, medical services, or self-referral (employees only). Student Active Health Coaches (SAHC) provided motivation and support to participants through weekly, one-on-one meetings over an eight-week period, to introduce the habit of PA into their daily lives. Due to COVID-19, program delivery was entirely virtual. **Evaluation:** Participants completed a pre-intervention interview and post-intervention survey which addressed participant knowledge, attitudes, and behaviours, and feedback on program structure. Significantly more days of PA/week were recorded post-intervention versus pre-intervention $t(11) = 3.432, p < 0.003$ ($d = -0.991$), $M1 = 1.50$ days/week, $M2 = 3.33$ days. Participants reported significantly more confidence in maintaining PA post-intervention versus pre-intervention $t(10) = 3.786, p < 0.002$ ($d = -1.142$), $M1 = 3.36/5$ confidence in becoming active, $M2 = 4.18/5$ confidence in maintaining PA. **Conclusions:** The pilot resulted in increased PA levels and confidence, feelings of connectedness, improved well-being, and meaningful learning experiences for SAHCs. Sedentary-time was not significantly different post-intervention, which may be due to reduced emphasis on this outcome and COVID-19 restrictions. **Funding:** Vancouver Coastal Health Active Living Grant.

Keywords: Physical Activity, Behaviour Change, University, Coaching, Sedentary Behaviour

Mini-Oral Presentation C1.10 Health Literacy, self-efficacy and satisfaction with life: A cross-sectional study of college students in Macao

8:53 am - 8:55 am (Vancouver, Canada, Thursday, October 14, 2021)

Chi Chong Wu¹, Si Man Lei^{2,3}, Yan Wang², Soi Po Wong²

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Background: Throughout history, disease outbreaks have affected humans, and low health literacy (HL) is usually associated with poor health care and prevention, as well as self-efficacy (SE) and reduced Satisfaction with Life (SWL). **Purpose:** This study investigated the current status and relationship of HL, SE, and SWL of college students in Macao. **Methods:** A total of 553 valid samples aged 18 to 25 ($M = 20.4 \pm 1.16$) were collected by stratified and convenient sampling methods in Macao. Three measurement tools included HLS-EU-Q ($\alpha = .94$), GSES ($\alpha = .87$), and SWLS ($\alpha = .89$) were verified validity and reliability. Data were analyzed by SPSS 24.0 with the methods of t-test, one-way ANOVA, and correlation and regression analysis. **Result:** Overall, the key findings include (1) college students in Macao respectively met a medium level of HL ($M = 3.6, SD = 0.53$), SE ($M = 6.7, SD = 1.3$), and SWL ($M = 6.2, SD = 1.8$). (2) there is a significant difference among various background variables (gender, region, and

living environment), (3) there is a positive relationship among HL, SE, and SWL, HL, and SE had a 34.1% explanation on SWL ($R^2=.341$, $\beta=.717$, $p<0.001$). **Conclusions:** The result is in agreement with other health-related studies. The findings suggested that the higher HL, the higher SWL. Even College students in Macao reached the medium level of HL, SE, and SWL, educational expansion, and community attention are needed. It also assumed that the association between HL and SWL might be mediated by SE.

Keywords: Health Literacy, Satisfaction With Life, College Students

Mini-Oral Presentation C1.11 "Ruta Leones" Cycling Rides Program at the University of Guadalajara, Mexico.

8:55 am - 8:57 am (Vancouver, Canada, Thursday, October 14, 2021)

Juan Ricardo López y Taylor¹, Edna Elvira Jáuregui Ulloa², Christian Josué Franco Avalos², Daniel Gómez Aldrete²

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Background: Jalisco has developed strategies to encourage active transport to combat physical inactivity. One of these strategies has been the construction of cycleways. Within the university community, interventions have emerged such as: "Pedaleando por tu Salud" in Union of Tula, "PROA" at Ing. Matute Remus High School and "Al CUCiénega en bici" in Ocotlán, to name a few. **Purpose:** Promote the use of the bicycle as an active transport and at the same time as realization of physical activity for health in the community of the University of Guadalajara and the State of Jalisco. **Methods:** This was an intervention study promoting physical activity which consisted on the realization of bicycle rides in 10 towns of the state of Jalisco along with health fairs where activities were carried out to promote healthy lifestyles. **Results:** Approximately 7500 people from 10 towns from 4 different regions of the state of Jalisco participated, which belonged to the basic education system, high school education system, college education system and community in general of the state of Jalisco. **Conclusions:** This cycling intervention study demonstrated that massive events of this nature are attractive for the realization of physical activity in the student community and can probably encourage the use of bicycles as an active transport. **Funds:** Self-generated resources by the Institute of Sciences Applied to Physical Activity and logistical and budgetary support of the coordination of Physical Culture of the University of Guadalajara.

Keywords: Physical Activity, Bicycle Rides, Community, Active Transport

Mini-Oral Presentation C1.12 Psychosocial effects of physical activity interventions for preschoolers, children, and adolescents: Role of intervention settings

8:57 am - 8:59 am (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Physical activity interventions are potential strategies to enhance psychosocial health of children. Interventions are performed in diverse settings (e.g., school, home, community), but little research has addressed whether and how the efficacy of these programs varies by setting type. **Purpose:** The aim of the current review is to summarize the psychosocial effects of physical activity programs for preschoolers, children, and adolescents at various intervention settings and identify settings that are potentially underutilized. **Methods:** Electronic databases were searched to identify physical activity interventions aimed at improving psychosocial health of preschoolers, children, and adolescents. Studies with experimental designs were only included. The PRISMA guidelines were followed in the conduct and reporting of this review. The risk of bias was assessed by the Evidence-Project tool. **Results:** Thirty-five studies met the inclusion criteria. Nearly three-fourths of interventions were performed in school-based settings. Although fewer studies used community- and home-based interventions, these were similarly effective in improving psychosocial health as the school-based interventions. Most commonly assessed outcomes in the included studies were self-esteem, physical self-concept, health-related quality of life, anxiety, and depression. Self-esteem and physical self-concept improved the most in response to the interventions at all settings. **Conclusions:** Community- and home-based intervention settings were underutilized despite being similarly effective as school-based settings. A large proportion of time is spent out of school during weekends and summer. Community- and home-based physical activity programs may be pragmatic strategies to deliver improvements in psychosocial health to children and adolescents. **Funding:** None.

Keywords: Children, Physical Activity, Psychosocial Health

Mini-Oral Presentations Session C2

Mini-Oral Presentation C2.1 Air quality in First Nations communities and the policy implications for community-based physical activity programming

1:45 pm - 1:47 pm (Vancouver, Canada, Thursday, October 14, 2021)

Rosalin M. Miles^{1,2}, Delon D. L. Chan¹, Ryan G. Chan¹, Kai L. Kaufman¹, Shannon S. D. Bredin¹, Darren E. R. Warburton¹

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Background: The health benefits of routine physical activity and exercise are clear; however, increased physical activity can lead

to elevated exposure to air pollution that increases the risks for adverse events. Within most Indigenous or rural communities in Canada there is limited monitoring of air quality so community members may unknowingly be at an increased health risk for adverse events while being active. **Policy Components:** An air quality monitor was placed outdoors in Lytton, BC, a rural First Nations community, from April 2019 – June 2021 and particulate matter (PM_{1.0}, PM_{2.5}, PM_{10.0}), inorganic matter (CO₂, O₃), temperature, pressure, and humidity were recorded during the two-year span. **Evaluation:** There were significant increases in particulate matter (PM_{1.0}, PM_{10.0}) over the two-year sample period ($p \leq 0.05$). There were significant relationships between the different particulate matter sizes (i.e., PM_{1.0}/2.5 (0.976), PM_{2.5}/10.0 (0.999), and PM_{1.0}/10.0 (0.965), respectively ($p < 0.001$)) and also between PM_{1.0}/O₃ (0.200, $p < 0.05$). At the highest PM levels, Environment and Climate Change Canada would recommend the reduction or rescheduling of physical activity/exercise. **Conclusions:** In a rural and First Nations community in BC, Canada, there were marked levels of air pollution that would affect the ability to safely participate in physical activity. These findings have important policy implications highlighting the need for monitoring of air quality within Indigenous or rural communities, and to consider the effects of air pollution when engaging in physical activity/exercise. **Funding:** This study was funded by Environment and Climate Change Canada.

Keywords: Air Quality Monitoring, Particulate Matter, Health, Indigenous, Rural

Mini-Oral Presentation C2.2 A systematic review of the associations between neighbourhood-built environment characteristics and health-related fitness

1:47 pm – 1:49 pm (Vancouver, Canada, Thursday, October 14, 2021)

Levi Frehlich¹, Chelsea Christie¹, Paul Ronksley¹, Tanvir Chowdhury, Patricia Doyle-Baker¹, Gavin McCormack^{1,2}

¹University of Calgary, ²Waseda University

Background: Low levels of health-related fitness is linked to chronic disease. Physical activity is a primary means of improving health-related fitness. While there is evidence suggesting that the built environment can support physical activity, it remains unclear if the built environment is also associated with health-related fitness. **Purpose:** To systematically review studies that have estimated associations between neighbourhood built environment and components of health-related fitness (i.e., muscular, cardiorespiratory, motor, and morphological) in adults. **Methods:** Using PRISMA guidelines, eight databases were searched (up to August 2020). Study quality was assessed. **Results:** Twenty-five eligible articles underwent final synthesis and quality assessment. Most studies (23/25) included objective measures of health-related fitness. All four health-related fitness components were represented (muscular = 8/25, cardiorespiratory = 11/25, motor = 2/25, and morphological = 16/25). Overall, built environments such as higher street connectivity, higher land use mix, and availability of sidewalks were associated with health-related fitness. Notably, individual studies found that associations between the built environment and health-related fitness remained significant after controlling for physical activity. Despite most studies being high quality, all but six were cross-sectional. **Conclusions:** The neighbourhood built environment may support health-related fitness, independent of physical activity. Although stronger study designs are needed to establish causality, policymakers, practitioners, and urban planners may need to consider how neighbourhood built characteristics can support health via health-related fitness. **Funding:** This systematic review is supported by a Canadian Institutes of Health Research (CIHR) Foundations Scheme Grant [FDN-154331].

Keywords: Body Composition, Built Environment, Environment Design, Muscle Strength, Fitness

Mini-Oral Presentation C2.3 Association between exercise variables and subjective well-being

1:49 pm – 1:51 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Understanding how exercise is related to well-being can inform health promotion practices for student-athletes. **Purpose:** To study the relationship between different exercise variables (frequency, intensity, and duration) and well-being (fatigue, mood, sleep quality, muscle soreness, and stress). **Methods:** A total of 237 student-athletes completed a 26-item survey. Well-being was assessed using a 5-question Likert questionnaire rating fatigue from “very fresh” (5) to “always tired” (1), sleep quality as “very restful” (5) to “insomnia” (1), general muscle soreness as “feeling great” (5) to “very sore” (1), stress levels as “very relaxed” (5) to “highly stressed” (1), and mood as “very positive mood” (5) to “highly annoyed/irritable/down” (1). Exercise variables were assessed using average frequency (ranging 0-7 days), duration (open-ended response), and intensity (utilizing the category ratio ratings of perceived exertion scale). Data was collected from May 29th-July 5th, 2020. A Spearman Correlation analysis was conducted for all scale and ordinal data. **Results:** Frequency of exercise (sessions per week) had a significant positive correlation with improved feelings of fatigue, sleep quality, and mood. Increased duration of exercise sessions was positively correlated with improved feelings of fatigue, stress, and mood. Increased session intensity was significantly correlated with improved general soreness, and mood. The interaction between domains of well-being indicated a significant relationship between fatigue and sleep quality, stress, and mood, with moderate effect sizes. Improved sleep quality was correlated with improved stress and mood with moderate effect sizes. **Conclusions:** The findings that exercise variables had a significant relationship to well-being domains can be used to design interventions for student-athletes.

Keywords: Physical Activity, Health, Well-Being, Exercise Variables, Sleep

Mini-Oral Presentation C2.4 Quality sleep frequency attenuates the negative impact of physical inactivity on mental wellbeing

1:51 pm - 1:53 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: With the emergent emphasis on the 24-hour movement paradigm, the importance of engaging in adequate amounts of sleep and physical activity (PA) is becoming increasingly apparent. **Purpose:** The present study used cross-sectional data from the Mental Health Million Project to examine how sleep and PA interact to influence mental health throughout adulthood. **Methods:** The sample included 46,202 participants (15,579 young adults, 10,658 middle-aged adults, 19,965 older adults; 27,299 females, 18,179 males, 724 other) from 137 countries that completed the 47-item Mental Health Quotient. Participants also reported how frequently they get a good night's sleep and exercise; and were subsequently classified into one of 20 groups based on possible behavioural combinations. A multi-level regression analysis was conducted with participants nested within country. The group with the healthiest combination of sleep and exercise behaviour was set as the referent for comparison. **Results:** After adjusting for covariates, findings revealed mental wellbeing was greatest among the group of participants who reported getting quality sleep and exercising everyday, while those who rarely had a good night's sleep and never exercise reported the worst scores. On average, groups characterized by higher levels of exercise reported greater mental wellbeing scores, but within each level of exercise engagement, there was a negative gradient association for mental wellbeing as frequency of quality sleep decreased. **Conclusions:** Overall, these findings suggest that sleep and physical activity behaviour need to be considered in tandem as the interactive effects amongst these behaviours appear to impact mental health in a potentially dose-response manner.


Keywords: Physical Activity, Sleep Quality, Mental Health Quotient, Interaction, Adults

Mini-Oral Presentation C2.5 A Narrative synthesis of pedometer- and accelerometer-based interventions for ethnically diverse populations

1:53 pm - 1:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Physical activity helps to maintain optimal health and wellness. However, ethnically diverse groups have low rates of physical activity when compared with White Caucasian populations. **Purpose:** To conduct a narrative synthesis to assess the effectiveness of pedometer- and/or accelerometer-based interventions on a) physical activity and b) anthropometric and physiological measurements and biochemical markers among ethnically diverse adults. **Methods:** Electronic searches of published full text, English language only, randomized controlled trials in adults greater than 18 years of age using the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL, and Scopus from the earliest records to June 2019. Data extraction was guided by PRIMA guidelines and Popay et al.'s methodology of narrative synthesis. **Results:** 911 adult participants, 555 (60.9%) women and 356 (39.1%) men were included. Participants were Southeast and East Asian (n=504, 55.3%), Arab and Middle Eastern (n=222, 24.4%), African and Caribbean (n=92, 10.1%), South Asian (n=40, 4.4%), and White Caucasian (n=53, 5.8%). Pedometer and/or accelerometer-based interventions appeared to be effective in increasing physical activity. There was poor quality evidence to assess the effects of these interventions on anthropometric risk (e.g., waist circumference, BMI), physiological measurements (e.g., blood pressure, heart rate), and biochemical markers (e.g., lipids, HbA1c). **Conclusions:** Due to poor quality evidence no firm conclusions can be made. There may be some benefit in using pedometer- and/or accelerometer-based interventions to increase physical activity among ethnically diverse populations, but more research is needed. **Funding:** Women's College Hospital Women's 15K Exchange, HEARTPA  Research.

Keywords: Physical Activity, Ethnicity, Pedometer/Accelerometer, Prevention

Mini-Oral Presentation C2.6 Forecasting the cost-effectiveness of awareness campaign as physical activity promotion in preventing non-communicable diseases (NCDs) in Thailand

1:55 pm - 1:57 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Insufficient physical activity is one of the risk factors for non-communicable disease and the leading cause of premature death. Awareness campaign has been widely implemented as one of health promotion strategies, yet, little is known whether its cost-effective in preventing the disease. **Purpose:** This study aims to forecasting the cost-effectiveness of awareness campaigns for the physical activity promotion in preventing NCDs among the Thai population. **Methods:** This study employed mixed methods to collect the data by conducted in-depth interview with related experts and policy makers. OneHealth Tool software was used during the cost-effectiveness analysis of awareness campaign policy. **Results:** This study showed that awareness campaigns reduced the prevalence of cardiovascular disease in both sexes. In 2021, the prevalence of cardiovascular diseases (CVDs) was -0.10% (males) and -0.09% (females) then decline to -9.11% (males) and -8.99% (females) in 2030. With 100% coverage setting (full scale-up), scenario for 9 years, the effect of awareness campaign in reducing the prevalence of CVDs was projected to 9.01% for males, and 8.90% for females. **Conclusions:** The result strongly informed that awareness campaign policy contributes to decreasing the prevalence of cardiovascular disease in both sexes. **Funding:** Study funded by the Thai Health Promotion Foundation, and Institute for Population and Social Research, Mahidol University.

Keywords: Awareness Campaign, Physical Activity, DALYs, OneHealth Tool, Population Projection, Cost-Effectiveness Analysis

Mini-Oral Presentation C2.7 Improving healthy behaviours through motivationally tailored messages: meta-analytic insights from 177 randomized control trials

1:57 pm - 1:59 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Tailoring health-related communications to account for people's characteristics (e.g., age, sex) can be a useful tool to promote healthier lifestyles (e.g., physical activity, healthy diets). Functional matching is a special type of tailoring that focuses on matching content to psychological motives, values, and needs, and has been argued to be a particularly powerful form of tailoring. Although functional matching has been widely and successfully applied to influence consumer behaviours, its effectiveness for encouraging health behaviours is less well established. **Purpose:** To synthesize current research applying functional matching to influence health decision-making. **Methods:** We present a meta-analytic synthesis of randomized control trials evaluating functional matching on health behaviour outcomes (attitudes, intentions, behaviours) in general, and in the domains of physical activity, diet, smoking, and alcohol use. Using a three-level meta-analysis, we synthesize 1,316 effects from 177 studies. **Results:** The average effect of functional matching on health-related attitudes, intentions, and behaviours was significant and positive at $r = .12$ ($k = 177$; 95% CI = .09 to .14). Significant effects were obtained for physical activity ($r = .16$; $k=21$; 95% CI = .09 to .23), dietary changes ($r = .16$; $k=44$; 95% CI = .10-.22), and smoking ($r = .08$; $k=36$; 95% CI = .03 to .12). Effects on alcohol use were of a similar magnitude but not significant ($r=.10$; $k=15$; 95% CI = -.02 to .22). **Conclusions:** These findings suggest that functional matching may be a highly promising tool for interventionists to consider when building interventions to encourage healthier behaviors.

Keywords: Behaviour Change, Communication, Physical Activity, Diet, Smoking

Mini-Oral Presentation C2.8 Physical Activity can be successfully increased through a 12-week digital health intervention: the ACCELERATION Program

1:59 pm - 2:01 pm (Vancouver, Canada, Thursday, October 14, 2021)

Keven Joyal-Desmarais^{1,2}, Simon Bacon^{1,2}, Wanda Firth³, Nicholas Giacomantonio⁴, Jennifer Jones^{5,6}, Jessica Nooyen⁷, Paul Oh^{6,7}, Geneviève Szczepanik¹, Darren Warburton⁸

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Background: Over 2/3 of global deaths result from non-communicable diseases (NCDs) like heart disease and cancer. Modifiable behaviours (e.g., physical activity, diet) play a large role in NCDs and changing them is crucial for NCD prevention. ACCELERATION is a 12-week eHealth program that improves behaviours in people at risk for NCDs (e.g., through coaching/goal-setting). **Purpose:** To evaluate the effectiveness of the ACCELERATION program at improving physical activity levels. **Methods:** 696 patients enrolled in the ACCELERATION program. We assessed their physical activity levels at baseline (T1), after program completion (12-weeks; T2), and at a 6-month follow-up (T3). Each time, we assessed weekly number of minutes of moderate-to-vigorous physical activity (MVPA). Mixed effects models (controlling for sex, province, age, and ethnicity) were used to evaluate change in MVPA over time. **Results:** Mean levels of MVPA at each time point were as follow: T1=112.7; T2=189.8; T3=192.7. Additionally, the following percentage of participants met Canadian guidelines to engage in 150 minutes or more of weekly MVPA: T1=31.2%; T2=53.9%; T3=55.0%. Mixed effects models indicate a significant average increase of 76.4 (95% CI: 58.8 to 93.9) minutes of MVPA from baseline (T1) to program-completion (T2). Changes in MVPA were maintained in the long term, with a non-significant and negligible change between T2 and T3. **Conclusions:** Participants in the 12-week ACCELERATION program successfully and substantially increased their minutes of MVPA by an average of 76.4 minutes, and this increase was maintained over time. **Funding:** The ACCELERATION program was funded by the Canadian Partnership Against Cancer (CPAC).

Keywords: Physical Activity, Behaviour Change, eHealth, Intervention

Mini-Oral Presentation C2.9 Can eHealth interventions increase physical activity among individuals with depression: A systematic review

2:01 pm - 2:03 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Depression is one of the most common and debilitating mental disorders and one of the top contributors to the burden of disability in Canada and around the world. Exercise has been recommended as a monotherapy for mild-moderate depression and adjunctive treatment for severe depression. However, access to supervised and structured exercise interventions for depression may not always be available. EHealth interventions may be effective in increasing physical activity among people with depression who cannot, or prefer not to, access supervised exercise treatment. **Purpose:** The purpose of this systematic review (PROSPERO 2020 CRD42020221713) is to evaluate the impact of eHealth interventions on increasing physical activity among adults with

depression. **Methods:** Systematic literature searches for Randomized Controlled Trials (RCTs) and quasi-experimental studies were performed in nine electronic databases (e.g., Medline, PsycINFO) from inception to November 2020. **Results:** Four RCTs (440 participants) met the inclusion criteria. Three were web-based and one was app-based. All studies indicated that eHealth interventions are effective in decreasing depressive symptoms compared to waitlist group. Three studies showed medium to large effect sizes. However, we found inconsistent evidence of effectiveness in increasing physical activity behavior. Three studies showed increased physical activity in intervention groups but no significant difference between groups. Dropout rates were relatively low in intervention groups (0% - 21.9%). **Conclusions:** Physical activity eHealth interventions appear feasible in this population. Tailored eHealth interventions and well controlled studies are needed to assess the effectiveness and feasibility of using eHealth interventions to help people with depression increase physical activity. **Funding:** Four Year Doctoral Fellowship to Yiling Tang from the University of British Columbia, Canada.

Keywords: Physical Activity, Depression, e-Health

Mini-Oral Presentation C2.10 Remote monitoring of physical activity, sleep, and blood pressure with wearable technology in cancer populations: a single institution experience

2:03 pm - 2:05 pm (Vancouver, Canada, Thursday, October 14, 2021)

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¹Cedars-Sinai Cancer Research Center for Health Equity (CSMC)

Background: Wearable technology is changing the way we collect and analyze data. The use of wearable technology (activity trackers, blood pressure monitors) for remote monitoring of daily activity, sleep, and blood pressure in cancer patients may reveal insight into specific biomarkers of disease and symptom progression. **Purpose:** To establish a program that allows for remote monitoring of physical activity, sleep, heart rate, and blood pressure, accompanied by electronic patient-reported outcomes (PROs), for cancer patients participating in ongoing clinical studies conducted at CSMC, in order to achieve a holistic view of patient health outside of a clinical setting. **Methods:** A protocol to be included as a sub-study in ongoing studies was developed and initiated in 2015, involving: continuous remote monitoring using wearable technologies (e.g., Fitbits, Omron BP Monitors) and PRO surveys. Metrics collected include: sleep (duration, quality, latency), physical activity (steps, exercise, calories burned, time sedentary), BP (systolic, diastolic, HR). The PROs (fatigue, depression, quality-of-life) were reported electronically via REDcap on a varying basis. **Results:** Data from 300 patients (ages 18-92years) across 11 studies involving different cancer types (e.g., pancreatic, colorectal, etc.) and stages were collected and stored in HIPAA 21 CFR Part 11 compliant databases, with the goal of serving as a model for future studies. Adherence rates ranged from 80%-100%. **Conclusions:** Wearable technologies and PRO surveys provide a comprehensive view of patient disease related measures to physicians by tracking biometrics and quality-of-life, revealing insight into relevant lifestyle factors contributing to cancer progression. **Funding:** Study funded by PANCAN, DoD and Cedars-Sinai Medical Center.

Keywords: Cancer, Physical Activity, Sleep, Blood Pressure

Mini-Oral Presentation C2.11 Executive functioning and trait mindfulness in older adults before a remote physical exercise training program

2:05 pm - 2:07 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Physical exercise shows benefits to mood and executive functioning (EF), and there is evidence that trait mindfulness (TM) plays a role. Due to the Covid-19 pandemic, many older adults have reduced their physical activity. **Purpose:** Using data from the baseline evaluation of a randomized control trial implementing physical exercise training for older adults in Canada, this study examines the relative contributions of physical exercise and TM to EF and mood. **Methods:** 39 older adults (67% women, 66-78 years-old) were assessed for self-reported frequency of physical exercise; TM; EF that was evaluated by self-report (Executive Function Index -EFI) and computerized tasks (inhibition, working memory, shifting and decision-making); and mood (anxiety and depression). Multiple linear regressions were used to analyze the effects of physical exercise and TM on EF and mood. **Results:** TM alone significantly predicted self-reported EF, $\beta = .36$, $t(32) = 2.09$, $p < .05$, and symptoms of depression, $\beta = -.47$, $t(32) = -2.91$, $p < .01$, and anxiety, $\beta = -.42$, $t(32) = -2.65$, $p = .01$, but not performance on any EF cognitive tasks. Frequency of physical exercise did not significantly predict any measures of EF or mood. **Conclusions:** These results suggest that before beginning a remote physical exercise program, trait mindfulness may play a larger role than physical exercise in EF and mood. **Funding:** Funding for this study was provided by the Natural Sciences and Engineering Research Council (NSERC) and an internal research grant, University of Victoria.

Keywords: Trait Mindfulness, Executive Functioning, Physical Exercise, Mood

Mini-Oral Presentation C2.12 Classification of moderate-intensity walking speed during overground walking

2:07 pm - 2:09 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Moderate-intensity walking is recommended as an effective strategy to elicit health benefits. The Compendium of Physical Activities suggests that walking at 2.5 mph associates with moderate intensity (i.e., ≥ 3 metabolic equivalents [METs]). However, this speed was obtained from studies mostly conducted among younger adults and/or using treadmill protocols. It is plausible that moderate-intensity speed thresholds may vary by age and/or walking condition. **Purpose:** To determine and compare the walking speed associated with moderate-intensity overground walking among young, middle-aged and older adults. **Methods:** Participants (N=248 healthy adults, 21-85 years, 49%women) performed a single 5-minute overground walking trial at a preferred pace. Speed was measured using an electronic mat, and oxygen uptake was measured using an indirect calorimeter and converted to METs. Receiver operating characteristic (ROC) curve analyses were performed for the whole sample and three age groups: young (21-40y; n=75), middle-aged (41-60y; n=79) and older-aged (61-85y; n=94). Optimal thresholds were determined using Youden's Index and bootstraps with 20,000 replicates. **Results:** Seventy-five percent of participants achieved 3 METs. Speed thresholds [95%CI] associated with moderate intensity for the whole sample, young, middle-aged, and older-aged groups were 2.87 [2.53, 2.97], 2.86 [2.40, 3.09], 2.80 [2.54, 2.98] and 2.74 [2.48, 2.97] mph, respectively. **Conclusions:** Optimal overground walking speeds associated with moderate intensity were similar across different age groups, but trended lower with increasing age. Notably, all thresholds were greater than the Compendium of Physical Activities threshold, suggesting that a faster walking speed is required among all age groups to attain moderate intensity during overground walking. **Funding:** National Institutes of Health National Institute on Aging #: 5R01AG049024. Moore is supported by a T32 Training Grant: NRSA: T32-HL007055-44.

Keywords: Moderate Intensity, Walking, Physical Activity

Mini-Oral Presentation C2.13 The Impact of sprint interval training with or without weight loss on substrate oxidation in adults

2:09 pm - 2:11 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Endurance exercise training and weight loss (WL) has been associated with changes in fat oxidation (FO). However, there is limited evidence investigating the impact of sprint interval training (SIT) induced WL on FO in adults. **Purpose:** Investigate the impact of 4-week SIT with or without WL on FO at rest and during submaximal bout of exercise in adults. **Methods:** Thirty-four adults aged 19 to 60 years took part in 4-week SIT consisting of repeated 30-second Wingates separated by four minutes of active recovery three times per week. Respiratory exchange ratio (RER) was measured with indirect calorimetry (VCO_2/VO_2), while FO (g/min) was estimated using the formula $\text{FO} = 1.695 * \text{VO}_2 - 1.701 * \text{VCO}_2$. Outcome measures were quantified at rest and during submaximal exercise at baseline and post-intervention. Participants were classified to a WL group (weight change < 0kg) or a non-WL group (weight change ≥ 0 kg). **Results:** A significant interaction effect was observed between time and WL groups for submaximal RER and FO (all $p < 0.05$). Submaximal RER (0.96 ± 0.08 to 0.92 ± 0.06 ; $p = 0.030$) and FO (116.9 ± 223.7 g/min to 248.8 ± 165.3 g/min; $p = 0.008$) were both significantly improved in the WL group and were significantly different from the non-WL group (all $p < 0.05$). **Conclusion:** Short-term SIT-induced WL elicited significant improvements in submaximal RER and estimated FO in adults and should be recommended to increase FO in adults. **Funding:** Diabetes Action Canada, University Research Fund-University of New Brunswick Research Fund, and the Canadian Institute of Health Research.

Keywords: Metabolic Flexibility, Interval Training, Substrate Usage

Mini-Oral Presentation C2.14 The Effect of intermittent fasting and continuous low-moderate intensity physical activity on fat-oxidation rates and commonly used fatness-measurements: a sustainable approach for combatting the obesity epidemic

2:11 pm - 2:13 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: The World Health Organization estimates that within the next few years non-communicable diseases will become the principal global causes of morbidity and mortality. While customarily employed techniques for weight loss have proven to not provide sustainable resolutions, intermittent fasting (IF) has gained popularity as a healthy lifestyle and weight management approach. **Purpose:** To examine the effects of IF (16 hr) and manageable physical activity (PA) continuous light-moderate intensity interventions to combat overweightness which ultimately contributes to the growing obesity epidemic. **Methods:** 10 middle-aged women were recruited via snowball technique. Adiposity was assessed using sum of skinfolds, waist circumference, body mass index, % body fat via bioelectrical impedance, and aerobic fitness plus fat-oxidation rates were measured using discrete open circuit spirometry following an overnight fast. **Results:** Post 3-weeks of the combined IF and PA intervention, study participants experienced a statistically significant ($p < 0.05$) decrease of; -2.5% in body mass, -8.5% in the sum of skinfolds, -2.7% waist circumference. Statistically significant ($p < 0.05$) improvements were observed in; relative $\text{VO}_2\text{max} + 8.9\%$, absolute $\text{VO}_2\text{max} + 6.7\%$ and peak fat-oxidation $+11.7\%$. **Conclusions:** The statistically significant preliminary findings of this combined 3-week IF and PA intervention showed changes in subcutaneous and visceral adiposity, improvements in peak fat-oxidation rates, increases in VO_2max , and retention or improvement of estimated fat free mass. These data demonstrate the combined IF and PA intervention efficacy for weight loss. **Funding:** Non-received.

Keywords: Weight Management, Skinfolds, Bioelectrical Impedance

Mini-Oral Presentation C2.15 Performing a verification phase immediately after an incremental to maximal graded exercise test increases the proportion of participants who meet the job-related aerobic fitness standard for structural firefighters

2:13 pm - 2:15 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Maximal oxygen uptake (VO₂max) is routinely measured in structural firefighter applicants to ensure that they possess the job-related aerobic fitness to carry out the essential physically-demanding and frequently-occurring on-the-job tasks in a safe and effective manner during emergency circumstances. Incremental to maximal graded exercise tests (GXT) are customarily used to measure VO₂max via indirect calorimetry and typically depend on several secondary criteria to confirm a successful test. However, the use of these secondary criteria to verify VO₂max has been criticized and the renewed interest in applying a verification phase (VP). This is particularly important for non-athletic individuals who may not possess the work tolerance required to push themselves to maximal effort during a continuous incremental to maximal GXT. **Purpose:** The purpose of this investigation was to i) determine what proportion of individuals are able to attain their true VO₂max, as confirmed by the presence of a VO₂ plateau during an incremental to maximal GXT and what proportion of individuals require a VP, ii) for those individuals who require a VP, to compare the VO₂ values measured during the incremental to maximal GXT to those measured during the VP and iii) determine if a larger proportion of individuals are able to meet the aerobic fitness standard for firefighters when a VP is used following the incremental to maximal GXT. Importantly, differences in sex, age group and BMI were also examined. **Methods:** Participants completed an incremental to maximal GXT and a VP to measure their true VO₂max, as confirmed by the presence of a VO₂ plateau. Differences between the highest VO₂ values attained during the incremental to maximal GXT were compared to those attained during the VP using a paired t-test analysis ($p < 0.05$). Considering sex, age and BMI, differences in the proportion of participants who were able to meet the aerobic fitness standard for firefighters between the GXT and were compared using a chi-square test for homogeneity ($p < 0.05$). **Results:** 4,462 (4,179 male and 283 female) structural firefighter applicants completed an aerobic fitness test as part of a more comprehensive physical fitness assessment for structural firefighters. 1,096 (24.6%) participants were able to attain a “true” VO₂max during the incremental to maximal GXT. While 3,366 (75.4%) participants were only able to attain a VO₂peak during the incremental to maximal GXT and required the VP to attain a “true” VO₂max. For these participants, the VO₂peak values attained during the incremental to maximal GXT ($47.0 \pm 6.1 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$) were significantly lower than the “true” VO₂max values attained during the VP ($51.7 \pm 6.8 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$), a significant mean difference of $4.7 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ ($p < 0.001$). Similar differences were found to be significant in comparisons of sex, age group and BMI. In addition, the proportion of participants who met the job-related aerobic fitness standard for structural firefighters increased from 79.8% during the incremental to maximal GXT to 92.6% during the VP, a statistically significant difference of 12.8% ($p < 0.001$). Differences were found to be significant independent of sex, age group or BMI group. Therefore, the VP added definitive value for 430 (12.8%) participants who were not able to meet the aerobic standard for structural firefighters during the incremental to maximal GXT but were able to meet the standard during the VP. **Conclusions:** These findings underscore the importance of a VP, immediately following an incremental to maximal GXT, to confirm the attainment of a “true” VO₂max. This is particularly important for structural firefighter applicants whose VO₂max values are used to determine if they meet the job-related aerobic fitness standards. Using a VP immediately after an incremental to maximal GXT to volitional fatigue, significantly increases the proportion of individuals who meet the job-related aerobic fitness standard for structural firefighters. These findings are particularly critical because they are independent of sex, age and BMI status. **Funding:** None received.

Keywords: Workplace, VO₂max, Physically Demanding Occupations

Mini-Oral Presentation C2.16 The effectiveness of an Indigenous led, community-based physical activity intervention on cardio-metabolic health in Indigenous adults.

2:15 pm - 2:17 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Despite the growing awareness of the health disparities faced by Indigenous communities in Canada, limited research exists on how to enhance the cardio-metabolic health of Indigenous peoples in culturally appropriate ways. **Purpose:** To evaluate the effectiveness of an Indigenous led, community-based walking and running physical activity (PA) program on improving health-related physical fitness and other risk factors for cardio-metabolic disease. **Methods:** A total of 87 adults (44.6 ± 14.9 yr) of varying health status, PA, and fitness levels participated. Six Indigenous communities in the province of British Columbia co-led the 13-wk PA intervention including weekly running and walking sessions delivered by Indigenous community members. Aerobic fitness (6 min walk test), grip strength, PA behaviour (Godin-Shephard Leisure-Time Physical Activity Questionnaire), waist circumference, blood pressure, and fasting total cholesterol, high density lipoprotein, glucose, and A1C were assessed pre- and post-training. Complete post-training data was available in 52 (60%) participants. **Results:** With training (Mean \pm SD) there were significant improvements in aerobic fitness (26.9 ± 8.0 vs. $29.1 \pm 8.3 \text{ mL/kg/min}$), PA (% Active 27.5% vs. 39.2%), grip strength (60.9 ± 21.3 vs. $66.2 \pm 21.5 \text{ kg}$), waist circumference (112.2 ± 19.2 vs. $109.5 \pm 16.1 \text{ cm}$), and mean arterial blood pressure (99.4 ± 22.9 vs. $93.6 \pm 16.4 \text{ mmHg}$), respectively. The greatest changes ($p < 0.05$) in health-related physical fitness were seen in the participants starting the program within the lowest fitness category. There were no significant changes in lipid lipoprotein profile or markers of glucose homeostasis. **Conclusions:** An Indigenous led, community-based PA program was effective at improving the cardio-metabolic profile of Indigenous adults. This work supports the importance of community-based, participatory, Indigenous led health and wellness interventions. **Funding:** Study supported by Canadian Institutes of Health Research (Grant #IA5-156528).

Keywords: Indigenous, Physical Activity, Cardio-Metabolic Health, Participatory Research

Mini-Oral Presentation C2.17 The effects of physical fitness testing on behavioral intention and on physical activity behavior

2:17 pm - 2:19 pm (Vancouver, Canada, Thursday, October 14, 2021)

Bryce T. Daniels¹, Sarah Schwartz¹, Ashton Human¹, Erin K. Howie¹

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Background: Physical activity can increase physical fitness, improving overall health. It has been suggested positive changes in behavioral intentions can lead to a positive behavior change. However, assessing participant's changes in behavior intentions and changes in physical activity behavior after performing a fitness assessment has yet to be studied. **Purpose:** To evaluate changes in behavioral intentions and changes in physical activity behavior over time after performing and receiving the results of a fitness assessment. **Methods:** The sample began with 28 undergraduate students (14 females, median age 21.75 years), though only 17 participants were able to complete the full study due to Covid-19. The intervention included performing a fitness assessment and receiving the results of the assessment which included measures of percent body fat via a DXA scan, total hand grip strength score via a hand grip dynamometer, sit-and-reach score via a sit-and-reach box, maximum number of push-ups performed, and estimated VO₂max using the Bruce Protocol. Behavior intention surveys, which included assessing the current stage of change in the Transtheoretical Model for physical activity, were completed pre (time 1)/post (time 2) intervention and four weeks post intervention (time 3). Accelerometers were worn on the non-dominant wrist for one week after the intervention (time 2) and was repeated four weeks later (time 3) to obtain Counts per Minutes (CPM) and average steps per day. Wilcoxon matched pairs signed rank tests were conducted to detect differences in intention levels, CPM, and average steps per day across the different time points. **Results:** Changes in intentions to perform physical activity were observed from time 1 to time 2 ($p < 0.001$) with an increase of participants answering "I have started making healthier choices (i.e., increasing physical activity)." However, no significant changes occurred from time 2 to time 3 ($p = 0.18$). There was also no significant change ($p = 0.94$) for CPM from time 2- 2240.0 (1235.5) to time 3- 1988.0 (1235.5). Lastly, there was no significant change ($p = 0.46$) in average steps per day from time 2- 10,796.2 (1048.8) to time 3- 10,989.0 (900.5). **Conclusion:** The evidence supports fitness assessment interventions are effective for changing intentions to increase physical activity, but not physical activity behavior. Thus, changing intentions to perform physical activity alone may not be sufficient for changing physical activity behavior after a fitness assessment intervention. Due to the limitation of a small sample size, future studies should confirm these findings in a larger sample size and continue to evaluate behavior change strategies to increase physical activity. **Funding:** Study funded by the University of Arkansas Honor's College through the Honor's College Team Grant, Honors Equipment Grant, and Honor's Student Research Grant.

Keywords: Behavior Change, Behavior Intentions, Physical Activity, Physical Fitness

Mini Oral Presentation C2.18: Physical activity level and cardiovascular risk factors in Chinese adolescents living with type 1 diabetes

2:19 pm - 2:21 pm (Vancouver, Canada, Thursday, October 14, 2021)

Nana Wu¹, Shannon S. D. Bredin¹, Veronica Jamnik², Michael Koehle³, Yanfei Guan¹, Erin M. Shellington¹, Yongfeng Li⁴, Jun Li⁵, Darren E. R. Warburton¹

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Background: Type 1 diabetes mellitus (T1D) is associated with an increased risk for cardiovascular disease (CVD) related morbidity and premature mortality. Regular physical activity plays an important role in the primary and secondary prevention of CVD, improving overall health and wellbeing. Previous observational studies have examined the associations between self-reported physical activity and CVD risk factors in largely adult Caucasian populations. However, limited work has evaluated the relationship between objectively measured physical activity and CVD risk factors in other ethnicities, particularly Chinese youth living with T1D. **Methods:** This cross-sectional study assessed CVD risk factors, physical activity, and aerobic fitness (and their associations) in Chinese youth living with T1DM ($n = 48$) and peers ($n = 19$) without T1DM. Primary outcomes included blood pressure, lipid profiles, and physical activity (accelerometry). Statistical differences between groups were determined with chi-square, independent-samples t-tests, or analysis of covariance. The associations between aerobic fitness, daily physical activity variables, and CVD risk factors were assessed with univariate and multivariate linear regression analyses. **Results:** Results were summarized using means and standard deviation (SD) for normally distributed variables and medians and 25–75th quartile for non-normally distributed variables. In comparison to peers without diabetes, youth living with T1DM showed higher levels of total cholesterol (3.14 ± 0.67 vs. 4.03 ± 0.81 mmol·L⁻¹, $p = 0.001$), low-density lipoprotein cholesterol (1.74 ± 0.38 vs. 2.31 ± 0.72 mmol·L⁻¹, $p = 0.005$), and triglycerides (0.60 ± 0.40 vs. 0.89 ± 0.31 mmol·L⁻¹, $p = 0.012$), and lower maximal oxygen power (44.43 ± 8.29 vs. 35.48 ± 8.72 mL·kg⁻¹·min⁻¹, $p = 0.003$), total physical activity counts (451.01 ± 133.52 vs. 346.87 ± 101.97 counts·min⁻¹, $p = 0.004$), metabolic equivalents (METs) (2.41 ± 0.60 vs. 2.09 ± 0.41 METs, $p = 0.033$), moderate-to-vigorous intensity physical activity [MVPA: 89.57 (61.00–124.14) vs. $(53.19$ (35.68–63.16) min, $p = 0.001$], and the percentage of time spent in MVPA [11.91 (7.74–16.22) vs. 8.56 (6.18–10.12) %], $p = 0.038$). The level of high-density lipoprotein cholesterol was positively associated with METs ($\beta = 0.29$, $p = 0.030$, model $R^2 = 0.168$), and the level of triglycerides was negatively associated with physical activity counts ($\beta = -0.001$, $p = 0.018$, model $R^2 = 0.205$) and METs ($\beta = -0.359$, $p = 0.015$, model $R^2 = 0.208$), and positively associated with time spent in sedentary behaviour ($\beta = 0.002$, $p = 0.041$, model $R^2 = 0.156$) in persons living with T1DM. **Conclusions:** Chinese youth with T1D, despite their young age and short duration of diabetes, present early signs of CVD risk, as well as low physical activity levels and cardiorespiratory fitness compared to apparently healthy peers without diabetes. Regular physical activity is associated with a beneficial cardiovascular profile in T1DM, including improvements in lipid profile. Thus, physical activity participation should be widely promoted in youth living with T1D.

Keywords: Physical Activity, Cardiovascular Health, Type 1 Diabetes

Mini-Oral Presentation C2.19: Impacts of COVID-19 on Indigenous Communities in Canada

2:21 pm - 2:23 pm (Vancouver, Canada, Thursday, October 14, 2021)

Jocelyn Benji¹, Gemma Tomasky¹, Kai L. Kaufman¹, Rosalin Miles^{1,2}

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Background: The coronavirus disease (COVID-19) is an infectious and potentially deadly virus with growing research examining the mechanism of outbreak and community spread. It is commonly spread through respiratory droplets. This virus has caused a global pandemic declared on March 11, 2020, which has initiated and continues to cause negative health and wellness effects worldwide. This pandemic had led to a closure of social infrastructures, local businesses, and financial instability. **Purpose:** The purpose of this literature review was to explore the experiences and responses to COVID-19 for Indigenous communities in Canada, specifically looking at the physical health and wellness in these communities. **Methods:** A literature review was first conducted in March 2020 and was updated in June 2021. **Results:** An infographic was created after a review of the literature. Many Indigenous communities in Canada experience the disproportional effects from historical and ongoing health pandemics due to factors such as social determinants of health, the effects of intergenerational trauma, and systemic racism. Indigenous communities have found strengths in community-led initiatives that focus on promoting overall spiritual, mental, physical, and emotional wellbeing. **Conclusion:** Indigenous communities in Canada are successfully persevering through the COVID-19 pandemic by maintaining culturally relevant connections with family-centered and land-based approaches to physical health and wellness that have been practiced for generations. **Funding:** Canadian Institutes of Health Research (CIHR IA5-156528).

Keywords: COVID-19, Canada, Indigenous, Physical Health, Health, Communities

Mini-Oral Presentations Session C3

Mini-Oral Presentation C3.1 Physical activity levels and dietary patterns of Brazilians living in Canada

3:15 pm - 3:17 pm (Vancouver, Canada, Thursday, October 14, 2021)

Juliano Schwartz¹, Maira Botelho Perotto², Shannon S. D. Bredin^{3,11}, Paul Oh⁴, Ryan Rhodes⁵, Mariana de Assis Zanin⁶, Emanuel Couto⁷, Malcon Botteon⁸, Alejandro Gaytán González⁹, Flavia Markman¹⁰, Darren E. R. Warburton^{1,11}

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Background: The health benefits of routine physical activity and good dietary practices are clear. While Canada is a multi-cultural nation that welcomes immigrants from around the world, little is known about lifestyle behaviours of South Americans living in the country. **Purpose:** To examine levels of physical activity and fruit and vegetable consumption patterns of South American immigrants from Brazil, living in Vancouver. **Methods:** Recruited through social media postings, 84 Brazilians (68% women), aged 21-57 y (mean \pm SD = 35 \pm 6 y), reported their amount of moderate to vigorous physical activity (MVPA) and daily produce consumption. **Results:** A total of 76 (90.5%) participants did not meet the World Health Organization (WHO) guidelines on physical activity of a minimum of 150 minutes of MVPA per week. Also, 77 (91.5%) participants did not meet the recommendations of a combined consumption of a minimum of five servings of fruits and vegetables per day, as per the WHO global action plan for the prevention and control of chronic diseases. **Conclusion:** The vast majority of the participants reported low levels of physical activity and a suboptimal diet. These results emphasize the need for culturally appropriate initiatives to promote healthy lifestyle behaviours within this population. **Funding:** This work was supported by funding from CAPES (grant 2185-15-6), the Canadian Institutes of Health Research (CIHR IA5-156528), and the Natural Sciences and Engineering Research Council of Canada (NSERC RGPIN-2018-04613).

Keywords: Lifestyle, Health, Physical Inactivity

Mini-Oral Presentation C3.2 Prevalence of chronic non-communicable diseases in fitness centres users in Colombia

3:17 pm - 3:19 pm (Vancouver, Canada, Thursday, October 14, 2021)

Andrea Avila¹, S. Garcia¹, L. Camargo¹, A. Sarmiento¹

¹Medical department, BODYTECH

Background: The failure to achieve the recommended amounts of physical activity increases the risk of developing non-communicable diseases (NCDs), yet around 43% of the world population is not sufficiently active. Health clubs and fitness centres (HCFC) are an interesting option to practice physical activity but little is known about the presence of users with NCDs. **Purpose:** To assess the prevalence of NCDs in members of 91 fitness centres that attended first-time medical consultation during 2019. **Methodology:** A cross-sectional descriptive study was conducted based on data collected through monthly self-report by medical doctors at a fitness company during 2019. **Results:** By December 2019, the number of members was 208,147 nationwide. The medical department evaluate 20,423 (9.8%) users in first-time visits from which 58 (0.2%) were between 13 and 15 years old, 1896 (9.2%) were 16 to 35, 2414 (9.8%) were 36 to 49 and 3829 (18.7%) were above 50 years old. 2702 (13.2%) reported high blood pressure, 169 (0.8%) reported coronary heart disease, 2262 (11.1%) were obese and 1991 (9.7%) had overweight, 325 (1.5%) reported dyslipidaemia and 748 (3.6%) diabetes. **Conclusion:** There is scarce information related to users with NCDs

training in fitness centres. HCFC are places that represent a great opportunity to promote regular physical activity in individuals with NCDs. There is a need for HCFC to increase their participation as public health promoters. **Funding:** Bodytech is a Colombian HCFC with 91 facilities nationwide. Their services include physical training and free medical support by sports medicine physicians, physiotherapists and nutritionists.

Keywords: Non-Communicable Disease, Fitness Centre, Physical Activity

Mini-Oral Presentation C3.3 Abdominal obesity and its association with physical inactivity in Panamanian college students

3:19 pm - 3:21 pm (Vancouver, Canada, Thursday, October 14, 2021)

Luis Gabriel Rangel Caballero¹, Alba Liliana Murillo Lopez¹, Gonzalo Pulido Silva²

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Background: Abdominal obesity (AO) is an independent risk factor for cardiovascular disease. Physical inactivity (PI) has been determined by the World Health Organization (WHO) as a risk factor for obesity. **Purpose:** To assess the association between AO and PI in Panamanian college students. **Methods:** The sample comprises 374 college students, (263 women, 161 men; median age 20 years) from five different cities of a private university in Panamá. Every participant of the study signed written consent. The Global Physical Activity Questionnaire from WHO was utilized to collect data. AO was established as a waist circumference ≥ 80 cm in women and ≥ 90 cm in men. U Mann-Whitney and Chi-squared tests were used to compare differences by sex. Descriptive, as well as bivariate and multivariate analysis, were realized using logistic regression models. **Results:** 33.84% of participants had AO (no statistically significant difference was found by sex). 52.11% of women and 22.36% of men (<0.0001) showed PI. Men reported higher medians of minutes/week in occupational (<0.0001), leisure-time (<0.0001) and transport-related physical activity (<0.0150). After adjusting by gender, age and socioeconomic level, AO was associated with PI (OR: 1.762, IC 95%: 1.040 – 2.985, $p=0.035$). **Conclusions:** Women reported higher levels of PI than men did. Students who evidenced PI were more likely to have AO. It is important to implement strategies to promote physical activity, especially in women, to avoid future cardiovascular risk. **Funding:** Study founded by Santo Tomás University and Del Istmo University (Project code: 1924011).

Keywords: Abdominal Obesity, Motor Activity, Student, University, Risk

Mini-Oral Presentation C3.4 Perceived social variables related to physical activity levels in university students

3:21 pm - 3:23 pm (Vancouver, Canada, Thursday, October 14, 2021)

Claudia M. Espinosa Méndez¹, Darlene Kluka², Rodrigo I. Aguilar Enríquez¹, Sebastian L. San Martin Rodríguez³

¹Benemérita Universidad Autónoma de Puebla, México, ²Sport Management Consultant, USA, ³Centro Mexicano Universitario de Ciencias y Humanidades

Purpose: The aim of this research was to analyze the social variables related to the level of physical activity with university students in Mexico. **Methods:** A cross-sectional study was conducted, in which an ad hoc survey was applied where data of study variables were collected: level of physical activity and social influences (parents, friends, teachers, neighborhood). The sample consisted of 400 university students (268 men and 132 women) between the ages of 16 and 30 years. **Results:** Descriptive and qualitative relationship analysis through crosstabs (chi square), using variable recoding showed that 75% of the respondents were at moderate to high physical activity levels, showing a positive relationship between the level of physical activity and the perception of it with friends ($X^2 .04$), as well as dependent on parents and friends to encourage physical activity and that the neighborhood in which they live is safe ($X^2 .05$) without difference between men and women. No positive associations were found relative to the importance that parents gave to physical activity or if they were physically active prior to, not linked to the existence of recreation areas near homes or if neighbors were physically active. There was also no link between the level of physical activity and the influence of teachers relative to physical activity encouragement. **Conclusion:** A higher level of physical activity exists when parents and friends encourage the person and when friends participate together in a safe neighborhood. Teachers, recreation areas near home, neighbors, and family members participating in physical activity show no influence on the level of physical activity of the person.

Keywords: Social Variables, Physical Activity, University Students

Mini-Oral Presentation C3.5 Enjoyment and physiological benefits from exergaming vs. brisk walking among older adults: a comparison

3:23 pm - 3:25 pm (Vancouver, Canada, Thursday, October 14, 2021)

Reza Sayar¹, Farhad Daryanoosh¹, Maryam Koushie Jahromi¹, Ehsan Sinaei², Maryam Kheirmand Parizi¹, Sobhan Sobhani²

¹Shiraz University, Shiraz, Iran, ²School of Rehabilitation Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

Background: Physical activity (PA) rates are low among older adults, despite having various physiological and psychological benefits. Among the various reasons behind this low turn-out, is a lack of enjoyment from traditional exercise. **Purpose:** This study was conducted to compare the effects of Exergaming (EX; a form of active video gaming) with Brisk Walking (BW) on physiologic and psychological measures of older adults. **Methods:** 40 eligible male/female older adults were recruited in Shiraz, Iran. They were randomly put in two groups of 20 in a crossover design, and performed either a Brisk Walking or Exergaming session first and the other one a week later. Measures of Heart Rate (Chest Strap), Blood Pressure (Blood pressure monitor), Enjoyment (PACES Questionnaire) and Perceived Exertion (RPE Scale) were taken before, during, and after training sessions. A linear mixed model was used to analyze the data. **Results:** Although EX was physiologically more demanding compared to BW, as shown by both a significantly higher average ($p=0.003$), and peak heart rate ($p=0.000$), and also double product measurements ($p=0.002$), it resulted in significantly lower levels of perceived exertion ($p=0.000$), and higher enjoyment ($p=0.000$) among older

adults. **Conclusions:** Exergaming sessions can be a good alternative to traditional exercises like walking for older adults, providing higher to similar physiological benefits while being less exhausting and more enjoyable for the participants. **Funding:** No Funding sources to disclose.

Keywords: Exergaming, Brisk Walking, Enjoyment, Older Adults

Mini-Oral Presentation C3.6 Sleep and physical activity patterns in coordinator administrative staff in wildfire service settings

3:25 pm - 3:27 pm (Vancouver, Canada, Thursday, October 14, 2021)

Juliano Schwartz^{1,2}, Andrew T. Jeklin^{2,3}, Shannon S. D. Bredin^{4,5}, Kai Kaufman², Andrew S. Perrotta⁶, Bradley C. Hansen², Darren E. R. Warburton^{1,2,5}

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Background: Coordinator administrative staff working in wildland fire settings have high levels of stress and strain. They are responsible for the oversight of the health and safety of wildland firefighters and the general public. They are also often required to work in harsh environments with limited time for recovery. **Purpose:** To examine the sleep and physical activity patterns in coordinator administrative staff working in a wildfire service setting. **Methods:** The Sleep Condition Indicator (SCI) and the modified Godin-Shephard Leisure-Time Physical Activity Questionnaire were completed by 21 workers (61.9% Female), aged 21 -61yr (mean \pm SD = 38.5 \pm 11.9yr) from the British Columbia Wildfire Service, before and after the 2020 fire season. **Results:** In comparison to before the fire season, by the end of the season there was a significant decrease in the quality of sleep (SCI score: 21.1 \pm 7.1 vs 19.3 \pm 6.9, respectively, $t(20) = 2.493, p = 0.01$), as well as in the amount of moderate to vigorous physical activity (MVPA) per week (268.6 \pm 232.3min vs. 173.3 \pm 169.7min, respectively, $t(20) = 1.831, p = 0.04$). **Conclusions:** Our findings indicate that these individuals exhibit altered sleep and physical activity patterns during the fire season. The alterations in lifestyle behaviours are likely the result of the stressful and strenuous working conditions imposed by the fire season. Further studies are warranted to fully elucidate the effects of these changes on health outcomes in this population. **Funding:** This study was funded by WorkSafeBC.

Keywords: Workplace, Cognitive Fatigue, Health

Mini-Oral Presentation C3.7 The Association of retirement and leisure-time physical activity among middle-aged and older US adults

3:27 pm - 3:29 pm (Vancouver, Canada, Thursday, October 14, 2021)

Yuqi Zhang¹, Kathryn Burford¹, Harold W. Kohl, III¹

¹The University of Texas Health Science Center at Houston

Background: Changes in daily routine with retirement provides a good opportunity for adapting an active lifestyle. **Purpose:** To examine the association between retirement and leisure-time physical activity (LTPA) among middle-aged and older US adults. **Methods:** The sample comprised participants aged 55 years of age and older ($n = 148,849$; female = 52.9%) from the 2017 Behavioral Risk Factor Surveillance System. Employment status, LTPA, and socio-demographics were self-reported. The primary outcome was meeting the 2008 Physical Activity Guidelines for Americans (Guidelines). Univariate logistic regression was conducted to explore the association in each 5-year age group for both sexes. **Results:** Retirement was associated with higher odds of meeting the aerobic guidelines for both sexes (Men: OR 1.33; 95% CI 1.29-1.37; women: OR 1.06; 95% CI 1.03-1.09) and were observed across most of the age groups. Retirement was associated with higher odds for men (OR 1.04; 95% CI 1.00-1.07), while lower odds for women (OR 0.91; 95% CI 0.88-0.94) of meeting the muscle-strengthening guidelines. The associations were varied by age group for both sexes. Retirees were more likely to meet either vs. none of the guidelines, while retired women were less likely to meet both vs. none of the guidelines. **Conclusions:** Reported aerobic activity was higher across age groups for both sexes with retirement. The change in muscle-strengthening activity was different by sexes and not consistent across age groups, highlighting the need for promoting muscle-strengthening activity among retirees, especially in women and the older population. **Funding:** No funding.

Keywords: Older Adults, Retirement, LTPA

Mini-Oral Presentation C3.8 Investigation of social support provided for senior citizens in six-week virtual exercise program

3:29 pm - 3:31 pm (Vancouver, Canada, Thursday, October 14, 2021)

Takahiro Sato¹, Susumu Iwasaki², Garrett L. Peltonen¹

¹School of Nursing and Kinesiology, Western New Mexico University, ²Health & Human Performance Department, Fort Lewis College

Background: Providing social support is considered key for senior citizens to increase adherence to physical activity. **Purpose:** To qualitatively investigate the types of social support provided for senior participants by instructors during a six-week community-based virtual exercise program. **Methods:** The six-week exercise intervention, being offered via Zoom under the COVID-19 pandemic, consisted of bi-weekly whole body resistance training sessions that lasted 1 hour in duration. Semi-structured interviews were conducted individually with two exercise groups consisting of two instructors and eight senior participants on a weekly basis. **Results:** Qualitative analysis revealed that the instructors provided the senior participants with encouragement implementing specific strategies including the instructional, behavioral, and motivational approaches, while the senior participants felt encouraged by their instructors utilizing the forementioned approaches. The participants also felt challenged in ways that the instructors

challenged their participants, such as providing tough exercises. The senior participants perceived that Zoom sessions exceeded their expectations and accepted it positively, while both instructors and participants had to handle technological difficulties. **Conclusions:** Data indicate that exercise instructors demonstrated various kinds of social support to encourage and challenge the senior participants while the senior participants coincidentally perceived to be supported by the instructors in a six-week virtual exercise program offered via Zoom. The senior participants perceived the virtual class to be effective. **Funding:** Western New Mexico University Research Grant.

Keywords: Senior Citizens, Community-Based Exercise Program, Social Support, Zoom

Mini-Oral Presentation C3.9 Effects of six-week virtual exercise program on senior citizens' multidimensional well-being

3:31 pm - 3:33 pm (Vancouver, Canada, Thursday, October 14, 2021)

Takahiro Sato¹, Garrett L. Peltonen¹, Susumu Iwasaki²

¹School of Nursing and Kinesiology, Western New Mexico University, ²Health & Human Performance Department, Fort Lewis College

Background: Community-based exercise programs promote healthy aging by improving multidimensional well-being. **Purpose:** To elucidate the effect of a six-week community-based virtual exercise program on senior participants' multidimensional well-being, including self-perception of health and fitness and physical activity levels as well as adherence to the exercise program. **Methods:** The six-week exercise intervention, being offered via Zoom under the COVID-19 pandemic, consisted of bi-weekly whole body resistance training sessions that lasted 1 hour in duration. Pre- and post-intervention assessments were conducted with sub-groups of the senior participants to examine their perceived health and fitness utilizing Short Version of Physical Self-Description Questionnaire (PSDQ-S). Physical activity levels were quantified by an accelerometer prior to, during, and following the exercise program. Adherence was calculated as the percentage of exercise sessions attended. **Results:** Pre- and post-assessments indicated that the six-week exercise program was partially effective for the senior participants' multidimensional well-being. More specifically, paired t-tests revealed significant improvements ($P < .01$) for two out of 11 subscales of PSDQ-S observed in Health ($M_{pre} = 4.76$ & $M_{post} = 5.80$) and Body Fat ($M_{pre} = 1.78$ & $M_{post} = 3.11$). Physical activity levels were not different prior to, during, or after the exercise intervention based on the accelerometer captured data. Adherence to the six-week exercise program was high at 89%. **Conclusions:** The six-week community-based virtual exercise program was effective at improving senior participants' multidimensional well-being including self-perception of health and fitness and maintaining adherence high despite not increasing physical activity levels. **Funding:** Western New Mexico University Research Grant.

Keywords: Senior Citizens, Community-Based Exercise Program, Multidimensional Well-Being, Zoom

Mini-Oral Presentation C3.10 Health associations with meeting the Canadian 24- hour movement guidelines for adults and older adults

3:33 pm - 3:35 pm (Vancouver, Canada, Thursday, October 14, 2021)

Scott Rollo^{1,2}, Karen C Roberts³, Felix Bang³, Valerie Carson⁴, Jean-Philippe Chaput^{1,2,5,6}, Rachel C Colley⁷, Ian Janssen⁸, Mark S Tremblay^{1,2,5,6}

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Background: The Canadian 24-Hour Movement Guidelines for Adults aged 18-64 years and Adults aged 65 years or older (24hrMG) provide evidence-based recommendations for moderate-to-vigorous physical activity (MVPA), sedentary behaviour (SB) and sleep. **Purpose:** To examine whether meeting the overall 24hrMG, and different combinations of guideline recommendations, were associated with health indicators in a representative sample of Canadian adults. **Methods:** Participants were 8,297 adults aged 18-79 years from the Canadian Health Measures Survey. They were classified as meeting or not meeting each of the 24hrMG recommendations: MVPA (≥ 150 minutes/week), SB (≤ 9 hours/day of sedentary time including ≤ 3 hours/day of recreational screen time), and sleep duration (adults 18-64 years: 7-9 hours/day, adults aged ≥ 65 years: 7-8 hours/day). A combination of self-reported and device-based measures were used. Indicators of adiposity ($n=2$), aerobic fitness ($n=1$), and cardiometabolic health ($n=7$) were measured. **Results:** A total of 19.1% of the sample met none, 43.9% met one, 29.8% met two, and 7.1% met all three recommendations. Compared to meeting no recommendations, meeting one, two and all three recommendations was associated with better health for one, six and seven health indicators, respectively ($p < .05$). Compared to adults meeting two or fewer recommendations, those who met all three recommendations had more favourable BMI, waist circumference, aerobic fitness scores, and triglyceride, insulin, C-reactive protein, and serum glucose levels ($p < .05$). **Conclusions:** These findings provide support for the 24hrMG and show that less than one in ten Canadian adults are meeting the overall 24hrMG. **Funding:** None.

Keywords: Movement Behaviours, Public Health Recommendations, Risk Factors, Adults, Epidemiology

Mini-Oral Presentation C3.11 Socio-demographic factors associated with meeting the Canadian 24-hour movement guidelines among adults and older adults

3:35 pm - 3:37 pm (Vancouver, Canada, Thursday, October 14, 2021)

Scott Rollo^{1,2}, Karen C. Roberts³, Felix Bang³, Valerie Carson⁴, Jean-Philippe Chaput^{1,2,5,6}, Rachel C. Colley⁷, Ian Janssen⁸, Mark S. Tremblay^{1,2,5,6}

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Background: The Canadian 24-Hour Movement Guidelines for Adults aged 18-64 years and Adults aged 65 years or older (24hrMG) provide evidence-based recommendations for moderate-to-vigorous physical activity (MVPA), sedentary behaviour (SB) and sleep. **Purpose:** To provide estimates of the proportion of Canadian adults meeting the new 24hrMG and examine associations between socio-demographic factors and meeting vs. not meeting the individual and integrated guideline recommendations. **Methods:** The study is based on 7,651 respondents aged 18-79 years from the 2007-to-2013 Canadian Health Measures Survey, a nationally representative, cross-sectional survey. Socio-demographic factors included age, sex, household education, household income, ethnicity, having a chronic condition, smoking status, alcohol consumption, and BMI. Participants were classified as meeting or not meeting each of the time-specific recommendations for MVPA, SB, and sleep duration. A combination of self-reported and device-based measures were used. **Results:** The proportion of adults who met the MVPA, SB, sleep and integrated guidelines were 42.0, 18.4, 65.2, and 7.1%, respectively. Multivariable logistic regression analyses showed that age, BMI, smoking status, and presence of a chronic condition were associated with meeting the integrated guidelines. Examining adherence to the individual recommendations, age, sex, BMI, household education, household income, smoking status, and having a chronic condition were associated with meeting the MVPA recommendation; age was associated with meeting the SB recommendation; and household income, ethnicity, and presence of a chronic condition were associated with meeting the sleep recommendation. **Conclusions:** Few Canadian adults meet the Canadian 24hrMG and disparities across socio-demographic factors exist. **Funding:** None.

Keywords: Movement Behaviours, Public Health Recommendations, Correlates, Adults, Epidemiology

Mini-Oral Presentation C3.12 Prescribing physical activity during pregnancy: Behaviour of professionals from public health system under COM-B model

3:37 pm - 3:39 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Pregnancy is associated with a decrease in physical activity (PA) in women. During the antenatal consultation, health professionals are essential to provide health advice during the pregnancy including PA. **Purpose:** To explore the factors related to the capacity, opportunity and motivation of health professionals of the public system for the routine prescription of PA in women with a healthy pregnancy. **Methods:** A qualitative study with thematic analysis was developed. Were conducted seven semi-structured interviews to nutritionists and midwives who follow up pregnant women in their routine health check-ups. The interviews were analyzed following the themes of the COM-B behaviour change model **Results:** For capacities, the participants identified the need for training on gestational FA. For opportunities, the topics surveyed were: the need for infrastructure, access, time, and a professional in charge of implementation. For motivation, it was identified there is a high motivation to prescribe PA during prenatal controls, provided that the barriers of lack of system support are overcome, and there is recognition of the work, reducing work overload. **Conclusions:** The behaviour of health professionals regarding the prescription of PA during pregnancy is determined by the lack of knowledge of the subject, the structural conditions of the health system and culture, which are perceived as adverse and generate demotivation. However, there is a high interest to include PA in prenatal counselling due to its health benefits. Motivation is influenced by personal experience with PA. **Funding:** Study founded by Physical Therapy School, Universidad del Desarrollo.

Keywords: Pregnancy, Behaviour Change, Physical Activity, Public System

Mini-Oral Presentation C3.13 Physical activity in pregnant women: Understanding behaviour change from Transtheoretical Model

3:39 pm - 3:41 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Pregnancy is associated with a decrease in physical activity (PA) despite its benefits. The Transtheoretical Model (TTM) allows explaining the changed behaviour in health, and it can help understand health behaviour during pregnancy. **Purpose:** To evaluate the stages of change to perform PA during pregnancy according to TTM and describe the barriers and facilitators for each stage of change of TTM in pregnant women controlled in primary care. **Methods:** Healthy pregnant women (n=71) from primary care centres filled in a self-administered TTM questionnaire and an open-ended questionnaire about barriers and facilitators for each stage of change. For data analysis, was used inferential statistics using Chi2 and Wilcoxon tests ($\alpha=5\%$). **Results:** 79% of pregnant women were in inactive stages (pre-contemplation, contemplation, preparation) of the TTM and 84% from their reported not receiving PA advice during their pregnancy. There was an association between TTM-stage and marital status, parity, PA advice and pre-pregnancy PA ($p<0,05$). No association was found between TTM-stages and BMI >25 . Participants in inactive stages were older, compared to women in active stages($p<0,05$) (action and maintenance stages). The main

barriers described were physical and psychological. The main facilitators were environmental. **Conclusions:** A high proportion of pregnant women were in "inactive stages". Being older, having a lower educational level, greater parity, being married/partner is associated with "inactive stages". Receiving PA advice during pregnancy is associated with "active stages". There is a special opportunity to engage pregnant women who are in the Preparation stage to do PA. **Funding:** No funding.

Keywords: Pregnancy, Physical Activity, Stage of Change

Mini-Oral Presentation C3.14 Increasing interest in bicycling among adolescents through physical education

3:41 pm - 3:43 pm (Vancouver, Canada, Thursday, October 14, 2021)

Esther Walker¹, Lauren Freeman¹

¹Outride, San Diego, USA

Background: Physical education (PE) class is an important setting for engaging adolescents in physical activity. Identifying activities students enjoy is critical for preparing students for a physically active lifestyle. **Purpose:** To understand adolescents' experience with bicycling programming during PE class. **Methods:** Students from a sample of schools participating in Outride's 6 week Riding for Focus PE unit completed pre and post Spring 2021 unit surveys (1268 middle school students across 20 schools in the United States; 40% female). Students were asked to report their experience with bicycling and the Riding for Focus PE unit as well as feelings of well-being (WHO-5). **Results:** 91% of students reported being at least a little interested in continuing to ride outside of school. Students were most interested in bicycling with friends and least interested in bicycling to school. Program enjoyment was associated with bicycling experience ($p < .001$), but not gender ($p = .83$) or weekly physical activity levels ($p = .47$). Riding preferences were modulated by gender. **Conclusions:** Bicycling during physical education engages students in a safe and enjoyable activity, particularly for students who may not typically enjoy PE class. Students who have never ridden a bike may need extra support and encouragement from teachers and peers. Schools implementing the program should use the opportunity to work with their wider community to support increased student interest in bicycling and promote riding with friends to school. **Funding:** Study supported by Outride.

Keywords: Adolescents, Bicycling, Physical Education

Mini-Oral Presentation C3.15 Monitoring study on the development status of scientific fitness literacy for adolescents in China

3:43 pm - 3:45 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: On June 25, 2019, the State Council issued the "Opinions on Implementing Health China Action", in order to better understand the current situation of scientific fitness among Chinese adolescents, comprehensively promote the overall development of physical health of Chinese adolescents, and develop a targeted scientific fitness strategy for Chinese adolescents. **Purpose:** To monitor the current status of Chinese youth participation in scientific fitness, and to provide targeted reference for youth scientific fitness decision making in order to promote the improvement of scientific fitness literacy among Chinese youth. **Methods:** The questionnaire was developed through the expert interview method, and the survey was conducted after testing the reliability of the questionnaire and using mathematical and statistical methods. 4938 survey samples were collected nationwide, of which 4663 were valid, with an efficiency rate of 94.4%, and the corresponding data were processed using SPSS26.0. **Results:** (1) The main way for our teenagers to obtain fitness knowledge is mainly through school and internet (84.4%); supplemented by family way (10%); (2) The most number of weekly exercise for our teenagers is 3-4 times (28.5%), followed by 5 times and above (27.1%); (3) The length of exercise for our teenagers keeps within 30 minutes accounts for 33.2%, 31-60 minutes for 21.3%; (4) In terms of exercise frequency: 32.1% of adolescents are irregular and 31.5% do not exercise. **Conclusions:** Chinese adolescents have relatively single access to fitness knowledge, and most of them keep the number of weekly exercise within the scientific range, but the length and regularity of exercise are poor. It is suggested that the relevant departments adopt systematic and diversified fitness strategies to enhance the exercise duration of youth participation in fitness activities and cultivate the regularity of youth exercise. **Funding:** 2019 National Sports Administration Decision Making Grant Project, Approval No. 2019-C-08.

Keywords: Adolescents, Scientific Fitness Literacy, Monitoring Research

Mini-Oral Presentation C3.16 Understanding the intention-to-behaviour relationship for adolescents: An application of the Multi-Process Action Control Model

3:45 pm - 3:47 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: The multi-process action control model (M-PAC) is an integrative model specifically designed to evaluate intention-behaviour gaps (Rhodes, 2017). To date, however, the processes through which intentions are translated into action have largely been underexplored among adolescents. **Purpose:** The primary purpose of the study was to investigate the distribution of intention-behaviour profiles during late adolescence; and to apply the M-PAC framework to better understand predictors of these

profiles. **Methods:** Our sample included 1176 grade 11 students ($M_{age}=15.85 \pm 0.38$, 45.6% male) that completed an online questionnaire as part of the baseline cohort in the ADAPT study. The questionnaire assessed the reflective, regulatory, and reflexive processes outlined within M-PAC, and a self-reported measure of moderate-to-vigorous PA. **Results:** Following the use of a novel tertiary split, six intention-behaviour profiles were observed: successful non-intenders (7.1%; $n=83$), unsuccessful non-intenders (2.8%; $n=33$), inactive quasi-intenders (20.6%; $n=242$), active quasi-intenders (19.2%; $n=226$), unsuccessful intenders (12.5%; $n=147$) and successful intenders (37.8%; $n=445$). Descriptive statistics revealed successful intenders reported the highest scores on all M-PAC predictors, followed by unsuccessful intenders. A graded response pattern continued for quasi-intenders and non-intenders, with successful non-intenders scoring the lowest across all M-PAC variables. **Conclusions:** The current study offers new insight into the intention-behaviour gap by differentiating adolescents with more conviction in their intentions from those that report intention ambivalence to create six intention-behaviour profiles. Findings demonstrate strong support for the core tenets of M-PAC in predicting physical activity intention-behaviour profiles during late adolescence. **Funding:** The ADAPT study is funded by an Insight Grant from the Social Sciences and Humanities Research Council of Canada.

Keywords: Adolescents, Physical Activity, Intention-Behaviour Gap, Multi-Process Action Control Model, Quasi-Intenders

Mini-Oral Presentation C3.17 Longitudinal associations between e-cigarette use, cigarette smoking, physical activity and screen time among Canadian adolescents

3:47 pm - 3:49 pm (Vancouver, Canada, Thursday, October 14, 2021)

Dylan S. Irvine^{1,2}, Ellen McGarity-Shiple¹, Eun-Young Lee^{1,3}, Ian Janssen^{1,4}, Scott T. Leatherdale⁵

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Background: Cross-sectional studies have suggested that among adolescents, e-cigarette use may be protective and cigarette smoking may be harmful in terms of movement behaviors and sport participation. **Purpose:** To examine longitudinal associations between e-cigarette use, cigarette smoking, physical activity, and recreational screen time in a cohort of Canadian adolescents (grades 9-12). **Methods:** Data from 5,951 adolescents who participated in COMPASS 2015-16 (baseline) and 2017-18 (follow-up) were used. Exposures included e-cigarette use and cigarette smoking. Outcomes included cut-points for moderate- to vigorous-physical activity (MVPA; 60 min/d), muscular strengthening exercises (MSE; 3 time/wk), participation in sport (SP; intramural or competitive), and recreational screen time (ST; 430 min/day). Generalized linear mixed models were performed. **Results:** E-cigarette use (16.6% to 39.2%) and cigarette smoking (0.9% to 4.7%) increased from baseline to follow-up, while a decrease was observed for MVPA (49.8 to 42.1%), MSE (54.0 to 45.3%), and SP (70.8 to 61.3%). New e-cigarette use at follow-up was associated with maintenance of SP and meeting MVPA/MSE cut-points, but also with increased ST. New cigarette smoking at follow-up was associated with maintaining high ST and low SP. Cigarette smoking at baseline and follow-up was associated with maintaining high ST, low MSE, and low SP. Cigarette smoking cessation at follow-up was associated with increasing MVPA and MSE, decreasing ST, and maintaining low SP. **Conclusion:** E-cigarette use can have a protective or harmful effect on movement behaviors depending on the movement behavior in question, with protective effects for PA, but harmful effects for ST. **Funding:** The COMPASS study has been supported by a bridge grant from the CIHR Institute of Nutrition, Metabolism and Diabetes (INMD) through the "Obesity – Interventions to Prevent or Treat" priority funding awards (OOP-110788; awarded to SL), an operating grant from the CIHR Institute of Population and Public Health (IPPH) (MOP-114875; awarded to SL), a CIHR Project Grant (PJT-148562; awarded to SL) and by a research funding arrangement with Health Canada (#1617-HQ00012; awarded to SL). Dr. Leatherdale (APHC201405CPP-329323-116339) is a Chair in Applied Public Health Research funded by the Public Health Agency of Canada in partnership with CIHR. The funding bodies had no role in the design of the study, the collection, analysis, or interpretation of data, or the writing of the manuscript.

Keywords: Vaping, Tobacco Smoking, 24-Hour Movement Guidelines, COMPASS

Mini-Oral Presentation C3.18 Gendered associations between e-cigarette use, cigarette smoking, physical activity, and sedentary behavior among Canadian adolescents

3:49 pm - 3:51 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: A large increase in adolescent e-cigarette use and cigarette smoking has generated concerns about how these exposures may impact adolescent health behaviors. **Purpose:** To examine associations between e-cigarette use, cigarette smoking, physical activity, and sedentary behavior among a large sample of Canadian adolescents (grades 9-12). **Methods:** Data from 55,629 students who participated in COMPASS Year 6 (2017-2018) were used. Exposures included e-cigarette use and cigarette smoking. Outcomes included meeting recommendations for moderate-to vigorous-physical activity (MVPA; 60 min/d), muscular strengthening exercises (MSE; 3 time/wk), and recreational screen time (ST; 2hr/day) and participating in sports. Logistic regressions were performed. **Results:** Males showed higher prevalence of e-cigarette use (40.0% vs 31.3%) and cigarette smoking (4.4% vs 2.9%) than females. Both males and females who used e-cigarettes were more likely to meet MVPA and MSE recommendations, but less likely to meet the ST recommendation than those who did not use e-cigarettes. E-cigarette use was associated with more sport participation in males, however, results among females were mixed. Current cigarette use was associated with meeting the MVPA recommendation and less participation in intramurals in males; however, in females, current

cigarette smoking was associated with less participation in any sports. Former cigarette use was associated with meeting the MSE recommendation in females. **Conclusions:** This study found that associations between e-cigarette use and cigarette smoking with movement behaviors and sport participation are largely gendered. Identifying differential co-occurrence of risk behaviors by gender is important for future health promotion efforts targeting physical activity among adolescents. **Funding:** The COMPASS study has been supported by a bridge grant from the CIHR Institute of Nutrition, Metabolism and Diabetes (INMD) through the “Obesity – Interventions to Prevent or Treat” priority funding awards (OOP-110788; awarded to SL), an operating grant from the CIHR Institute of Population and Public Health (IPPH) (MOP-114875; awarded to SL), a CIHR Project Grant (PJT-148562; awarded to SL) and by a research funding arrangement with Health Canada (#1617-HQ000012; awarded to SL). Dr. Leatherdale (APHC201405CPP-329323-116339) is a Chair in Applied Public Health Research funded by the Public Health Agency of Canada in partnership with CIHR. The funding bodies had no role in the design of the study, the collection, analysis, or interpretation of data, or the writing of the manuscript.

Keywords: Vaping, Tobacco, Exercise, Sport, Teens

Mini-Oral Presentation C3.19 Health implications associated with long-term vaping or electronic cigarette use in adults: A systematic review

3:51 pm - 3:53 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Millions of active e-cigarette users exist in a midst of a rapidly growing industry. However, its long-term effects on health are largely unknown. **Purpose:** To examine the health impacts of prolonged e-cigarette use. **Methods:** MEDLINE and google scholar were searched in December 2020. Keywords were vaping, e-cigarette, chronic, long-term, and health impacts. Inclusion criteria were 1) adults (18+ years), 2) chronic e-cigarette/vape users, 3) studies published 2010-2020, and 4) written in English. Exclusion criteria included 1) reviews/editorials, 2) smoking cessation interventions, 3) studies without control population, 4) participants with pre-existing co-morbidities, and 5) studies investigated acute outcomes. Covidence software was used for screening and Microsoft Word with a predesigned coding form was used for data extraction, of which the evidence was synthesized from. **Results:** Based on eight studies included in this review, e-cigarette use demonstrated an independent risk associated with developing chronic illnesses when compared to combustible tobacco use. Socio-economic factors (i.e., sex/race/income/education), substance abuse, and access to healthcare were strong predictors of e-cigarette use and subsequently, the development of respiratory illness. E-cigarette users who did not smoke cigarettes were between 1.40–5.17 times more likely to report COPD than non-e-cigarette users. E-cigarette use also significantly impacted esophageal protein activity and included 14 altered pathways that were not observed in smokers. **Conclusion:** There was some evidence suggesting a short-term negative impact of e-cigarette use on health. However, there is an extensive need for more prospective studies that investigate the long-term effect of e-cigarette use on chronic illnesses to establish causality. **Funding:** None.

Keywords: E-cigarette, Vaping, Respiratory Disease, Chronic Health Conditions

Mini-Oral Presentation C3.20 Dose-response association between protein content per meal and physical disability in Mexican older adults

3:53 pm - 3:55 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Physical disability (PD) usually increases with age. A protein content per meal ≥ 30 g has been associated with a lower probability of PD in older adults. However, whether a similar pattern is observed with a different protein content remains to be determined. **Purpose:** To determine the protein content per meal associated with a lower probability of PD in a sample of Mexican older adults. **Methods:** Cross-sectional study (n=187, ≥ 60 y, 75% female). One 24-h dietary recall was administered to estimate the protein content per meal (categorized with cut points between 10 and 40 g) and to count the number of meals with such amounts. PD was assessed with the Lawton questionnaire. Logistic regressions adjusted for age, sex, BMI, diagnosed diseases, and total protein intake were performed. **Results:** Three out of five PD showed a significant association with protein content per meal ($p < 0.05$). PD in shopping was less likely for those consuming one meal with 35 to 40 g and those consuming two meals with 25 to 30 g. Transport disability was less likely for those consuming one meal with 30 to 40 g and those consuming two meals with 20 to 30 g. Finally, medication disability was less likely for those consuming one meal with 35 to 40 g. **Conclusions:** A protein content of 30 to 40 g in one meal or two meals with 25 to 30 g each seems to be advisable for decreasing the probability of presenting PD. **Funding:** None.

Keywords: Older Adults, Physical Disability, Protein

Mini-Oral Presentation C3.21 Effect of major life events on travel behaviours: a scoping review

3:55 pm - 3:57 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Previous research suggests that major life events may be “windows of opportunity” for travel behaviour change. **Purpose:** Our scoping review examined the effects of seven events (transitions to secondary school, post-secondary studies,

labour market, marriage, parenthood, retirement, and relocation) on travel behaviours. **Methods:** We searched five databases (MEDLINE, PsycINFO, Web of Science, SportDISCUS and ProQuest Dissertations and Theses) for articles/theses published by April 2020. After removing duplicates, 3,061 potentially-relevant articles/theses were screened independently by two researchers. Original prospective and retrospective studies reporting travel behaviours before and after the transition were eligible. Eighty articles met inclusion criteria. **Results:** Relocating to compact neighbourhoods (with shorter commute distance or travel time, greater walkability, and better access to destinations) was associated with shifts towards sustainable travel modes (e.g., walking, cycling, and transit). Relocation may be an opportune period to implement interventions to promote sustainable transportation because all six interventions with sufficient statistical power were effective. Entering the labour market was generally associated with declines in sustainable transportation and increased car use. Qualitative studies suggested that attitudes towards cycling may worsen during adolescence, while attitudes towards driving improve. Changes in travel behaviour for other events were less consistent. **Conclusion:** These findings suggest that major life events are indeed “windows of opportunity” for travel behaviour change. Urban planners and policymakers should develop compact and walkable neighbourhoods in an effort to facilitate healthy and sustainable travel behaviours. Research in developing countries remain scarce and further intervention research is needed to enhance quality of evidence. **Funding:** Study funded by start-up research funds from the University of Lethbridge.

Keywords: Sustainable Transport, Commuting, Transition Periods, Life-course Approach, Physical Activity

Mini-Oral Presentation C3.22 Clusters types of obesogenic behaviors in youth according to country income: a systematic review

3:57 pm - 3:59 pm (Vancouver, Canada, Thursday, October 14, 2021)

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Background: Interaction effects of physical activity (PA), diet, and sedentary behavior (SB) are included as obesity behavioral determinants mainly in youth and may vary according to economic and cultural aspects. **Purpose:** This systematic review aimed to identify clusters of PA, diet, and SB among youth according to countries' income. **Methods:** This study was registered in PROSPERO (CRD42018094826). Five electronic databases were assessed. Studies that analyzed only PA, diet, and SB by applying data-based cluster procedures in samples of children or adolescents were eligible. Cluster characteristics were extracted in accordance to authors' descriptions and countries' income was obtained from World Bank data. **Results:** 11,910 articles have been reached and 25 were included. Thirty-nine clusters were found in high-, 22 in upper-middle and 7 in low-income countries. Clusters characterized by “High PA” (n=9) and “High SB and high consumption of sugar, salt, and beverages (SSB)”(n=8) were the most common and were observed in all incomes. The healthiest profile “High PA and F&V; Low SB and SSB” (n=6) was observed only in high-income countries. Clusters “High SSB”, “High SB” and “Low PA, SB, SSB and High F&V” were found only in upper-middle and low-income countries. **Conclusion:** Clusters behaviors in youth seems to vary depending on the country's economic condition. However, most studies have come from high-income countries, then more studies are needed in lower income countries to understand the variation of these behaviors in youth population. These results support the necessity on tailoring multicomponent intervention programs including more than one behavior at the same time. **Funding:** None.

Keywords: Adolescent, Children, Cluster, Physical Activity, Sedentary Behavior, Diet