



People and Planet

**from Theory to
Solutions 2024:**
towards Transformations

ABSTRACTS

THE PEOPLE AND PLANET - FROM THEORY TO SOLUTIONS CONFERENCE 2024: TOWARDS TRANSFORMATIONS

Dates: 13-15th of February
Location: Lahti, a leading city in sustainability and planetary health

#PeoplePlanetConference #PlanetaryHealth

This international conference will bring together researchers, decisionmakers, specialists and other stakeholders interested in planetary health, sustainability and wellbeing.

Participation includes 3 days of transdisciplinary sessions, discussions, presentations and posters that spur transformative action through scientific knowledge.

The conference will focus on how human health and the health of the planet are closely connected and what can be done to protect and enhance both. In particular, the conference encourages finding solutions in complex systems and interlinked crises of climate change, biodiversity loss and the rise of noncommunicable diseases.

Science-informed knowledge and solutions for tackling challenges around planetary health are essential for transformative action. Planetary health requires supportive leadership and urban planning, sustainable healthcare, sustainable food systems, active mobility and improved understanding of the value of nature to our wellbeing, among other subjects. Furthermore, an emphasis is needed on finding effective intervention points and strategies while considering societal megatrends such as digitalization and aging population.

This conference follows on from the Helsinki Planetary Health Conference in 2019, People and Planet Conference in 2021, and will continue in the spirit of the Helsinki Declaration in emphasizing the urgency for action.

The conference is organized in connection to Nature Step to Health – Lahti Regional Health and Environment Programme 2022-2032, by Lahti University Campus together with City of Lahti, Wellbeing Services County of Päijät-Häme and other partners.

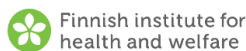


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Keynotes

Planetary health, a new paradigm for action and systems research

Prof. Pim Martens, Maastricht University, System Earth Science Institute / University College Venlo



Pim Martens

Pim Martens has a PhD in applied mathematics and biological sciences. He is a professor of planetary health and the dean of Maastricht University College Venlo. Prof. Dr. Martens is currently a project-leader and a principal investigator of several projects related to planetary health, sustainability science and education, and human-animal-nature relationships. Pim Martens is a scientist and founder of AnimalWise, a “think and do tank” integrating scientific knowledge and animal advocacy to bring about sustainable change in our relationship with animals.

Healthy and sustainable futures: at the interface of science and practice

Planetary Health physician, MD, PhD Hanna Haveri, Päijät-Häme Central Hospital
Unit director, PhD, Doc. Riikka Paloniemi, Finnish Environment Institute



Hanna Haveri

Dr. **Hanna Haveri** (MD PhD) is a specialist in neurology with special competence in eHealth. Since 2021, she has been working as a planetary health physician besides her clinical work in Päijät-Häme Central Hospital in Lahti, Finland. In her current work she tries to disseminate knowledge of planetary health to different sectors and stakeholders, including popularizing science to lay audiences. In her research, she is investigating the determinators of human health and its interlinkages with the environment, a special focus on biodiversity. She regards transdisciplinary collaboration as the key to achieving tangible results in planetary health. The regional health and environment program *Nature Step to Health 2022-32* is an exemplary framework for such transformations.

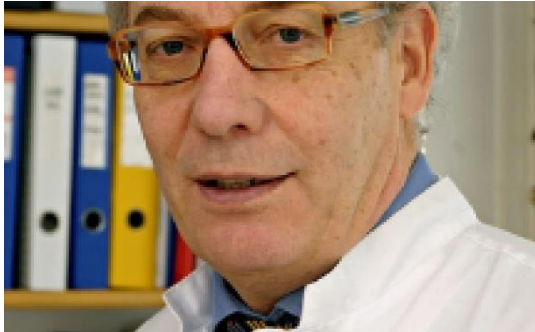


Riikka Paloniemi

PhD, doc. **Riikka Paloniemi** works as a unit director of societal change unit at Finnish Environment Institute (Syke). Her work focuses on exploring and encouraging sustainability transformation through transdisciplinary research, science-policy interaction and societal dialogue. Her research has covered diverse aspects of planetary health, including for example biodiversity, planning and decision-making, and sustainability agency.

Natural step towards preventing non-communicable diseases

Prof. Em. Tari Haahtela, University of Helsinki



Tari Haahtela

Dr. **Tari Haahtela** is professor emeritus of clinical allergology at the University of Helsinki. He is the former Head of Skin and Allergy Hospital, Helsinki University Hospital. He has chaired the Finnish Asthma Programme in 1994-2004 and the Allergy Programme in 2008-2018. His group has studied the environmental and lifestyle determinants of allergy and asthma in the Finnish and Russian Karelia. The results led to the biodiversity hypothesis of allergy and health in general.

Healthy living environments – what do we need?

Adj. Prof., MD, PhD Matilda van den Bosch, Barcelona Institute for Global Health, Biocities Facility of the European Forest Institute



Matilda van den Bosch

Dr **Matilda van den Bosch** (MD, PhD) is a Senior Researcher at the Barcelona Institute for Global Health, Spain and at the Biocities Facility of the European Forest Institute, Italy. She is also an adjunct professor at the University of British Columbia, Canada. She has a background in medicine and her interdisciplinary research analyses the interconnections between human health and the health of natural environments. Her goal is to contribute to evidence-based policies and practice that acknowledges and supports the interdependence between a healthy planet and healthy people. She is leading several international research projects related to climate change mitigation, childhood health, and nature-based solutions and she advises various international organisations, including the World Health Organization and the UN Environmental Programme.

Towards social, environmental and economic sustainability with digital health

Prof. Minna Isomursu, University of Oulu



Minna Isomursu

Professor **Minna Isomursu** is dedicated to enhancing people's lives through technology. The focus of her research is on digital health and data-driven services. Her career journey has led her through the interwoven paths of academia and industry, both in Finland and internationally. Today, she is a professor at the University of Oulu for the 6G-enabled sustainable society (6GESS) profiling programme.

Within the walls of the university and beyond, Minna's current work embraces the complexities of healthcare, striving to craft effective digital care pathways and address the intricacies of health data infrastructures. She values the cross-pollination of disciplines, seeing sustainability as an integral part of wellbeing. To Prof. Isomursu, the future is shaped by the rich tapestry of dialogues and the blending of diverse interdisciplinary data and knowledge.

Climate change and health - the evidence for action

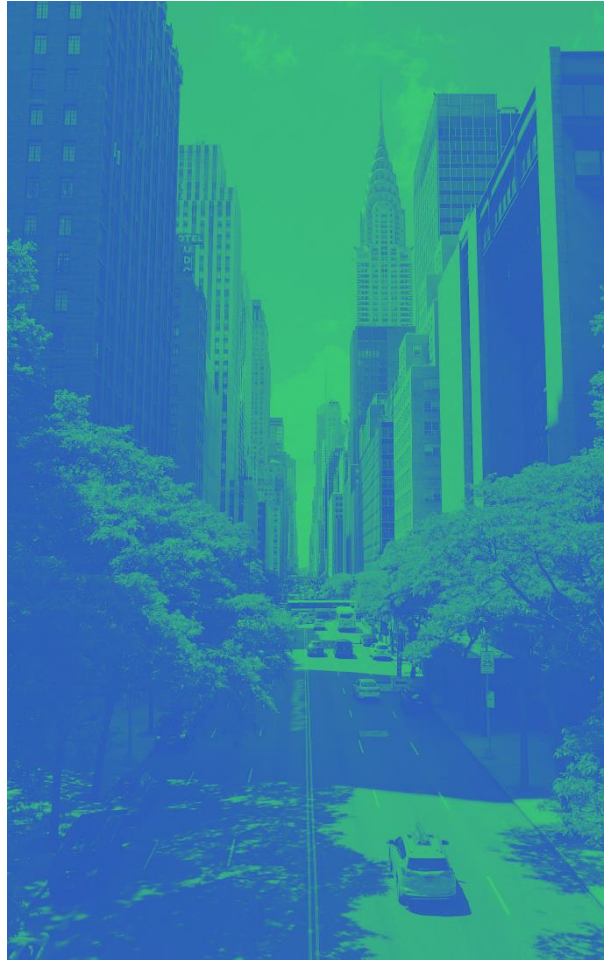
Prof. Sir Andrew Haines, London School of Hygiene & Tropical Medicine



Sir Andy Haines

Professor **Sir Andy Haines**, Professor of Environmental Change and Public Health, Co-director of the WHO Collaborating Centre on Climate Change, Health and Sustainable Development, London School of Hygiene & Tropical Medicine.

He was formerly a family doctor and Professor of Primary Health Care at University College London. He developed an interest in climate change and health in the 1990's and was a member of the Intergovernmental Panel on Climate Change for the 2nd, 3rd and 5th assessment exercises. He chaired the Scientific Advisory Panel for the 2013 WHO World Health Report, the Rockefeller/Lancet Commission on Planetary Health (2014-2015) and the European Academies Science Advisory Council working group on climate change and health (2018-2019). He co-chaired the InterAcademy Partnership (140 science academies worldwide) working group on climate change and health (2019-2022) and is currently co-chairing the Lancet Pathfinder Commission on health in the zero-carbon economy. He was awarded the Tyler Prize for Environmental Achievement in 2022.



Session A. Defining and demonstrating leadership of healthy and sustainable cities

Chair: Prof. Sirkku Juhola, University of Helsinki

Oral presentation

Casimiro Vizzini, One Sustainable Health for All Foundation
Brian Rudkin, Benoît Miribel

Rethinking sustainable health: Leveraging novel technologies and knowledge through interdisciplinary collaboration

Background: Pursuing sustainable health globally necessitates collaborative work, integrating expertise from various disciplines and stakeholders. The One Sustainable Health (OSH) Forum symbolizes this endeavor, bringing together a diverse group of over 80 experts from 19 countries across civil society, academia, NGOs, and the private sector. The Initiative aims to enable an integrated, equitable, global health approach.

Methods: OSH Forum initiated a consultation and research process, focusing on six strategic sectors: Pollution, Food and nutrition Systems, Human and planetary Health, Equitable Access to Health Services, Finance and Global Levers of Change, and Empowering Local Communities. International Partner Sessions in Bangladesh, Brazil, Lebanon, and Senegal further enriched this discourse with additional recommendations and case studies.

Findings: The inclusive process culminated in concrete operational actions and policy recommendations presented at an international forum in Lyon, France. These recommendations emphasize public knowledge, finance, data and scientific evidence, and strategy and governance. They advocate for multifaceted approaches involving taxation, subsidies, multisectoral financing, data generation, research, and strategic governance to address the intertwined facets of health, environment, and climate.

Conclusion: The One Sustainable Health Forum emerged as a dynamic platform for interdisciplinary dialogue. It fosters innovation and actionable steps toward global health equity by integrating planetary, animal, and human health perspectives. This holistic approach transcends traditional boundaries and is instrumental in profoundly impacting global health outcomes. The recommendations from the forum serve as a guiding framework for rethinking sustainable health, leveraging novel technologies, and integrating diverse knowledge to ensure equitable and lasting global health solutions.

Keywords: One Health, Planetary, Animal, and Human Health, Interdisciplinary Collaboration, Pollution and Environmental Impact, Strategy and Governance, Operational Actions and Policy Recommendations

Oral presentation

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Tailored cities: Unlocking well-being potential

Several factors such as increasing urban population density, environmental and health crises, and political conflicts are shaping discussions about the future of cities. Over decades, multi-lateral agreements on the international fora have led to adoption of several ambitious goals, including SDGs, which funnel down to the crucial role of cities in taking actions to strive towards achieving them. Whilst striving towards such goals it must not be forgotten that "Leave no one behind (LNOB)" is the central, transformative promise of the 2030 Agenda for Sustainable Development. This also applies to the case of Nature based Solutions (NBS). Quite a lot of the research endeavors, policy formulations, and practical applications have been dedicated to finding ways to adhere to equity principles mainstreaming NBS within urban environments. In order to uphold NBS' commitment to delivering multifaceted advantages and co-benefits humans and nature, the incorporation of a comprehensive array of perspectives is imperative, commencing from the inception stages of planning and extending to the maintenance practices to follow. Within the framework of the GoGreenRoutes project, researchers have developed a first concept for "seedbeds" as initial place-based interventions to foster recognition and bolster the sense of ownership of the inhabitants pertaining to NBS in six cities: Umea, Tallinn, Burgas, Lahti, Versailles, and Limerick. In the context of NBS, these seedbed interventions serve as catalysts for co-creating innovative and local and cultural context specific solutions aimed at addressing interlinked environmental and societal challenges. They have the capacity to deconstruct disciplinary barriers, stimulate novel collaborations, and foster the origination of innovative ideas. This session will underscore the foundational principles of effective participatory approaches, expound on the methodologies employed, and contemplate the outcomes. Furthermore, the insights garnered from GoGreenRoutes could potentially offer valuable guidance to other municipalities to support cities shaped by human and nature.

Keywords: Urbanization Sustainable Development Goals (SDGs); Nature-Based Solutions (NBS); Participatory Planning; Just Transition; Co-creation

Oral presentation

Eliisa Kylkilahti¹, Anne Viljanen¹, Liina Häyrynen², Vesa Kanninen¹, Juhani Marttila², Anne Toppinen¹, Katja Lähtinen²

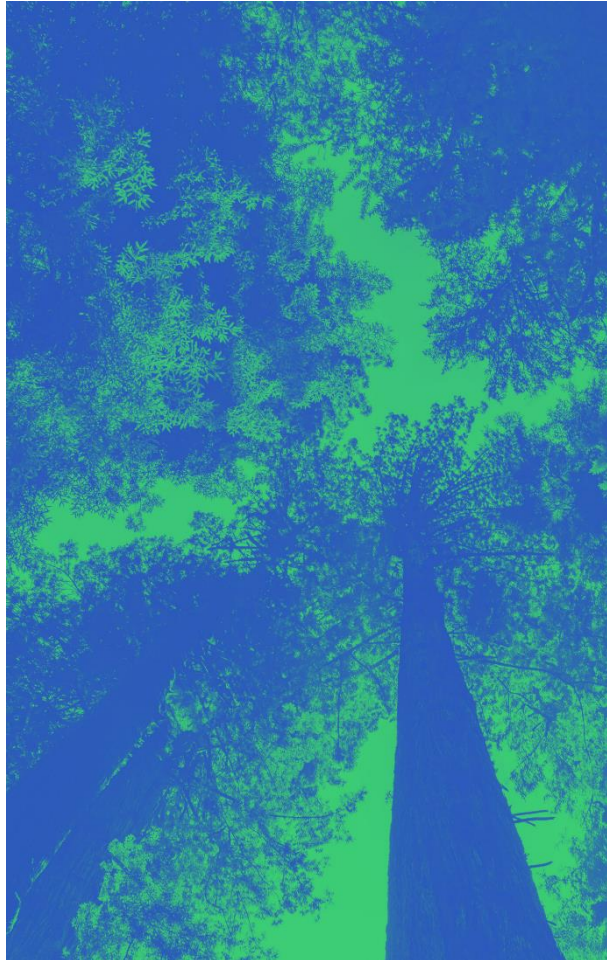
¹University of Helsinki

²Luonnonvarakeskus

Cities driving carbon-wise housing and retrofits?

Cities may act as enablers or intermediators for climate-wise housing. However, to actively drive service idea generation is not as easily adopted role for cities. This study focuses on a multi-actor co-design process that involves researchers, practitioners and other stakeholders. The process aims to generate ideas for initiatives that contribute to climate change in the context of housing, such as services for citizens to support carbon-wise housing and retrofits in four case cities in Finland. We ask, how cities could drive the development process of holistic, feasible and acceptable solutions. The data consists of workshop discussions, i.e., focus groups that are documented in transcribes, posters, notes and photos as well as pre-workshops materials, such as consumer interviews, diaries, and municipality strategies. Results suggest that citizens need support for climate-wise living. Municipalities could take active role in five tasks: providing reliable information, encouraging citizens in action, nudging, steering and supervising building and construction sector, and organizing existing services to support carbon-wise living. Multi-actor workshop series resulted in innovation initiatives related to 1) motivation, encouragement, and education of housing associations to pro-actively and wisely plan and execute (energy) retrofits, 2) empowering citizens to participate more actively in city planning that would support their low-carbon living, 3) creating an arena for joint discussion across municipality and construction industry firms about feasible city planning. The results indicate that instead of creating a wide pool of new service ideas, the process leads the way for ideas to intertwine. To facilitate cities' empowerment, it is important to proceed promptly from abstract future visioning to concrete actions, identify synergies with existing solutions in one's own organizations and beyond, and aim for concrete solutions that improve not only the strategically envisioned future, but also take into account the limited resources and efficiency gains.

Keywords: City, carbon-wise, co-design process, housing, retrofitting, workshop



Session B. The value of nature and biodiversity for human well-being and health

Chair: Doc. Riikka Puhakka, University of Helsinki

Oral presentation

Jenni Lehtimäki, Finnish Environment Institute

Anna Pulakka, Yuan Wang, Kimmo Nurmio, Basho Poelman, Johanna Metsälä, Anna Strandell, Ville Helminen, Niko Karvosenoja, Marius Lahtinen-Pulkkinen, Suvi Alenius, Markku Nurhonen, Jaana Halonen, Eero Kajantie

Land cover diversity in early-life living environments and the risk of non-communicable diseases during childhood

Natural land cover in early life living environments is associated with a reduced risk of respiratory and neurological diseases. However, it is unknown at which age exposure to natural land cover can provide protection against these diseases, what is the interplay between predisposing and protective land cover types, and which non-communicable diseases in children are associated to land cover. To address these gaps in knowledge, we studied associations between land cover in living environments during the first three years of life and the risk of eight non-communicable diseases during childhood. We followed all children born in Finland between 1997 and 2006 (n>550 000) from birth to 10-12 years of age excluding children who had died during follow-up period or had missing data. We used exact address information to link the child and environmental data, and created weighted index of total exposure to each land cover type based on duration they have lived in each address. We found that land cover in early life living environment was associated to the risk of 4 non-communicable diseases including autism spectrum disorders, ADHD, asthma and atopic dermatitis, matching with earlier evidence. The predisposing effect of built environment was independent from the protective effect of forests and agricultural land. We could not define certain time window when these exposures were most important. Finally, we studied if the amount or diversity of natural land cover were associated to children health. In ADHD and asthma diversity of natural land cover associated with reduced risk while in autism and atopic dermatitis, amount of natural land cover was more important. This study utilizing Finland's unique registered health information provides a detailed look on longitudinal associations between land cover and children's health.

Keywords: Land cover, non-communicable diseases, epidemiology, environmental health, nationwide, land cover diversity

Oral presentation

Hans Orru, University of Tartu

Tanel Tamm, Hedi Katre Kriit, Marek Maasikmets, Mare Lõhmus

Green inequality in Estonian cities – what does it mean in health perspectives

Green space has several benefits for public health and well-being. Greenness motivates health-promoting behaviors, reduces stress and mitigates the impact of hazardous environmental exposures such as air pollution, noise, and urban heat islands. According to scientific evidence, access to greenness is often unequally distributed among the urban residents, which creates potential health gaps between population groups. Current study aimed to map green inequality in Estonian cities and highlight the potential benefits for public health if these inequalities were reduced. The access to greenness in 2020 was assessed by using the normalized vegetation difference index (NDVI). NDVI is a satellite-based estimate that typically assesses the quantity of photosynthesizing biomass during the summer months. The average NDVI value (using 95th percentile) within 500m circular buffers centered at the place of residence of the whole Estonian population was 0.33. As expected, NDVI was highest in rural areas (>0.4) and lowest in the two main cities: Tallinn (0.26) and Tartu (0.29). When the maximum exposure to residential greenness (e.g. 0.49 in Tartu) was compared to the average exposure of each resident (e.g. 0.29 in Tartu), we found significant signs of "green inequality". Using health impact assessment methodology, we estimated that if this inequality would be eliminated, we would prevent 823.3 premature deaths and 9853.7 years of life lost. Further, we would increase the life expectancy by 0.59 years and save 463.1 million € in external health costs. The potential to substantial health benefits was greatest in larger cities, where the life expectancy could be increased by up to 1.49 years. The green inequality appeared to be most profound in the city of Tartu, where, despite the presence of large green areas (25% of the city area), the vast majority of population was exposed to significantly lower levels of residential greenness.

Keywords: greenness, health, urban

Oral presentation

Emilia Rönkkö, University of Oulu

Urban patterns for OneHealth: Pathways to pandemic-proof and resilient cities

Many overlapping environmental and societal challenges urge cities to transform into sustainable, healthy and just places for all. The coronavirus (COVID-19) pandemic has brought to the forefront the question of pandemic-preparedness in cities. Thus far, consideration of infectious diseases or better pandemic preparedness in urban settings has largely been neglected, even though global urbanization continues, and many past and recent pandemics have originated and spread in cities. It is also increasingly probable that serious epidemics will become more common in the future, as new kinds of threats are formed by increasing floods, zoonoses and the thawing permafrost caused by climate change. To tackle these crises and interlinked, complex health issues, transformative methods and integrative policies across government, society and science are needed, that place planetary health and urban resilience at the heart of policymaking. Existing governance structures and silos are, however, hindering the implementation of OneHealth perspective in decision-making, research, and practical urban planning work. This needs to be replaced with more holistic planning approaches that contribute to thriving habitats for other species and forms of life as well. It would also mean that the primary goal of urban planning and design is negotiation of the boundaries between humans, nonhumans, and the environment, and finding a sustainable ground for appreciative coexistence. The presentation is based on "Resistant Cities: Urban Planning as Means for Pandemic Prevention" (RECIPE) research project led by the University of Oulu. The multidisciplinary project combines expertise from the fields of environmental research, environmental health, history, information studies, public health, and urban planning. The results provide new scientific knowledge on the interconnections of the built environment, physical activity and biodiversity to the occurrence of infectious diseases and human health outcomes.

Keywords: Urban planning, planetary health, OneHealth, urban patterns, systems thinking, resilience, evidence-based planning

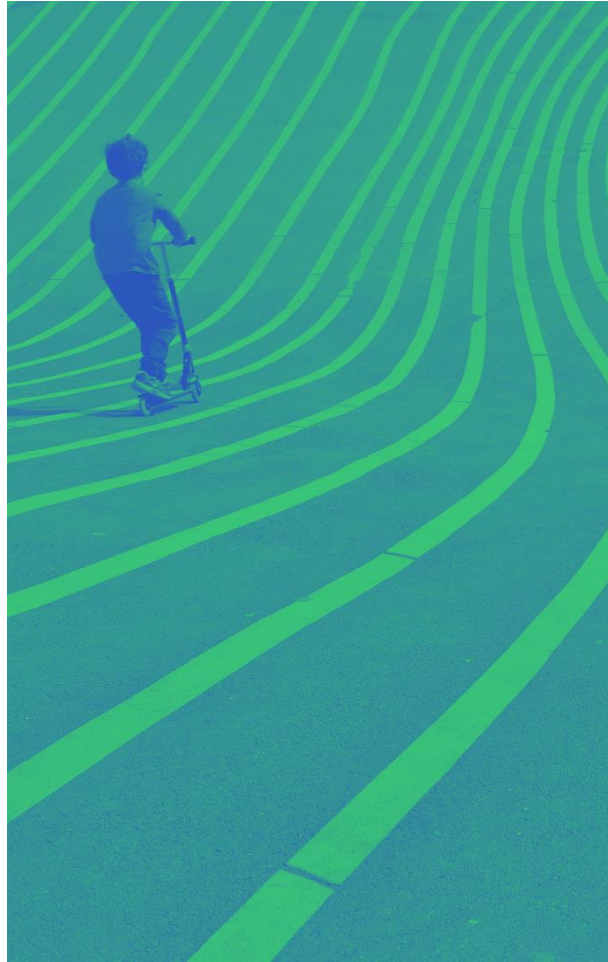
Oral presentation

Martin Grisel and Federica Risi, European Urban Knowledge Network (EUKN)

Rethinking nature through the SDGs framework: Evidence for urban health and well-being

Nature-based solutions (NBS) are actions that aim to protect, conserve, restore, sustainably use, and manage natural and modified ecosystems, which provide benefits for biodiversity, while simultaneously generating integrated opportunities for the sustainable development of societies and economies. Growing evidence in research and practice points to the important contributions of NBS in cities towards increasing residents physical and mental health, as well as other aspects of urban well-being as enshrined in the UN 2030 Agenda for Sustainable Development and its urban counterpart, the UN New Urban Agenda. The Covid-pandemic and, on a wider scale, climate change have shown that urban policy often has a blind spot when it comes to aspects of mental and physical health in relation to the Sustainable Development Goals (SDGs). Those cities that do put health at the core of their urban policies are still the exception (e.g. Lahti, Utrecht and Mannheim). The Horizon 2020 project CONEXUS project has undertaken a critical investigation to capture new evidence on the potential of urban NBS to localise the SDGs, creating benefits for both people and the planet. Through an analysis of real Life-Lab cases and NBS pilots in European and Latin American cities, synergies between biodiverse urban nature and human health are uncovered. In turn, mapped links between locally implemented NBS and global sustainability agendas can provide a powerful incentive for policy integration of NBS across governmental levels and beyond traditional policy sectors (and silos), including the health sector. By operationalising the SDGs framework and implementing aspects of Nature-based Thinking, evidence from the CONEXUS project offers important learnings on the role of integrated and multilevel governance of NBS in cities, which creates new perspectives for policies for the common good, in particular aimed at human well-being and health.

Keywords: NBS, biodiversity, urban health, common good, SDG



Session C. Transformation towards healthy and sustainable mobility

Chair: Assoc. Prof. Ville Uusitalo, LUT University

Oral presentation

Liisa Vanttinen, University of Helsinki

Improving the equality of physical activity environments through research knowledge and data-based tools

Inadequate physical activity contributes to individual health problems and broader societal and economic challenges, simultaneously increasing disparities among regions and socioeconomic classes. Improving the equality of physical activity possibilities is important in reducing societal polarization. Equal access to physical activity, especially in lower socioeconomic areas, is identified as key to bridging well-being gaps and mitigating segregation effects. Physical activity policy in Finland has long been implemented on the terms of already active groups, leaving the least active residents with less attention. YLLI ("Equality in suburban physical activity environments") project studied obstacles to physical activity in two Finnish low socioeconomic status suburbs, revealing diverse hindrances related to personal circumstances often associated with social background factors. Most prevalent barriers to physical activity were low mood or tiredness, lack of time, physical and/or mental health problems, and lack of company. Groups that experienced most barriers were non-Finnish or non-Swedish speakers, single parents, people age of 30-44, and people with low income. Based on the results, project researchers created a model called dimensions of accessibility, to help understand the variety of factors constraining physical activity. The model includes ten dimensions: spatial, physical and technological, temporal, informational, economic, cultural-attitudinal, legal-organizational, mental, social, and skills dimension. As municipalities in Finland play a vital role in providing physical activity services, they must be supported by versatile sources of data and information in utilization. YLLI project studied the applicability of GIS (geographic information systems) when supporting decision making and planning. The project developed new GIS data outputs and even indicators and tools to describe the spatial and temporal nature of residents' physical activity. The data-driven classification helps with recognizing physical activity barriers among specific demographics. Through producing data and information, the accessibility of physical activity can be improved.

Keywords: physical activity, equality, accessibility, GIS (geographic information systems), YLLI project

Oral presentation

Robert Klein, University of Helsinki
Elias Willberg, Silviya Korpilo, Tuuli Toivonen

Capturing seasonality of greenery exposure in urban travel environments throughout European cities

The positive impacts of urban greenery to human health and well-being are well documented in scholarly literature. However, the focus by large is on exposure to residential greenery, which neglects the exposure during travel. Furthermore, very little emphasis is put on the seasonal variations in greenery availability. In this presentation, we present our current research that addresses these knowledge gaps and comparatively assesses the availability of urban travel environment greenery during everyday mobility and the impact of seasonal changes using an open data approach. Using monthly NDVI composites from 2018-2022 for 70 European cities derived from the Copernicus Sentinel2 L2A catalogue, we compare the share of greenery present in 1) the total urban areas, 2) residential areas, and 3) travel environments. In addition, we compare the impact of seasonal changes on the availability of greenery across the study cities and link the results with daily travel needs of people. The results of an ongoing research demonstrate how the availability of residential and travel environment greenery differs, and how large the differences between European cities are. Moreover, the results show how phenological changes induce fluctuations in greenery exposure, and how the course and magnitude of these fluctuations vary in different regions. Concluding, the influence of daily mobility and seasonality should not be overlooked when assessing greenery exposure. The inclusion of dynamic factors, like mobility and seasonality, can provide a more realistic assessment of how "green" a city is, and of spatio-temporal difference in citizens greenery exposure. Thus, this work will serve for further studies investigating differences in dynamic exposure to urban greenery at urban scale using open big data.

Keywords: greenery, exposure, mobility, travel environment, seasonality, NDVI

Oral presentation

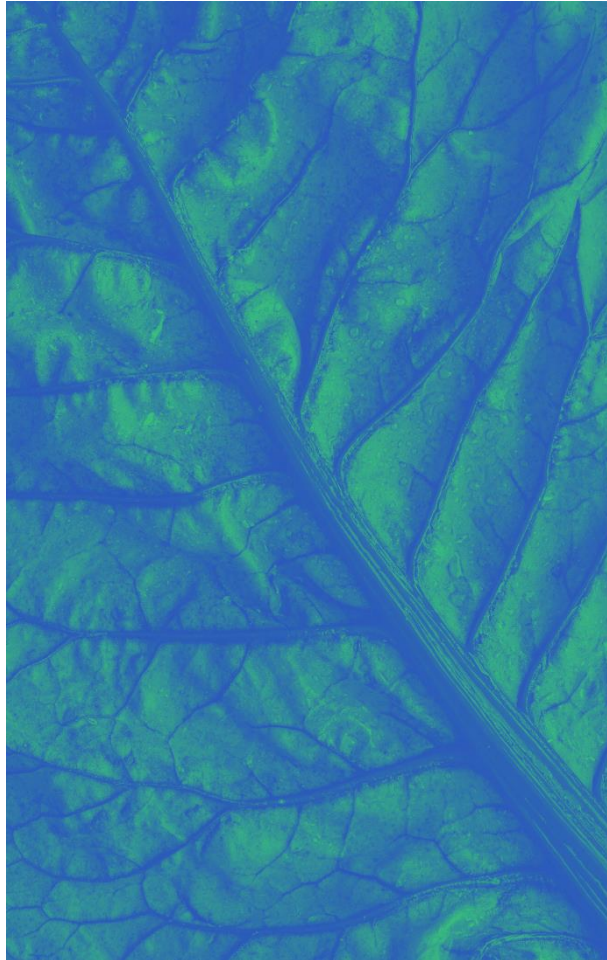
Emilia Suomalainen, Finnish Environment Institute

Markku Karhunen, Claire Mosoni

Micro-mobility – an opportunity or a threat to sustainable mobility in cities?

Micro-mobility and especially shared e-scooters have become ubiquitous in many cities since their launch in California in 2017. In Finland, there are over 55 000 shared e-scooters in operation in 37 municipalities, and nearly 17 million micro-mobility trips were made in 2022. While traffic safety and the use of urban space have dominated public discourse, less attention has been paid to the sustainability implications of these systems. Several recent studies have however highlighted that e-scooters might have a detrimental impact on the greenhouse gas emissions of transport in many cities in Europe. This is due to their short life span and the fact that these devices often replace travel on foot or by public transport. What is the potential emission impact of shared e-scooters systems in Finland and what are the system parameters with the greatest impact? What does the proliferation of shared e-scooter systems mean in terms of material demand, especially in the case of critical raw materials? How is the end of life of e-scooters regulated and what recommendations might be made to maximise the sustainability of these systems, both in terms of emissions and material demand in a circular economy context? These are some of the key questions that we hope to explore in the UC-Mobility project. Our preliminary results indicate that current e-scooters are more robust and have longer lifespans than those referred to in earlier life cycle assessment studies. National and municipal regulations mostly seem to focus on the safety and parking of e-scooters, and little attention has been devoted to exploring measures that would encourage the use of e-scooters to replace more motorised travel. This is crucial to ensure that they contribute to sustainable mobility in cities in a positive way.

Keywords: micro-mobility, e-scooters, life cycle assessment, end of life, CRMs, regulation, emissions



Session D. Transformation towards healthy lives through nature-positive consumption

Chair: Prof. Suvi Virtanen, Finnish Institute for Health and Welfare

Oral presentation

Stamatia-Maria (Tina) Kontonika, University of Limerick
Alan Scarry, Eibhlis O'Connor, Audrey Tierney

Enablers and barriers to household meat reduction in adults - A systematic literature review

Background: The production and consumption of meat is the second most environmentally harmful consumer activity in the world today. It is recommended that current meat consumption should reduce, but as meat is an integral part of Western dietary patterns, and as consumers' dietary behaviours and their food choices can shape the change needed to lead to a sustainable, environmentally healthy way of living, it is necessary to explore the factors hindering and motivating people to reduce meat intake.

Aim: The aim of this systematic literature review was to investigate, collate and report enablers and barriers of household meat reduction in adults.

Methods: Following the PRISMA guidelines, 6 electronic databases were searched (PubMed, Scopus, Web of Science, EMBASE, CINAHL, and PsycINFO). A total of 9775 papers were retrieved with 64 of them eligible for inclusion.

Results: From the included studies, 23 enablers were identified with the majority of studies reporting health and well-being (n=45), environmental concerns (n=35), and affordability and budgetary factors (n=24) as the predominant enablers to remove and/or reduce meat consumption. Twenty-two barriers were identified with most studies reporting health and well-being (n=26), social factors (n=22) and personal norms and beliefs (n=20) as the predominant barriers to remove and/or reduce meat consumption.

Conclusion: To conclude, a wide range of enablers and barriers were identified which affected adults' capabilities, willingness, intentions, and opportunities to engage in meat reduction consumption behaviours with health and well-being cited as the main facilitating and inhibiting factors. This study may inform the development of various interventions to reduce household meat consumption in adults or inform dietary guideline development, taking into consideration the enabling factors towards plant-based dietary approaches.

Keywords: food, sustainability, enablers, barriers

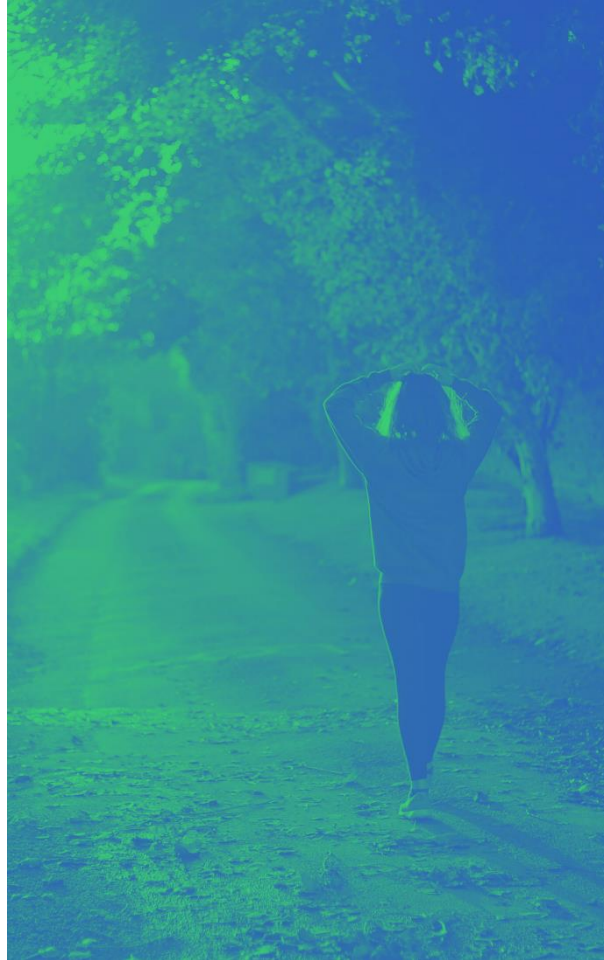
Oral presentation

Ilkka Pietilä, University of Helsinki
Katarina Blomqvist

Exchanging views of sustainable food consumption: a study on three family generations

Several studies have shown that ecological awareness and knowledge of sustainable food production is more widespread among younger generations. Research also shows that older generations spend more time in and have a stronger connection to nature. In a project focusing on food-choices of three family-generations, we approached the ways in which grandchildren, their parents and grandparents negotiate values and practices related to healthiness and naturalness of food as well as sustainability of food systems. For the study, we collected 10 sets of interviews with three successive family generations totaling in 30 interviews. Our analysis showed that family generations were aware of their differing food choices and wanted to increase each others' knowledge of the food-related practices they considered important. Such exchange of knowledge was most evident between grandchildren and grandparents. The grandchildren wanted to widen their grandparents' views of food by suggesting new and sometimes more 'exotic' foodstuff and new sources of information about food (YouTube, TikTok, Instagram, Pinterest) as well as urging their grandparents to pay attention to healthiness and ecological qualities of the food they purchase. The grandparents wanted to teach their grandchildren to fish, pick berries and mushrooms, grow vegetables and preserve food with traditional methods, thus transferring both food-related knowledge and skills that emphasised the use of surrounding nature, and traditions and values of self-sufficiency and thrift. Middle generation mostly had a mediating role between the youngest and oldest generation as their active engagement in nature-positive consumption was weaker due to busy working life. Our study shows that family generations consider it important to increase all family members' food-related awareness by both sharing their own knowledge with and learning from other generations. Consequently, the study also shows that family generations jointly transform each others' everyday choices towards a healthier and both ecologically and socially sustainable consumption.

Keywords: Ageing studies, consumption, family, food choices, generations, social sustainability



Session E. Rethinking sustainable health, taking advantage of novel technologies and knowledge

Chair: MD, PhD Hanna Haveri, Päijät-Häme Central Hospital

Oral presentation

Cale Lawlor, Independent Environmental Public Health Consultant / previously European Public Health Alliance (EPHA)

Selling planetary health: Innovative narratives and health co-benefits to achieve buy-in of planetary health concepts

Background: awareness of Planetary Health as a concept is still in its infancy within society and policymaking. While the field is growing in academia, research and health, it remains a somewhat unknown, and foreign, concept outside of these sectors. For the goals Planetary Health to be advanced as a concept, and implemented, buy-in is needed. To achieve buy-in, Planetary Health has to be 'sold' as a tangible concept to people.

Methods: evidence has been gathered from public health organisation consultations in the European Union policy space, policy fora, and online, to synthesise actions to advance the Planetary Health narrative as a concept. This was supplemented by learnings from public health organisation workshops that looked to identify areas for action in Planetary Health.

Results: To achieve social and political buy-in, Planetary Health practitioners and researchers have to:

1. Identify health and public health costs and co-benefits, including novel co-benefits between previously unrelated fields
2. Identify case studies of practical and successful Planetary Health action, including practical implementation and modelling research
3. Create innovative narratives to engage, and continue to engage, policymakers and society to muster action

Conclusion: buy using the above concepts, Planetary Health can be presented as a strong, innovative, useful, cost-effective, and most importantly, health benefiting, concept for society and policymakers to take up. By presenting evidence in a compelling way, both in terms of data, research and cost, but also in terms of engaging narratives, Planetary Health practitioners can advance the agenda and achieve buy-in and action to protect Planetary Health through increasing population buy-in, which will dependently and independently, influence policymakers

Keywords: Planetary health, public health, health co-benefits, investment, policy, creative narratives, research

Oral presentation

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Health promotion with guided nature walks or guided sports activities: a controlled trial in primary care

Background: Nature based social prescribing (NBSP) allows health professionals to refer patients with defined needs to nature-based interventions. Health-promoting interventions are potentially effective especially in primary care, where patients commonly suffer from multimorbidity and poor general health. This non-randomized controlled pilot study compares two social prescribing schemes, one of which is nature based.

Methods: This intention-to-treat study was conducted at Sipoo Health center 2018-2019. Participants were identified by health professionals; the aim was to involve particularly those in poor general health. Positive mental wellbeing was assessed using Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS), physical activity and sleep by wrist-worn accelerometers before and after the intervention. Participants attended group excursions in a biodiverse natural environment or group activities in sports facilities, groups met weekly for 8 weeks.

Results: Participants (n=79, mean age 57, 79% female) rated their perceived general and mental health lower than the general population. In the Nature-group mental wellbeing improved (mean WEMWBS improvement 3.5 p = 0.008), with a positive change for feeling relaxed, being cheerful, having energy to spare, feeling able to deal well with problems, feeling good about oneself and feeling close to other people. In the Sports group mental wellbeing improved only if perceived health was good. Of all participants, 81% slept less than 6 h per night and 70% rated their sleep quality as poor. Sleep duration improved in the Sports-group, while participants in the Nature-group reported better sleep quality.

Following the interventions, perceived health, and ability to function improved in both groups, while perceived mental health improved only in the Nature-group.

Conclusions: Active interventions can improve health in a primary care population, and nature-based interventions are beneficial for those in poor health. NBSP is a potential way to reduce pressure on health and social service, although cost-benefits of social prescribing remains to be determined.

Oral presentation

Mari Partanen, Jamk University of Applied Sciences

Heading to a forest or a virtual forest? Sustainability questions of (virtual) nature visits

Nature tourism and visits to nature are known to enhance well-being and personal health. For instance, heading to nature after a workday is a common way of recovering. However, not all nature visits are sustainable in terms of transportation emissions or damages to biodiversity. Meanwhile, virtual tourism development has been suggested as an alternative opportunity for visiting nature. Virtual tourism can provide more sustainable ways to visit ecologically vulnerable nature sites, with less transportation emissions. It is also known that virtual tourism can bring socially inclusive nature experiences when accessibility is restricted. Nevertheless, virtual tourism development raises various sustainability questions. Among others, research is needed on whether virtual tourism enhances work recovery when compared with recovering in actual nature. In the Hybrid Nature project, we have studied hybrid worker's recovering in virtual nature and actual nature. In addition to physiological measurements, surveys, and diaries, the participants were interviewed on their experiences in the (virtual) nature environments. Our first results show that both virtual and actual nature experiences have differing positive and negative effects in terms of work recovery. Still, despite suggesting that virtual nature holds potential for enhancing well-being, majority of participants would choose visiting the actual nature for recovering from work. Thus, the findings present interesting insights on how to pick the benefits from both kinds of nature visits. Furthermore, the findings suggest practical ways for tourism developers to make virtual visits more recovering. The results also provide tools for workplaces to support workers' health by thinking about the role of nature in hybrid work. Yet, enhancing people's well-being through virtual nature visits need further examination in terms of planetary-scale environmental health.

Keywords: nature tourism, virtual tourism, sustainability, work recovery, well-being

Oral presentation

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²Finnish Environment Institute, Helsinki

Digitalization of home care and healthcare services – a combined climate and social impact assessment

A rising aim in digitalization strategies is that services are implemented in a socially, environmentally and economically sustainable manner. Until recently, sustainability of healthcare and home care services has been regarded particularly from the point of view of economic and social sustainability. Integration of environmental sustainability thinking is essential. This study focuses on the positive and negative climate impacts and related social impacts of digital home care and healthcare services. The study is based on empirical research in healthcare and older people's home care in Finland. The two case studies focused on (1) medicine robot and video call services for home care clients, and (2) remote healthcare appointments for diverse clients. Impacts were identified from the data collected from two public service providers as well as technology suppliers in the form of 23 interviews, statistics and other documents. A quantitative and a qualitative assessment were conducted. The latter included the social impacts on clients, professional caregivers, and organizations and society. The results showed that multi-perspective and multi-method impact assessments are essential to properly capture the service context and to advance sustainability thinking in healthcare and home care services. A well-planned and well-implemented digital service is likely to be a climate-friendly option, but at least some negative impacts are caused by every digitalization action. The design, architecture and practical implementation of digital services greatly affect their climate and social impacts. In addition to the quantitative assessment – and to help interpret its results – qualitative understanding of digitalization and its impacts is needed, especially when access to numerical data is limited. The two case studies on innovative digital healthcare and home care services offered a multidimensional picture of digitalization's impacts, especially climate impacts but also the intertwined social impacts.

Keywords: Digital services, healthcare, home care, sustainability, climate impacts, social impacts
Oral presentation
Elina Drakvik, Sitra

Advancing planetary health through engagement and tools for societal transformation

A systems approach for planetary health acknowledges that human health outcomes unfold from complex interactions between natural and social systems (1). Arising from this complexity, stakeholder involvement and collaborative processes of generating knowledge jointly becomes crucial for responding to planetary health challenges. Many public health problems cannot be solved purely within the health sector, but require a whole-of-society approach, linked to the context of place that is critical for understanding and improving health. The promotion of holistic understanding of health and wellbeing and systems change requires strengthening of cooperation and stakeholder engagement, being at the core of Sitra's activities as a societal change agent. At the core of systems thinking, is the skill to recognize systems as wholes instead of parts - to understand the structure, operation and interdependencies of systems, and to change systems to achieve the desired outcome. A set of concrete tools (2), will be presented, facilitating the different stakeholders and societal actors to recognize trends and link future-oriented thinking to change-making. The tools are freely available for anyone to use for workshops and trainings to enhance knowledge exchange. For example, the so-called Future's Triangle can help us in recognising desired futures and barriers to change, whereas the Spheres of Societal Transformation can enable a better understanding of systems and contribute to finding solutions at various levels of structures. By imagining sustainable futures and looking at the bigger picture of interconnectedness of health and environment and the related societal and cultural contexts can we better take concrete steps forward and build a roadmap towards a fair and sustainable future, advancing planetary health. References: 1. Pongsiri, J., Gatzweiler, F., Bassi, A., Haines, A., Demassieux, F. (2017): The need for a systems approach to planetary health. *The Lancet Planetary Health*. Vol 1, Issue 7. [https://doi.org/10.1016/S2542-5196\(17\)30116-X](https://doi.org/10.1016/S2542-5196(17)30116-X). 2. Sitra (2023): Futuremaker's toolbox. <https://www.sitra.fi/en/projects/toolbox-for-people-shaping-the-future/>

Keywords: planetary health, engagement, tools, future

SEPARATE PRESENTATION

Sonja Salomäki, University of Lapland

Planetbic - Community art performance as a method of internalizing planetary boundaries and as a builder of a better body-Earth relationship

Art can make fissures in everyday reality and reshape the relationship between people's actions and emotions. It enables to bring intuition, emotions and embodied experiences into the systems thinking that complex problems related to planetary boundaries require.

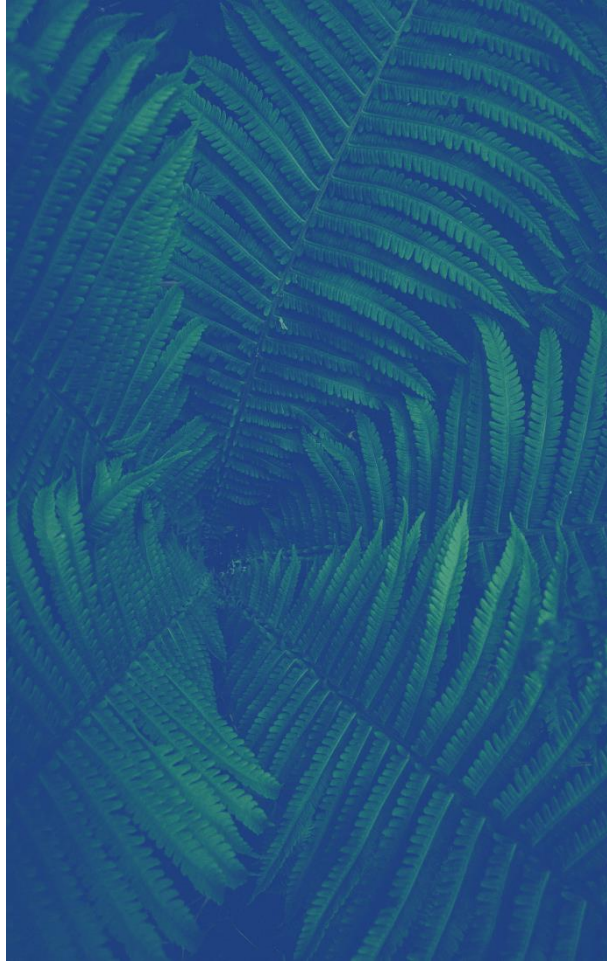
This paper focuses on Planetbic, a multi-sensory community art performance open to everyone and a group exercise class for the planet's viability. The performance is part of my doctoral research into the affecting features of climate art activism.

According to a previous study, internalizing the eco-crisis could be better achieved through alternative knowledge and communication and even through the positive health effects of aerobic exercises, as in the case with Planetbic. As attested by Planetbic, art can enable people to let their guard down, and to bring joy, meaning and well-being to life through participation and communality. According to the research, people need emotional bonds and narratives that activate them to be inspired to act in an environmentally friendly way.

In addition to the previous research, theory and criticism of art activism and environmental psychology, Planetbic is based on my artistic research. This means data produced by analyzing the climate-related performances made and documented during the Fridays for Future protests 2019-22. Observations made during the practical part of my doctoral research, which produced climate art pieces in artist-organization collaboration (The Climate Channel, 2018), have also influenced Planetbic.

The paper argues that community art can help people internalize the planetary boundaries. This is evidenced by the positive informal audience feedback received during Planetbic's three performances in 2023 which encourage the continuation of the plan to develop it into a science implementation project, where the effects of Planetbic can be augmented and clarified through discussions and surveys.

Keywords: Planetary boundaries, community art, bodily knowledge, planetary health



Posters

THEME: DEFINING AND DEMONSTRATING LEADERSHIP OF HEALTHY AND SUSTAINABLE CITIES

Poster presentation

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Green dreams, local realities: Complexities of the European Union's energy transition to ensure local health and well-being in a fossil fuel-based industrial region

The European Union's (EU) Green Deal aiming to achieve net-zero greenhouse gas emissions by 2050 requires EU countries to transition from a fossil-fuel-based to a renewable energy system. While this transition will bring significant global health benefits, it is crucial to understand how it will affect local communities' livelihood and well-being. The study proposes a framework for considering the energy transitions' implications for health and well-being and tests this framework in the context of a transitioning fossil fuel oil-shale-based energy system in Estonia. First, we developed a conceptual framework based on socio-technical systems theory and the production of space theory to identify the interacting points between energy systems and health and well-being systems in the energy transition context. Second, we employed four focus group discussions, ten expert interviews, and document analysis, including regulations, policy, and media reports. Lastly, we pinpointed pathways, including feedback loops, through a causal loop diagram (CLD) impacting inhabitants' health and well-being from the interplay between energy and health and well-being systems. The analysis indicates that protecting and promoting health and well-being has been a challenge not only due to disruption created by the energy transition process but also due to the accumulated problems over time regarding socio-economic conditions, environmental health impacts, and social well-being at the local level. The compound effects of multiple existing and emerging issues, including the varied interpretations of health and the lack of holistic support mechanisms for inhabitants to navigate the changes in socio-cultural and economic space, can harm locals' health and well-being. The suggested framework assists in investigating the pathways to short- and long-term impacts on the inhabitants' physical, mental, and social health and well-being. The CLD developed using this framework demonstrates the interacting points to avoid unintended consequences of energy transitions.

Keywords: climate change action, energy transition, social and environmental impacts, health and well-being impacts, systems approach, causal loop diagram

Poster presentation

Tuula Löytty, Smart & Lean Hub Oy

City Region Food Systems sustainable transition towards FOOD2030 policy

City Region Food Systems (CRFS) demand immediate action. Consumers at city region must be at the core of solutions. More than 7.7 billion consumers hold the power to shift 100-year old consumption patterns to meet the requirements for a improved future. The challenges: population overgrowth, rapid urbanisation, vast migration phenomena, climate change and resources scarcity. 9 billion people, most living in cities, 3 billion overweight, and 2 billion without enough food (RUAF, 2023; FAO, 2023). "The 19th century was a century of empires, 20th century was a century of nation states and the 21st century will be a century of cities." says former Denver Mayor W. Webb. Key strategic intelligence on city region development under the motto "smart cities" lack too often incorporation of food systems as equality critical as infrastructures, transportation, connectivity and security, to name but a few. Yet 1.3 million people are currently moving into cities each week (World Economic Forum, Desjardins, Jeff, 2019). Without action toward transition towards sustainable CRFS, the environment will persist being degraded and diminish the world's capacities to produce quality food for all. CRFSs are complex systems that are hard to change. Therefore the discussion of the scientific thinking rooted methodology and open innovation ecosystem aka Living Lab to advance CRFS transformation are embraced. CRFS poses a planetary challenge that new initiatives, addresses at local and regional levels, to generate small steps, systemic, pragmatic, actionable, transferable and sustainable solutions.

Keywords: urban food system, Living Labs, system thinking, innovation actions

THEME: THE VALUE OF NATURE AND BIODIVERSITY FOR HUMAN WELL-BEING AND HEALTH

Poster presentation

Mario V. Balzan, Ecostack Innovations

Martha Arambula Coyote, Laura Costadone, Mario V. Balzan

Closing the loop in landscape management through the assessment of ecosystem condition and nature-based tourism and recreation flows

Nature-based tourism is examined for its potential to connect the goals of the tourism sector with the economic advantages of nature conservation. This research seeks to develop a more comprehensive understanding of nature-based tourism in Malta. By leveraging on different crowdsource datasets, we assess, and map sites associated with high natural-based recreation and tourism visitation, and landscapes of unique social-ecological value. The methodological core of this study involved using social media data to evaluate tourist preferences and behaviour. We used the Twitter API to collect historical and location-based data, which provided the groundwork for our analysis. Our methodology included extracting and analysing geotagged social media posts to measure visitor engagement at sites of environmental importance. We compare this dataset to recent work carrying out a spatial assessment of nature-based interactions using Flickr and iNaturalist data. By applying geospatial analysis and natural language processing, we map the distribution of nature-based tourism sites to provide a first understanding of the relative amenity values of different landscapes that is based on site visitation. Furthermore, we provide preliminary results on interactions between nature-based recreation and tourism site visitation and ecosystem condition indicators, with the latter including remotely sensed datasets and biodiversity surveys. By integrating digital data analytics with ecological and economic indicators, this research underscores the potential of nature-based tourism as a driver for the restoration economy, with implications for enhancing visitor experiences, identifying imbalances between site visitation and ecosystem condition, and catalysing regional development through ecosystem restoration practices that improve ecosystem condition and nature-based amenity value.

Keywords: Nature-Based Tourism, Social Media Data Analysis, Malta, Economic Development, Ecosystem Services, Environmental Sustainability, EU Biodiversity Strategy, Interactive Mapping

Poster presentation

Mark David Casagrande Mansoldo, Ecostack Innovations
Mario V. Balzan

Exploring the potential co-implementation of nature-based solutions through mosaic governance and community placemaking

Recent reviews of nature-based solutions (NbS) research highlight the need for greater engagement with local communities during the design and implementation phases, as projects often proceed without considering the broader social-ecological system conditions. In contrast, co-creation processes offer an opportunity to promote ownership, broaden participation, and enhance the legitimacy of NbS initiatives while addressing social and environmental justice concerns. The term 'placemaking' is used for projects collectively reinventing public space by appreciating the physical, cultural and social aspects of a community's identity, with the goal of improving residents' wellbeing. This study focuses on Cottonera, a densely populated and historic urban area within Malta's Grand Harbour, where limited green space availability necessitates retrofitting to incorporate NbS for enhanced pedestrian thermal comfort. A survey of 93 local residents explored attitudes towards vegetation in cities, current community contributions to streetscape greening, and preferences for the implementation, organisation, and funding of NbS for streetscape shading. The majority (86%) expressed a desire for vegetated canopies, and 91% indicated a willingness to collaborate with neighbours on NbS implementation. However, most participants preferred public authorities to organise and fund such projects, with a smaller percentage favouring informal arrangements among neighbours. Based on the outcomes of this survey, a mosaic governance approach is proposed, promoting the involvement of a wide range of stakeholders and collaboration between different levels of government, government agencies, and community groups. This approach facilitates flexible NbS co-creation. Under the concept of 'nature-based placemaking', residents become stewards of emerging green spaces, collaborating with public authorities and community-interest groups in shared management strategies. Successful examples of placemaking interventions within the study area are presented.

Keywords: Nature-based solutions, mosaic governance, nature-based placemaking, community engagement

Poster presentation

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"I felt how wonderful it was to leave my mobile phone and jump into nature." - Experiences in outdoor excursions in international undergraduate students of the summer course

Our planet faces crises of habitat loss, biodiversity decline and climate warming due to human actions. Some argue that our disconnection from nature in this urbanized and tech-driven world not only contributes to environmental crises but also increases mental health challenges. Growing research indicates that even brief encounters with nature can boost our connection to it, fostering emotional, psychological and physiological well-being. Various theories also highlight the influence of engaging with nature on overall well-being.

We focus here on students' emotional experiences regarding outdoor excursions to campus farm, island, livestock farm and forest. The excursions included guided activities and free time. Participants were Chinese undergraduate students from urban backgrounds attending a summer course at the university. After each excursion, students wrote a learning diary in which they freely described the excursions. The learning diary texts were analyzed using content analysis and emotions were classified based on valences and dimensions.

Our results suggest that excursions promoted happiness and emotional well-being. The excursions elicited a wide variety of writing about emotional experiences. Joy/happiness was the most described in nature-based activities and interest in knowledge-based activities. The forest trip inspired students to describe positive emotions more broadly and richly than the other destinations. Negative emotions were recorded in all excursions and moral reflections were evoked in the cattle farm trip.

Recent years have seen a concerning rise in student stress and mental health issues. One possible solution to tackle it is to integrate outdoor activities into the curriculum to enhance nature connectedness. Even short nature-based activities with reflections on feelings improve emotional states by providing restorative multisensory experiences and fostering a sense of community, which virtual tours cannot replicate.

Poster presentation

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The development of a Gender, Inclusion and Diversity Framework: An urgent call for inclusive nature-based solutions

Background: Evidence consistently shows that the distribution of benefits Nature-based Solutions generate for human health are dependent on several individual characteristics such as gender, age, sexuality, ethnicity and disability. As a result, the distribution of Nature-based Solutions can perpetuate existing inequalities and even create new inequalities partly because diverse minority and marginalized people are underrepresented in the process of designing and implementing Nature-based Solutions. Therefore some scholars have highlighted the necessity to actively involve diverse minority and marginalized groups into the co-creation processes of Nature-based Solutions and to evaluate who benefits from the Nature-based Solution and why.

Methods: Within the GoGreenRoutes H2020 EU-project, applying a participatory action research approach, we established a transdisciplinary gender, inclusion and diversity panel containing professionals from four EU countries, and containing both academic and non-academic partners from several disciplines, including – although not limited to – health sciences, architecture and economics. The goal of the panel was to address and operationalize the gender, inclusion and diversity perspective in the project. Existing inclusion challenges within the consortium were mapped during panel meetings. Concordantly, relevant scientific resources and policy documents were identified. Both were blended during consensus meetings in order to develop a common understanding leading to a theoretical gender, inclusion and diversity framework. We then transformed the framework to a practice oriented checklist to confront reality. The checklist was adapted twice during a pilot and feedback workshop with the broader Nature-based Solutions community, including local governments.

Findings: The framework consists of five domains: (1) gender equality; (2) LGBTQI+ rights; (3) people with disabilities; (4) integration of refugees and immigrants; and (5) intergenerational perspectives. The checklist consists of three main categories: (1) engagement with the public; (2) communication; (3) reflecting upon engagement with the public.

Interpretation:

This framework conceptualizes and operationalizes the necessity of assessing the level of inclusion throughout the entire Nature-based Solutions lifecycle as there are arguments to contest that Nature-based Solutions will, by default, be co-designed taking distributional aspects of equity and justice goals into account.

FINANCIAL SUPPORT

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest of any kind.

AUTHOR CONTRIBUTIONS

BD coordinated the development of the framework and wrote the original draft of the manuscript. EPB and HK critically reviewed the manuscript and finetuned the framework. EVR coordinated the panel meetings. KP, EMC, AMB, SU, KR, MJFOF, AD, and JG contributed to the framework based on their expertise. All authors contributed to the development of the checklist.

Poster presentation

Nora Fagerholm¹, Mario Torralba², Viola Hakkarainen³, Neil Coles⁴, Christian Albert⁵, Erik Andersson³, Tom Beery⁶, Ryan Bergstrom⁷, Claudia Bieling⁸, Sandra Gentin⁹, Carolin Klonner¹, Christopher Raymond³, Henna Rouhiainen¹, Anton Stahl Olafsson⁹, Christine Wamsler¹⁰

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Multispecies transitions of cities and regions (MUST) project

Poster presenting the objectives of Strategic Research Council funded project Multispecies transitions of cities and regions (MUST), 2023-26.

Keywords: biodiversity conservation, multi-species justice, urban and regional planning, cross-sectoral governance, knowledge co-creation, nature-based solutions, participatory mapping, connectivity modelling, well-being

Poster presentation

Maria Fernandez de Osso Fuentes, Maynooth University

Brendan J. Keegan, Marc V. Jones, Tadhg E. MacIntyre

Reaching a Modified Delphi Study Consensus on Digital Placemaking for Nature and Wellbeing – A Working Paper

Cities face the challenge of preserving and enhancing nature spaces in the context of economic globalization. The decline of public spaces (Paquin, 2019), including urban nature, has disconnected humans from the natural world (Riechers et al., 2021), particularly due to the rise of technology (Edwards et al., 2020). Urban nature spaces have the potential to improve city resilience and citizen wellbeing in the context of climate change (Gulrud et al., 2018). The COVID-19 pandemic highlighted the importance of nature for human wellbeing and mental health (Heckert & Bristowe, 2021; Tomasso et al., 2021). Riechers et al. (2021) emphasize the need to reestablish the human-nature connection, suggesting innovative approaches incorporating technology (Schmidt & Marratto, 2008). Digital placemaking can play a vital role in engaging individuals with urban nature spaces and integrating nature into their identity. Digital placemaking uses digital media to foster individual and communal place attachment (Halegoua & Polson, 2021), offering a multifaceted solution to global and economic challenges. Our published literature review informed the Digital Placemaking for Nature and Wellbeing model. To explore the effects of digital placemaking in marketing urban nature spaces, we propose a modified Delphi study involving experts in digital placemaking and expanded experts in related fields. This study aims to establish consensus on implementing digital placemaking for nature and wellbeing as a place branding strategy. Our research enhances the understanding of digital placemaking's potential in place marketing and psychology, offering practical insights into how it can boost citizen wellbeing and support sustainability goals. In conclusion, our study underscores the importance of reconnecting with nature in urban environments and highlights the benefits of digital placemaking for both citizens and organizations. It encourages the adoption of these practices to enhance place attachment, place branding, nature connectedness and community identity in hybrid urban settings.

Keywords: digital placemaking, place branding, nature connectedness, place attachment, wellbeing, delphi method, marketing communication

Poster presentation

Maria Carmen Garcia Mateo, MCG Research and Innovation
Ilkka Väänänen, Taru Suutari, Päivi Sieppi

Experimenting and exploring in planning, strategies, governance and policies. Towards mainstreaming of nature-based solutions for well-being and health impact. Conceptual and empirical study. The case of Lahti.

Nature-based solutions are considered as living solutions to tackle societal challenges, while at the same time benefit biodiversity, human well-being and ecosystem services in a sustainable management process. However, the pathways for mainstreaming nature-based solutions are not clear and gaps in the process of integration and mainstreaming of nature-based solutions are not well understood. Likewise, how to proceed with the transformational change needed in the nexus between strategies governance- policy and planning. Therefore, this article discusses transdisciplinary and holistic approach pathway explorations in urban green infrastructure planning and how it should be based on principles for addressing a variety of societal challenges associated with well-being, climate, environment and health and active lifestyle. One of the strategic directions of urban and territorial planning should be to innovate in a user-oriented way to design just, sustainable, resilient and resource efficient healthy enhancing environments. The pathways to achieve this aim should be a collaborative process. Consideration should be given to the diversity of the community. This article describes the Lahti, Finland case study. The study was implemented as a part of the Go Green Routes project. The multiple data collection methods used in this diversified perspective qualitative study were semi-structured questionnaire surveys and group interviews. Moreover, the local environmental and health policy documents were analysed. The analysis process was iterative, and the qualitative content analysis method was used. In this contribution, the health forest was seen to be utilised especially in psychiatric nursing as a restorative environment. The recommendations for strategies to integrate health factors in urban and territorial planning settings, as a pathway in which citizens could improve their relation and be in harmony with nature, as has been pointed out by the United Nations Convention on Biological Diversity are argued.

Keywords: Mainstreaming nature-based solutions, well-being and health, biodiversity benefits, transformational change, transdisciplinary, governance, policy and planning

Poster presentation

Charlotta Harju¹, Katja Lähtinen¹, Anne Toppinen²

¹Natural Resources Institute Finland (Luke)

²University of Helsinki

“Living with nature as the nearest neighbor” – Values related to nature in Finnish citizens’ housing aspirations

Human-nature connections in the built environment have multiple benefits related to physical health and mental well-being, and proximity to nature has started to become more important also in defining citizens’ housing preferences. People value nature in diverse ways, and in forest rich and scarcely populated Finland, nature has also always been a significant part of the citizens’ national identity. Yet, there is still limited information on the values Finnish citizens attach to natural environments in relation to other housing attributes. This study investigates the conceptualization and the role of nature in citizens’ housing aspirations in Finland. The data were collected in 2022 with an online questionnaire sent to randomly sampled 10,000 people aged 18–80 living in Finland. In this study, an open-ended question related to sub-section of data on citizens’ wishes and hopes for housing with 382 responses were utilized and analyzed with qualitative methods (e.g., content analysis). The results show that having a home near natural environments is important to half of the respondents. Especially they emphasize living near lakes, forests, and the coast. Furthermore, citizens attach different values to natural environments in their housing aspirations, including intrinsic, instrumental, and relational values. Additionally, those citizens wishing to live near nature also place other values in their housing aspirations, including functional, social, esthetic, and recreational values, and the values of peacefulness and easiness. The results provide new information on the value of natural environments in relation to other housing attributes in Finnish citizens’ housing aspirations. Recognizing the importance and value of nature in housing also provides opportunities for new innovations, such as developing different nature-based solutions to substitute the existing technologies, e.g., in living milieus.

Keywords: natural environments, nature values, consumption values, housing aspirations, housing preferences

Poster presentation

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¹University of Helsinki, HUMUS - Healthcare for a sustainable future -project

Health as part of nature – spiritual health and nature

When promoting sustainability, human health and even well-being is often left out of the discussion. Human health has primarily been examined in medical sciences and health care with differentiative approaches that divide health to parts like physical, mental, social and spiritual health. Often these parts are examined separately both in scientific research and in health care practice. Similarly, the environmental issues and sustainability challenges such as climate change, biodiversity degradation and overall pollution are more prominent each year and yet, they also are treated as separate issues managed in different fields of society. In the interdisciplinary HUMUS - Health care for a Sustainable Future - research project we have sought a new perspective on understanding the connection between human health and nature, and how health care can work in building a more sustainable society. We have brought together sustainability science, medicine, and study of religions, and with healthcare professionals we have considered the connection between their everyday work and sustainability, and the connection between health and the environment. We have also looked at general practitioners' perceptions of human-nature connectedness. In this talk I will focus on my research within the HUMUS project. I have looked at spiritual health, and the connections health care professionals find between spiritual health and nature. Spiritual health is an aspect of health that is often overlooked in western medicine and health care, but it is nevertheless an important aspect covering one's connection to the self, to the moment, to others, to nature and to the sacred. Spiritual health can affect the perception one has of their own health and well-being. Can the connections between spiritual health and nature be seen as sacred and thus as something improving one's state of health and well-being?

Keywords: spiritual health, nature, the sacred

Poster presentation

Katja Kangas, Luonnonvarakeskus

Sannakajsa Velmala, Taina Pennanen, Krista Peltoniemi, Oili Tarvainen, Jenni Hultman, Jouni Karhu, Marjo Neuvonen, Tiina Lankila, Soile Puhakka, Raija Korpelainen, Hannu Fritze

Resistant cities - Connecting biodiversity of urban green spaces with human health and well-being

There is increasing evidence on the beneficial impacts of natural environments on human health and well-being. Residential greenness is associated with improvements in both physical and psychological well-being, and visits to green spaces have proven benefits for mental health. In addition, human contact with a diverse natural environment reduces inflammatory diseases like asthma. In RECIPE - Resistant Cities: Urban Planning as Means for Pandemic Prevention project, we explore what is the biodiversity value of different green space types in terms of soil microbial and plant diversity, and is the health and well-being of the residents connected to biodiversity value of residential environment or the environment used for outdoor recreation? The study has been conducted in two Finnish cities, Oulu and Helsinki, in which we have identified different urban green space types including variations from built parks to urban forests. This field survey provided a total of 150 urban green spaces which were 2022 analyzed for their soil structure, microbial diversity and plant community. In addition, we studied with Public participatory GIS, PPGIS, survey (n=1394) the residents' views on which green spaces are important for outdoor recreation, and how residents perceive biodiversity of green spaces. The collected biodiversity data will be further combined with health data of Northern Birth Cohort 1966 and 1986 members to investigate the possible impacts on immunological health and susceptibility to infections. The goal is to instruct future city planning and give value to diverse urban green areas.

Keywords: Biodiversity, green space, health, well-being, Public Participatory GIS

Poster presentation

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GoGreenNext: Future proofing urban health by profiling citizens psychological factors relating to climate change and future health

In light of today's challenges, it is critical to engage with citizens to gain an understanding of their readiness for behaviour change, and support their participation in decision-making and advocacy relating to their future health, sustainable behaviours and conservation of ecosystems (e.g. citizen science). Our goal is to assess using a novel interactive survey on the challenges of biodiversity loss, climate anxiety and use of green space across both attitudinal and behavioural dimensions, the readiness of individuals to engage in behaviour change and engage in sustainable activities. This approach goes beyond the contemporary focus on climate anxiety, a negatively laden and highly contested term. Attempts to assess climate anxiety (e.g. Yale global survey methodology) can support citizens understanding of their own climate views (e.g. concerned, cautious, alarmed etc.) but don't connect to pathways for action. On the other hand, the use of positively laden concepts (e.g. climate hope) within a multi-dimensional health framework can help researchers to better understand how and why climate change and biodiversity loss affects mental health and how climate action may promote and protect mental health and well-being. A dynamic profile of the individual (future health score) will be developed based on the dimensions of their relationship with nature: emotion, engagement; relatedness and access; and will include objective and subjective measures of health and wellbeing relevant to climate change and benefits of sustainable actions. Integrating the Future-Health Score will provide a compass for the individual citizens to direct them to positive action for their own health and planetary health starting from their own context. This initiative can help us identify change makers (e.g. future health ambassadors) in urban each area (based on profiles) and be a major catalyst for transformative shifts toward sustainable actions through peer-modelling climate and biodiversity awareness, pro-environmental behaviours and environmental concern.

FINANCIAL SUPPORT

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest of any kind.

AUTHOR CONTRIBUTIONS

TM and AA contributed to the framework based on their expertise. All authors contributed to the development of the concept.

Poster presentation

Annika Kolster, University of Helsinki

The importance of nature and views of nature experiences among older people in assisted living facilities - a survey study

As vicinity to greenspace is associated with reduced mortality among older people, we increasingly understand how human health depends on nature [1]. Contact with nature promotes health by a) reducing harm (air pollution and noise), b) enhancing healthy behaviour c) activating human restorative capacities [2]. Nature-based interventions are a potential way to improve health. Methods: Residents in assisted care facilities in the Helsinki region with MMSE ≥ 15 were interviewed with a structured survey. We aim to explore the meaning of nature in their current life and to recruit participants to a future intervention trial. Results: Participants' (n=569) mean age was 82.3, 72% were women. Mean Charlson comorbidity index was 2.0, dementia (59%), diabetes (24%) and stroke (23%) being the most frequent diagnoses. Of participants, 82% slept enough, 29% suffered from daily pain, and 81% felt satisfied with life. Nature was important to 95%. Half of the responders felt the importance of nature had changed with age. Of them, 51% reported increased importance while 33% felt nature was more distant, mostly due to loss of functional ability. Only 50% felt they could go outdoors when desired. Participants appreciated fresh air (98%), a nature views through the window (91%), nature's sounds (87%), being outside (86%), TV programs with nature themes (74%), animal contacts (72%), and gardening (52%). 50% had a fear of falling outdoors. 80% were willing to participate in future nature-based interventions. Conclusions: Nature remains important and has a potential to improve health and wellbeing in late life. [1] Y. Yuan et al, "Green space exposure on mortality and cardiovascular outcomes in older adults: a systematic review and meta-analysis of observational studies," *Aging Clin Exp Res*, vol. 33, Jul 2021, [2] T. Hartig et al "Nature and health," *Annu Rev Public Health*, vol. 35, 2014,

Keywords: meaning of nature, nature based interventions, older adults, assisted care facilities

Poster presentation

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Alleviating loneliness among older adults in long-term care through nature-based interventions: RECETAS project in Helsinki

Background: Patient centred care incorporates non-pharmaceutical methods in rehabilitation and treatment. Loneliness is common and increasingly understood to cause adverse health effects. It is associated with cognitive decline, depression, disability, increased mortality, and leads to increased use of healthcare services.

Nature-based social prescribing (NBSP) connects participants with a defined need to nature-based interventions supporting wellbeing.

Methods: The international RECETAS project explores whether loneliness can be alleviated by nature-based interventions that enable social activity. RECETAS will test NBSP in six cities: Barcelona, Cuenca, Helsinki, Marseille, Melbourne, and Prague. In Helsinki, our target group is older adults in long-term care facilities.

The poster presents the overall aims of RECETAS, focusing on the randomized controlled trial (RCT) conducted in Helsinki. Results from a survey study, aiming to 1) recruit participants to the RCT, and 2) explore the meaning of nature in the target group, will be presented.

Results: Residents (n=850, aged 82.3y on average, 72% women, MMSE \geq 15) living in assisted care facilities in the Helsinki region were interviewed with a structured survey. Nature was important to 95%, and 80% were willing to participate in nature-based interventions. The most appreciated ways of contact with nature were fresh air (98%) and being outdoors (86%), while gardening, the most researched nature-based intervention, appealed to 52% of the responders.

The participants identified to be lonely were recruited to the RCT (n= 317). The group-based, social intervention *Friends in Nature* to be used for the RCT is based on the *Circle of Friends* method demonstrated earlier to alleviate loneliness. The activities conducted are decided by the participants themselves.

Conclusions: Nature remains important in late life. The interest to participate in nature-based interventions was high, making this a potential method to support health and wellbeing.

Funding: The research is part of the RECETAS project, Funded by EU Horizon 2020 Grant agreement ID: 945095. Annika Kolster has received research grants from Finska Läkarsällskapet, Perkléns stiftelse, and HUS-erva.

Conflict of interest statement: Authors have no conflict of interest.

Poster presentation

Pekka Korpelainen, Oulun Diakonissalaitoksen Säätiö sr

Association between nature relatedness and physical activity in adults—A population-based Northern Finland birth cohort 1986 study

Physical inactivity is a major risk factor for non-communicable diseases and death worldwide and hence a huge public health and economic concern. Recent evidence has shown the various benefits of nature exposure and nature relatedness (NR) on human health and along with mental health benefits through stress reduction and restorative effects, natural environments have also been shown to promote physical activity (PA). The aim of this study was to explore the associations between NR and total leisure-time physical activity (LTPA) at population level. The study population consisted of Northern Finland Birth Cohort 1986 who participated in follow-up data collection during 2019 - 2020 at the age of 33 years (n = 1995). The participants filled in a postal questionnaire including items on health, health behavior, socioeconomic status and NR. LTPA was self-reported with questions on the frequency and duration of light and moderate to vigorous physical activities (MVPA) during leisure time. Weekly averages of metabolic equivalent of task (MET) minutes of light and MVPA were calculated by multiplying the PA volume by its mean intensity (light PA = 3 METs and MVPA = 5 METs). Total MET-minutes were calculated (light PA + MVPA) and used as a dependent variable. The data were analyzed by multiple linear regression. The mean weekly total self-reported LTPA of the participants was 993 (95% CI 961, 1024) MET-minutes. The mean NR score was 43 (95% CI 43, 44). In the unadjusted model, NR ($\beta = 28$, CI 95% 23, 32) was positively associated with total weekly LTPA. After adjustment for smoking and waist circumference, NR ($\beta = 29$, CI 95% 21, 36) remained a significant determinant of LTPA. Nature relatedness was positively associated with self-reported total leisure time physical activity. This information could be utilized by supporting nature relatedness in promoting physical activity of adults.

Keywords: Physical activity, Nature Relatedness, Population health, Northern Finland Birth Cohort 1986

Poster presentation

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Enhancing Psychophysiological Well-Being through Nature-based Soundscapes: An Examination of Heart Rate Variability in a Cross-Over Study

Stress and psychological disorders are pressing public health challenges, necessitating innovative therapeutic strategies. The biophilia hypothesis suggests that humans inherently resonate with nature, potentially due to evolutionary benefits. This innate connection implies that nature-based soundscapes that stimulate the limbic system may offer beneficial psychophysiological responses and could hold significant therapeutic value.

The purpose of this study was to compare the psychophysiological effects of the nature-based and reference soundscapes.

Using a randomized, acute cross-over design, 53 participants experienced either a nature-based or reference soundscape for 10 minutes, separated by a 2-minute washout period. The nature-based soundscape integrated a variety of nature sounds with elements of music to create an immersive nature experience having unity and continuity. A calm coffee shop soundscape with no discernible speech was chosen as the reference to present a typical urban relaxation environment. The primary outcome measured was heart rate variability (HRV), with exploratory outcomes including heart and respiratory rates, and questionnaires on affective well-being, creativity, and sense of belonging. Results indicated that the nature-based soundscape led to higher HRV and lower heart and breathing rates, suggesting increased parasympathetic activity. Participants also reported reduced feelings of anxiety and depression, and increased feelings of comfort, enthusiasm, creativity, and belonging.

This study comprehensively demonstrates the physiological benefits, along with the emotional, cognitive, and social advantages, of nature-based soundscapes. The nature-based soundscape offers an easily accessible therapeutic method for immediate recovery and relaxation. Developing mobile applications featuring these soundscapes would enable consistent access to these therapeutic auditory experiences, potentially benefiting a wide audience.

Poster presentation

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Urban planning for population physical activity, health and wellbeing – the Resistant Cities: Urban planning as means for pandemic prevention (RECIPE) project

Objectives: Disease prevention in contemporary urban planning has largely been neglected. Urban environment affects health in various direct and indirect ways. Strategies for preventing diseases and promoting health include urban planning that increase resilience through promoting healthy behaviors, such as physical activity (PA). Residents in walkable, high density, mixed land use and pedestrian oriented communities with recreational environments and facilities are physically more active than residents in lower-density areas. PA lowers the risk of non-communicable diseases and premature mortality and seems a feasible way of improving physical and mental health in a time of pandemic and social isolation. Benefits for infectious diseases may come through reducing the risk of severe consequences of infections that non-communicable diseases raise. Urban environments and lifestyles lack elements that are important for immune functioning, and the prevalence of immune-mediated diseases has increased rapidly. According to a biodiversity hypothesis they might be due to biodiversity loss in modern urbanized societies because contact with natural environments enriches the human microbiome, promotes immune balance, and protects from inflammatory disorders. The objective is to study which residential area features are associated with PA, immunological and subjective health and what are the possible pathways.

Content: The study will pool the population based Northern Finland birth cohort and register databases on health behaviors, health and socioeconomic factors, Geographic Information System based objective and subjective data on residential environment and accelerometer based data on PA to analyse these associations.

Findings: Our preliminary results showed that biodiversity and geodiversity are associated with PA, health and wellbeing. Residential areas with high density and mixed land use seem to promote walking and cycling. Green residential areas were associated with higher amount of light PA. Nature relationship was positively associated with PA among young people. The results will be further complemented and updated.

Keywords: urban planning, residential environment, physical activity, health, infectious diseases, cohort study

Poster presentation

Nina Loimusalo-Lipiäinen, JAMK University of Applied Sciences
Janne Laitinen

Sounding landscapes project: Supporting well-being of senior citizens with nature walks and art

Research shows that exposure to green areas improves human health in many ways. Natural Resources Institute Finland (Luke) hopes for regional and multifaceted nature health programs, so that people would be encouraged to spend more time in nature. Such health programs could bring along increased funding for the new welfare areas and municipalities, and, as a result, more possibilities to increase surrounding nature areas and peoples' walking in the nature. This kind of a program was piloted by JAMK University of Applied Sciences in the Sounding Landscapes -project: Senior citizens were encouraged to take part in group trips in the near-by nature, and meanwhile, to consciously and multimodally observe the surroundings. For this, photography and recording of soundscapes were used as art-based methods alongside with walking and enjoying the nature. According to the feedback forms, the participants observed very different things at different times of the year in the very same destination. In spring and summer, the greenery of nature, water elements and the sounds of birds got more attention. In winter, old trees, open landscapes and big stones were observed. It seems that each time, the familiar nearby nature appears as different. The participants noticed that during the trips they calmed down and the lack of urgency enabled a more detailed observation of nature. In the end of the project, the participants will get the photographs and soundscapes collected during the trips as audiovisual productions created by four artists – a photographer and graphic designer, two composers and a sound engineer. With these AV products, it is possible to memorize and enjoy the nature experience later at home – even when it may not be possible to return to nature. These products may offer different yet valuable health benefits – inspired by local nature.

Keywords: art methods, wellbeing, near-by nature, senior citizens

Poster presentation

Sarah O'Malley, Limerick City and County Council
Easley Britton, Sarah O'Malley, Sara Hunt

Welcome Wave: Surf Therapy in an Unfamiliar Sea for Young Asylum Seekers

This paper explores the health-enabling and socially connective potential of the sea for young asylum seekers participating in a surfing programme for the first time on the south-west coast of Ireland. Applying an ethno-case study framework, the authors address the differentiated experiences of a minority group. They explore how the 'unfamiliarity' of the sea and surf is encountered and experienced. A broad health promotion or enabling spaces approach is used to capture the emotional, embodied and experiential dimensions of immersions in coastal blue space. The findings highlight how active learning experiences in the sea can facilitate a greater sense of relational wellbeing and place connection that emerges from the dynamic interplay of personal, societal and environmental processes.

Keywords: Blue space, minority groups, health and wellbeing, play, nature connection, experiential learning

Poster presentation

Evelise Pereira Barboza¹, Federica Montana¹, Marta Cirach¹, Tamara Lungman¹, Sasha Khomenko¹, John Gallagher², Meelan Thondoo¹, Natalie Mueller¹, Hans Keune³, Tadhg MacIntyre^{4,5,6}, Mark Nieuwenhuijsen¹

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Environmental health impacts and inequalities in green space and air pollution in six medium-sized European cities

Background: The GoGreenRoutes project aims to introduce co-created nature-based solutions (NBS) to enhance environmental quality in six medium-sized cities (Burgas, Lahti, Limerick, Tallinn, Umeå, and Versailles). We estimated the mortality and economic impacts attributed to suboptimal exposure to green space and air pollution, economic impacts, and the distribution thereof the adult population by socioeconomic status.

Methods: We retrieved data from publicly accessible databases on green space (NDVI and % Green Area), air pollution (NO₂ and PM_{2.5}) and population (≥ 20 years, $n = 804,975$) at a 250m \times 250m grid-cell level, and mortality for each city for 2015. We compared baseline exposures at the grid-cell to World Health Organization's recommendations and guidelines. We applied a comparative risk assessment to estimate the mortality burden attributable to not achieving the recommendations and guidelines. We estimated attributable mortality distributions and the association with income levels.

Results: We found high variability in air pollution and green spaces levels. Around 60% of the population lacked green space and 90% were exposed to harmful air pollution. Overall, we estimated age-standardized mortality rates varying from 10 (Umeå) to 92 (Burgas) deaths per 100,000 persons attributable to low NDVI levels; 3 (Lahti) to 38 (Burgas) per 100,000 persons to lack of % Green Area; 1 (Umeå) to 88 (Tallinn) per 100,000 persons to exceedances of NO₂ guidelines; and 1 (Umeå) to 206 (Burgas) per 100,000 persons to exceedances of PM_{2.5} guidelines. Lower income associated with higher or lower mortality impacts depending on whether deprived populations lived in the densely constructed, highly-trafficked city centre or greener, less polluted outskirts.

Conclusions: We attributed a considerable mortality burden to lack of green spaces and higher air pollution, which was unevenly distributed across different social groups. NBS and health-promoting initiatives should consider socioeconomic aspects to regenerate urban areas while providing equally good environments.

*Please note this work is published as a Scientific publication:

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest of any kind.

AUTHOR CONTRIBUTIONS

Evelise Pereira Barboza conducted the analysis supervised by Mark Nieuwenhuijsen with the assistance of others in data collection and analysis.

Poster presentationRiikka Puhakka¹, Mira Grönroos¹¹University of Helsinki**Effects of an outdoor adventure on adolescents' well-being and microbiota – A comparison with a drama workshop**

While outdoor adventures in natural settings are recognized as enhancing one's personal and interpersonal development and connection with nature, the benefits for mental health and subjective well-being have been less studied. Furthermore, although there is increasing evidence of the benefits of nature contacts on human microbiota and the function of immune system, the effects of short-term outdoor activities have not been studied. In the NATUREWELL project, we examine how participation in an outdoor adventure affects Finnish 15- to 16-year-old adolescents' (1) perceived well-being and connection with nature, and (2) their health-associated microbiota compared to participation in a drama workshop. The study is based on survey and interview data and microbial samples collected from the participants in a three-day nature hike (n=16) and the control group participants attending a three-day indoor drama camp (n=17). The follow-up survey data were also collected one year following the intervention. The data were collected from two ninth-grade classes in the city of Lahti, Finland, in spring 2022. Based on survey and interview data, both groups highlighted the benefits on their social interaction and group cohesion. The quantitative results did not provide evidence that outdoor adventures are more beneficial to well-being than arts-based activities. The qualitative findings, however, indicated that being in a natural environment under simple conditions and participating in a challenging hike supported adolescents' opportunities to calm down and escape their everyday worries, to achieve the feeling of mastery, and to be themselves. The hike also supported adolescents' motivation to engage with nature. Furthermore, participating in indoor activities does not give the opportunity for microbial exposure that originates from the diverse natural environment and, based on previous studies, is likely to lead to positive health effects. The results support incorporating outdoor activities into adolescents' everyday lives.

Keywords: outdoor adventure, well-being, health, microbiota, connection with nature

Poster presentation

Kirsi Salonen, Tampere University

Jane-Veera Paakkolanvaara, Eleanor Ratcliffe, Yasushi Suko, Bethany Harries, Katriina Hyvönen, & Kalevi Korpela

Nature experiences and emotions associate with Planetary well-being in Finland and in the United Kingdom

Environmental crises such as biodiversity loss and climate change are among humanity's greatest contemporary challenges. Attention towards Planetary well-being, which encompasses both human and nonhuman well-being, may be part of the solution to these sustainability challenges. According to eco- and environmental psychology, planetary well-being can be approached by supporting nature-connectedness that enables both human well-being and pro-environmental behaviour (PEB). There is an urgent need for evidence-based interventions to support Planetary well-being and to test these international/cross-cultural contexts. This survey study, conducted in Finland and the United Kingdom, deepens understanding of psychological well-being in the context of nature experiences. Specifically, it examines the relationships between nature connectedness, coping with environment-related emotions and environmental self-regulation, PEB and well-being. Data were collected among working-age adults in Finland (n=667) and United Kingdom (n=1210). Preliminary analyses with cross-sectional data indicate that, in Finland, positive environmental emotions and comprehensive nature experiences (includes nature connectedness) associated positively with both PEB and well-being, but negative environmental emotions associated negatively only with well-being. In the UK, positive environmental emotions associated positively with both PEB and well-being. However, negative environmental emotions and nature connectedness showed dissociations in how they predicted PEB and well-being. Based on these results, we develop a nature-based group intervention programme (Act with Nature; AWN) that aims to strengthen psychological well-being and encourage PEB. AWN builds on a previous intervention, Flow with Nature (FWN; Salonen et al., 2022) which is a nature-based intervention (treatment) based on eco- and environmental psychology, psychotherapeutic theories and professional psychological practice. This presentation focuses on the preliminary results of the survey as well as the theoretical model of the AWN intervention.

Keywords: Nature experience, nature-connectedness, Planetary well-being, pro-environmental behaviour, nature-based intervention

Poster presentation

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Enhancing mental health through shared open green spaces

This project repropose an open space as a shared green space between the residents of Villa Chelsea, a residence for adults with mental health problems in Malta, and the immediate community. It responds to the pressing need for green open spaces in a highly urbanised core, driven by the awareness of the positive impact that enabling green environments can have on mental health (Callaghan et al., 2021). The initiative is highly collaborative in bringing together students from the Masters in Architecture course at the University of Malta, residents, users and staff at Villa Chelsea, the immediate community, and the governmental entity, Project Green. The objective is to develop an inclusive shared space that is responsive to the needs of the users, while including them as active agents in the process from inception, engendering ownership, participation, inclusivity and in turn, wellbeing. The process will include needs assessment research, community participation, and care programme development, that will be documented as part of the holistic design process and will eventually culminate in the final design proposal. The expected outcome is to restore the existing open space around villa Chelsea; tailored to the diverse mental health needs of the residents, service-users and immediate community. As a first of its kind in the local scenario, this space will be publicly accessible, enabling, and welcoming to various age groups and demographics, promoting a social and inter-generational mix. Moreover, it will afford informal mental health support by professional staff to anyone seeking help.

Keywords: Green Open Spaces, Mental Wellbeing, Community Engagement, Urban Design, Public Health, Environment

Poster presentation

Yuan Wang, Finnish Institute for Health and Welfare

Ninni Mikkonen, Janne Heliölä, Tytti Kontula, Louise Forsblom, Anna Pulakka, Eero Kajantie, Jenni Lehtimäki

Early childhood biodiversity exposure and its variation across biogeographical and urban-rural regions in Finland

Non-communicable diseases (NCD) such as immune dysfunction and neurodevelopment disorders has become a major health challenge. Living in rural area during childhood has been reported to have a protective effect against some NCDs such as asthma when compared to urban area. This may be attributed to early life exposure to a variety of microscopic and macroscopic biodiversity. However, the evidence is inconsistent. Main challenge is how to quantify the biodiversity in people's early living environment and previously rather rough proxies has been used. We have identified macroscopic biodiversity variation in early living environments and their distribution at a national scale in Finland. We used a dataset NORDCAP (Nordic Children and Adults Born Preterm) managed by Finnish institute for health and welfare, which includes longitudinal register data of children born 1987-2006. The location registration allowed us to locate individual living area of children (0-3y) as 250m and 500m buffer around each of their homes. We employed an array of environmental datasets from various sources in Finland, to quantify biodiversity variation in five main habitats, i.e., forest, peatlands, grasslands, inland water, and Baltic Sea, in each individual living areas. We further overlapped all habitats and built a suit of indices to describe different biodiversity qualities. Based on that, we explored the distribution of biodiversity exposure indices. Preliminary results show interesting early life biodiversity exposure variations among biogeographical regions. Across urban and rural areas, urban area with dense population has lower natural land coverage, which contractedly feature high biodiversity. In general, children lived close to higher biodiverse forest and sea environment, compared to the total biodiversity supply in Finland. This analysis provides interesting opportunity to further study the role of early life biodiversity exposure in health.

Keywords: biodiversity, early life exposure, national pattern

Poster presentation

Juliette Zimmermann, Université de Lille

Motivation for and obstacles to nature prescribing by general practitioners (GPs) in Hauts-de-France, France

Background: The positive influence of nature on human health is now well established. Nature has beneficial effects on mental, cardiovascular and respiratory health. Nature prescription programs have been set up in several countries to address the high burden of non-communicable diseases. Nature prescription is a non-drug therapy that is easy to implement at a low cost to the healthcare system. Nature prescribing encourages pro-environmental behaviour as a patient-planetary health co-benefit prescribing. The aim of this work was to identify motivation for and obstacles to nature prescribing by GPs in Hauts-de-France.

Method: Qualitative study inspired by grounded theory. Semi-structured interviews with 11 GPs in the Hauts-de-France region, recruited by purposive sampling until data saturation was reached. Results: The principal motivations were awareness of nature benefits for health, personal experience of nature, interest in an alternative to pharmacological treatment, recognition of a role in planetary health, easy implementation, and positive feedback from patients. As obstacles, GPs mentioned doubts about whether it was evidence-based and harmless. Nature prescription is not taught at university, adds to their pre-existing workload, is a source of societal and peer prejudice, and can be difficult to apply for patients who do not have access to nature. GPs suggested that access to theoretical resources should be facilitated, that official recommendations should be drawn up, that they should be helped by other healthcare professionals, and that access to nature should be facilitated.

Conclusion: Nature prescribing depends on the GP's interest in nature and knowledge of the subject. In order to alleviate the obstacles that have been highlighted and to popularise nature prescribing, it is essential to increase green in living environments, particularly in urban areas, and that official recommendations are drawn up. A national public health programme would enable nature prescription to be deployed.

Keywords: nature prescription, planetary health, co-benefit prescribing, general medicine, qualitative study

THEME: TRANSFORMATION TOWARDS HEALTHY AND SUSTAINABLE MOBILITY

Poster presentation

Roope Heinonen¹, Elias Willberg¹, Christoph Fink¹, Tuuli Toivonen¹

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Green Paths Software 2.0: Finding healthy and pleasant routes for a large-scale travel exposure analysis

In response to the looming climate and health crises, it's critical to provide accessible tools for sustainable living. Research on environmental exposure often overlooks the significant health impacts of travel, even though it makes up a significant portion of daily exposure. Especially active travel modes, which have gained lots of attention in recent years from city planners and the public, are particularly sensitive to the environmental quality along the route. In this poster, we present a new version of the Green Paths software. The route planning tool helps pedestrians and cyclists to choose urban travel routes with less air and noise pollution and more greenery. By developing Green Paths software, we aimed to quantify the exposures during active travel, enable end-users to access environmental information on their travel routes, and respond to the demand for a more holistic approach to daily mobility using the latest innovative technology and applied science. The objective of the current iteration of Green Paths software is to produce a multipurpose, spatial-temporally, and programmatically reusable, computationally efficient entity for travel exposure analysis. The upcoming iteration focuses on flexibility and efficiency. It will support various exposure data types and expand to new cities. By integrating the R5 routing engine, Green Paths 2.0 will also achieve faster processing times, essential for large-scale computations on broad urban areas. Green Paths 2.0 not only facilitates healthier travel choices for the public but can also generate exposure matrices that can be utilized in scientific research and urban planning. These matrices help to integrate environmental health considerations into city infrastructure planning, fostering healthier communities.

Keywords: route planning, environmental exposure, urban mobility, air quality, noise, greenery

Poster presentation

Markku Karhunen, Suomen ympäristökeskus
Emilia Suomalainen, Jaana Halonen

Factors affecting bicycle commuting in a Finnish expert population

Background: Moving from passive to active commuting is one way to mitigate climate change and to simultaneously improve public health. Various actions, like a company bike benefit, can increase active commuting. Interest towards a company bike benefit was studied in two Finnish government institutions. Simultaneously, questions about present biking behavior were asked. In this study, we focus on factors correlated with using a bike or e-bike for commuting.

Results: Among 474 respondents, 67% identified as a woman and 31% as a man. The mean age of the responders was 43.4 years (SD=10.2 years). Of the responders, 397 were working in the Helsinki metropolitan area, with 77 responders elsewhere in Finland. On average, the responders worked in the office on 2.6 days of a week (SD=1.5 days), and 47% of the responders cycled to work at least once a week in summer conditions. E-bike was owned by 11%. The mean commute distance was 23.3 km (SD=50.1 km). The factors most strongly associated with bicycle commuting were a distance too long for cycling and perceived safety of the cycling route, with highly significant correlation coefficients $r=-0.53$ and $r=0.48$, respectively. Men were more likely to bike to work than women (59% vs. 41%, P

Keywords: biking, e-bikes, biking behavior, bicycle commuting, logistic regression

Poster presentation

Loyse Queau, European Public Health Alliance
Dena Kasraian, Hannah E. Murdock, Ahmadreza Faghieh Imani, Yurong Yu, Audrey de Nazelle,
Dominic Stead, Sonja Kahlmeier

Prioritising health in mobility planning: Assessing health and co-benefits in European sustainable urban mobility plans

Background:

European towns and cities are strongly encouraged by the European Commission to develop Sustainable Urban Mobility Plans (SUMP) to improve residents' quality of life. Understanding how prominently and in what aspects health is featured in these plans can help guide future policy and strategies to make the most of transport as an opportunity for health promotion.

Aim and method:

The study investigates the intersection of health and transport in SUMP, focusing on the extent to which health is highlighted, transport pathways to health are made explicit, and health is operationalised into targets and key performance indicators (KPIs). The methodology combines a health dictionary and policy analysis checklist, quantitative text analysis on 230 SUMP across Europe from 2006 to 2023, and an in-depth qualitative analysis of a purposive sample of 13 SUMP.

Findings:

The findings show that while health is often touched upon, and its prominence seems to be increasing, SUMP miss out on the opportunity to embrace mobility as a driver of health promotion. While some documents mention health explicitly in mobility planning, 34 out of 230 cities show no mention of health or its variants. Overwhelmingly SUMP's health aspirations are concerned with minimising detrimental impacts of transport on health, primarily from traffic injuries and to a lesser extent from air pollution and noise. The health implications of climate change, linked to GHG emissions, stress, and urban heat islands are rarely discussed.

Recommendations:

The study outlines several recommendations on incorporating health in mobility frameworks, quantifying the health(care) costs and benefits of transport across many pathways, employing appropriate indicators and monitoring mechanisms, and enhancing the link between transport and health in higher-level strategies. The study contributes valuable insights for policymakers, planners, and academics working towards more health oriented and sustainable urban mobility planning.

Poster presentation

Mirja Kälviäinen¹, Anna Palokangas¹ (presenter)

¹LAB University of Applied Sciences

Win-win-win service design for people, planet and business

Sustainability studies show the need for radical reduction of consumption impact in developed countries. Companies have the opportunity to meet the needs of people, the planet and business by offering more environmentally responsible and healthier solutions to consumers. Based on previous user research, the change in consumption requires service journeys that fit consumers' everyday lives so that they are easy to find, accessible, easy to learn and use, as well as acceptable, attractive, and rewarding. The key factors needed for changing behaviour are capability, opportunity, and motivation. These aspects should be considered when designing services that are environmentally responsible and can, at the same time, increase customers' well-being. Customer-oriented environmental responsibility refers to a handprint situation in which the company helps its customers reduce their environmental impact when using the company's solution. This kind of assistance is expected today. The VPK and VPKE projects of LAB University of Applied Sciences have developed e-learning material to support small businesses in developing these customer-oriented, environmentally responsible solutions. Learning materials have been designed in collaboration with companies. Both customer orientation and environmental responsibility were considered difficult, and companies need to be gradually introduced to and supported in developing these issues. The development of the e-learning material has also used gamification to engage busy learners and to support adopting a complex issue: building a meaningful story for the company, taking on the role of a user persona, step-by-step progress, and the use of templates. The guiding questions and relatable examples facilitate and help to develop solutions that promote the well-being of the environment and customers. The study material was published in Finnish in November 2023 as a MOOC and guidebook by LAB University of Applied Sciences. An English-language guide will be published in the beginning of 2024.

Keywords: customer-oriented, behavioral change, sustainable consumption, service design

Honor Mackley-Ward, Countryside and Community Research Institute, University of Gloucestershire
Jane Mills, Ana Frelih-Larson

Breaking the pesticide lock-in: insights from the SPRINT project on transition pathways to reduce reliance on synthetic pesticides in agri-food systems

The use of synthetic pesticides in plant protection is highly contested. Increasingly, evidence suggests that the impact they have on planetary health is multifaceted and significant. Pesticides, whilst widely considered critical to current farming practices, also have a significant ecological footprint, pushing our diets beyond planetary boundaries. Currently, the pesticide lock-in in conventional agri-food systems hinders progress towards reduced reliance on pesticides, and ultimately, the transition to nature-positive farming. The Horizon 2020 SPRINT project examines the opportunities for breaking the pesticide lock-in situation in 10 European case study areas, employing the backcasting method to develop tailored transition pathways for specific contexts. Combining different qualitative research methods, we draw on discourse analysis, interviews and workshops to explore two alternative visions for sustainable plant protection: reducing pesticide use in alignment with the Farm to Fork Strategy goals and envisioning a pesticide-free future. We identify the pathways that would enable transition towards these possible futures in different contexts, drawing on insights from successful nature-positive farming initiatives in the development of effective transition pathways. Multiple interrelated processes and direct barriers mutually reinforce each other to limit or substantially slow down the possibility of a wider transition away from reliance on synthetic pesticides. Drawing on illustrative examples from permanent crops (vineyards), horticulture, and livestock farming, we will demonstrate how initiatives such as agroecology have addressed the different dimensions of the lock-in. We will explore approaches to integration and coordination across these different dimensions to enable sufficiently strong and sustained impetus to move beyond fragmented success stories to a more system-wide transition. We will then consider what implications this has for the development of policies for increased sustainability in agricultural production in a shift towards more nature positive dietary consumption.

Keywords: Synthetic pesticides, planetary boundaries, agroecology, transition pathways

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Motivators and barriers to sustainable food consumption – A cross-sectional survey

Modern food systems encounter significant challenges, producing adequate quantities of affordable and nutritious food in a sustainable manner. In line with the UN Sustainable Development Goals (SDGs) and in particular SDG 13 (climate action), this study seeks to understand motivators and barriers to sustainable food and dietary behaviours. A modified version of a validated survey (1) was used to determine consumers' behaviours and motivations for food consumption. The survey contained 35 questions on dietary preferences and sustainability linked to environmental, health and well-being, economics behavioural intentions, social perception and perceived consumer effectiveness for sustainable food purchases. A Qualtrics survey was disseminated to staff and students of University of Limerick and European partners of the GoGreen Routes project via email and social media. Descriptive statistics on motivators and barriers related to food consumption and environmental factors are presented herein. 481 people participated in the survey from 20 countries, 68% female. Most participants (29%) were between 18-24 years. A significant proportion of respondents were motivated to buy environmentally friendly food products and "totally agreed" they would purchase environmentally friendly bananas (38.3%), coffee (37.4%), milk (40.2%), and chocolate (31.1%) if available. However, availability of environmentally friendly food items may influence participant's purchasing decisions; with the majority of respondents (39.1%) only, "somewhat agreeing" that it is easy for them to acquire environmentally friendly foods, with 32% of respondents disagreeing with this statement. Clear signposting of a product's environmental potential and access to more environmentally or sustainably produced products may influence purchasing and consumption behaviours. (1) Sautron, Valérie, et al. "Validity of a Questionnaire Measuring Motives for Choosing Foods Including Sustainable Concerns." *Appetite*, vol. 87, Apr. 2015, pp. 90–97, www.sciencedirect.com/science/article/pii/S0195666314007661, <https://doi.org/10.1016/j.appet.2014.12.205>. Accessed 15 Dec. 2019.

Keywords: Sustainable Food systems, UN Sustainable Development Goals (SDGs), Motivators, Barriers, Survey, Consumers, Dietary behaviors, Environment

1.5 Degree lifestyles: Towards a fair consumption space for all

Overlooking lifestyle changes in climate solutions hinders GHG emission and addressing the global crisis. The complexity arises as large parts of the society are still living below their means and still need increased consumption for wellbeing. To limit warming to 1.5°C by 2030, the top 10% income earners must reduce emissions drastically, while those of the poorest 50% can still increase by two to three times their current level. The "1.5. Degree Lifestyles" report draws connection between current lifestyles, the imperative for lifestyle changes in terms of climate mitigation, and introduces the concept of "a fair consumption space" (FCS), a policy framework that can guide society toward equitable consumption within planetary boundaries. The results show substantial disparities between current lifestyle carbon footprints and targets, emphasizing the imbalance between high- and low-income countries. Footprints in high-income countries need to be reduced by 69-82% by 2030. Upper middle-income countries need to reduce their footprint by 23-69% to meet the 2030 target. While lower-income countries are currently consuming within GHG emission limits, growing demand for consumption to achieve basic level of wellbeing sets a challenge for a sustainable growth. The FCS concept includes policy tools addressing environmental and social challenges tied to lifestyle changes. Choice editing promotes limiting of harmful consumption choices while ensuring social innovations towards sustainable alternatives, while the sufficiency approach prioritizes necessity over excess. When coupled with universal basic service, it mitigates social tensions and inequalities arising from lifestyle transitions. While carbon rationing may face controversies due to unclear implementation mechanisms, it holds the potential to bridge the gap in achieving carbon reduction targets. These frameworks recognise that significant lifestyle changes require broader systemic change in the underlying economic and social conditions, and that the burden of change also includes communities, businesses and institutions, and government agencies.

Keywords: lifestyle carbon footprints; fair consumption space; choice editing; universal basic service; carbon rationing

THEME: RETHINKING SUSTAINABLE HEALTH, TAKING ADVANTAGE OF NOVEL TECHNOLOGIES AND KNOWLEDGE

Poster presentation

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CARING NATURE: ClimAte neutRal INitiatives for GrowiNg heALTH and care Unmet Requirements

Background: The healthcare sector is responsible for 5% of global Greenhouse Gases emissions and estimates to 2050 will dramatically increase if no action is taken. CARING NATURE (CN) is an international project funded from the European Union's Horizon Europe research and innovation programme, which includes partners from 11 European countries and is aimed at developing ten healthcare specific and sustainable solutions for carbon emissions and pollution reduction, demonstrating them in 33 use cases for the next 3 years. Methods: To reduce environmental impact of building, waste and patient travel and to increase governance capability and staff engagement towards this reduction, 3 phases will be developed: collection of stakeholder requirements, development, piloting & validation. A decision support system and a knowledge sharing system will allow healthcare providers to engage in collaborative co-creation activities related to their sustainability overall duties. Lifecycle multidimensional assessment model for healthcare professionals (HCPs) and sustainable finance evaluation model for HCPs will also be applied, together with a new Green Lean Six Sigma methodology and telemedicine/AI solutions. Case studies applied to different healthcare settings will be finally conducted. Findings: CN starts in January 2024. Seven "primary" solutions are expected to tackle main production sources on which HCPs are principal actors of transition: - building energy demand will be addressed through reduction of environmental impact of construction and renovation and utilizing AI-powered energy management; - reduction and valorization of medical, food and water waste through a HCP-tailored pyrolysis plant prototype and an on-site waste food digestion and drying system; - reduction of patient/visitors travel through next generation telemedicine. Interpretation: Decision-makers and other stakeholders could benefit from the HCPs' specific eco-friendly approach to reengineering processes for enforcing sustainability based on the CN findings. Opportunities for standardization will be identified and reported, to export CN model in different countries and settings.

Keywords: healthcare, sustainability, planetary health, decarbonisation, solutions

Poster presentation

Tuula Jyske, University of Helsinki

Emilia Rosenborg, Jutta Kauppi, Jaakko Jussila, Jouni Pykäläinen

Healing interiors: in search of yet non-quantitative dimensions of social sustainability in building with wood concepts

Buildings and built environment affect human wellbeing in many ways, creating an opportunity to develop sustainable, restorative buildings and materials. This ongoing research project studies human behavior and chosen psychophysiological parameters to create a holistic view on humans' wellbeing related to different living environments. The aim is to use a multidisciplinary approach to create better understanding on how novel material choices in built environments and interiors affect human's stress levels in longer term, and how psychophysiological load can be relieved by introducing different novel engineered wood and nature-based materials into housing. The study utilizes the Living Lab of Wood Construction at the University of Helsinki – a unique test bed for holistic wellbeing research. The research applies ambulatory health metrics technologies to obtain anonymous data from the voluntary study subjects randomized into cross-over trial. The study subjects live in both wooden and non-wooden housing for six weeks, and their heart rate, heart rate variability, skin electrodermal activity, and sleep metrics are monitored together with the self-assessments and targeted focus group interviews of perceived wellbeing. The study provides new knowledge on longer-term impacts of interior materials in built environments for human wellbeing. The results help design building materials that may provide stress-relieving, healthy and restorative environments for users in home or work environments. Moreover, the study aims to connect principles of sustainability assessment as part of the assessment of human psychophysiological wellbeing. Suitability of selected wellbeing assessment methods and biomarker measurement technologies are evaluated as part of a more comprehensive assessment of sustainability in the building with wood concepts. The results achieved will be discussed in the presentation.

Keywords: Wellbeing, Wood construction

Poster presentation

Ilkka Miettinen, University of Helsinki

Anniina Tammissalo, Leena Hanski, Outi Lapatto-Reiniluoto, Sanja Riikonen, Tiina Sikanen, Mia Sivé

Education for sustainable transformation – Transdisciplinary course on sustainable health

Sustainable Health, a novel online course, addresses sustainable development in healthcare and life sciences. The course design is guided by these starting points¹: 1. There is a need for more sustainability education in pharmacy. 2. Sustainability themes are currently scattered throughout various courses. 3. Surveys reveal that students often narrow their focus on specific aspects of sustainability, highlighting the need for a more holistic approach for impactful sustainability education. 4. Curricula call for flexible courses that students in different programmes can easily incorporate in their studies. The course is intended for university students in health and life sciences. Having experts from various disciplines work together is essential for solving sustainability challenges, and observing shared problems from various angles with peers from diverse fields helps students broaden their perspectives, a vital aspect of effective sustainability education. The course includes self-directed online learning, leading to an e-portfolio showcasing the participant's sustainability competences. It is centred around the United Nations 17 Sustainable Development Goals, each linked to assignments on human, animal, and environmental health. Peer feedback midway through the course and a final peer assessment workshop serve as the primary methods for formative and summative assessment, respectively. The learning outcomes and feedback from a course pilot suggest that the participants' sustainability thinking has deepened and perspectives broadened. The activation of the students' sustainability competences has been demonstrated by the innovative solutions they present to complex challenges in the field of sustainable health. Graduates equipped with such skills will be needed for sustainability transformation and the promotion of planetary health. 1. Sivé M, Teppo J, Lapatto-Reiniluoto O, Teräsalmi E, Salminen O, Sikanen T. Generation green – a holistic approach to implementation of green principles and practices in educational programmes in pharmaceutical and Medical Sciences at the University of Helsinki. *Sustain Chem Pharm.* 2020;16:100262. doi:10.1016/j.scp.2020.100262

Keywords: education, e-learning, sustainability, life sciences, pharmacy, health

Poster presentation

Ari Nissinen, Suomen ympäristökeskus
Atte Pitkänen, Annika Johansson, Ari Nissinen

Carbon footprints of digital health technologies: Case studies of continuous glucose monitoring and point-of-care testing of C-reactive protein

Healthcare is responsible for 5.2% of global greenhouse gas (GHG) emissions and for 4.2% of consumption-based GHG emissions of Finland. Majority of the healthcare carbon footprint stems from clinical care and healthcare supply chains. Efforts for healthcare decarbonisation have been taken and several national health systems have recently set a net-zero target. Digital health technologies can provide health and clinical benefits and patient convenience over the practices they replace. They can also help reduce emissions by, e.g., reducing travel and the use of single-use medical supplies. Two topical examples are 1) continuous glucose monitoring (CGM) devices for diabetes patients, which are gradually replacing self-monitoring of blood glucose, and 2) point-of-care testing for common pathology tests, such as C-reactive protein (CRP), usually conducted in laboratory setting. Globally, there are around half a billion adults living with diabetes and billions of pathology tests performed annually. The aim of this study is to conduct estimates of the carbon footprints of CGM use and point-of-care CRP testing. Life cycle assessment (LCA) is used as a method to analyse the carbon footprints of the two digital health technologies and their preceding reference systems. For example, the lifetime of CGM devices and the required digital infrastructure are some important factors affecting its carbon footprint, while point-of-care testing could decrease the emissions from disposable medical consumables and laboratory infrastructure. Primary product data from manufacturers and process data from healthcare providers are needed for LCA of healthcare product systems. However, in case health technology manufacturers are reluctant to share data on the material composition and production processes of their products, extrapolations and secondary data from LCA databases might be needed. Our results can support the decarbonisation of healthcare, by guiding the research and development of climate-smart health technologies without compromising people's health.

Keywords: carbon footprint, continuous glucose monitoring, digital, health technology, healthcare, hospitals, life cycle assessment, laboratories, point-of-care testing

Poster presentation

Liisa Timonen, Karelia University of Applied Sciences

Catriona Curtin, Suzanne Timmons, Liisa Timonen, Andrea Stitzel, Roswitha Schipfer, Filomena Carnide, Francisca Leite, André Rodrigues, Ara Hayrabedian, Panagiota Sourtzi, Christoforos Akrivos, Costis Prouskas, Claire McSweeney

Climate change and Healthy AgeinG: co-creating E-learning for resilience and adaptation (chAnGE)

Climate change and Healthy AgeinG: co-creating E-learning for resilience and adaptation (chAnGE). Recent unprecedented climate change and extreme weather events have resulted in an escalation in climate-related health risks amongst an ever-expanding European population of older people. Climate-vulnerability amongst older people is exacerbated by the challenges of providing safe and responsive healthcare during climate crisis events. An EU-funded Erasmus+ project entitled, 'Climate change and Healthy AgeinG: co-creating E-learning for resilience and adaptation' (chAnGE), aims to address some of these issues. An alliance of universities, vocational education and training providers, and health & social care organisations, across Ireland, Portugal, Finland, Austria & Greece, are co-creating a suite of online micro credentials with health and social care workers who deliver care to older people, such as nurses doctors, and care workers. The chAnGE alliance seeks to enable and empower health and social care workers to plan and incorporate climate adaptation and resilience into their everyday work. The innovative education will be interactive, accessible, bite-sized, and stackable, and co-created with target learners and older people, at European Qualification Framework level 4-6. Learners will have access to resources for learning amplification, allowing them to act as climate-resilience champions at work and to train others. The learning content and learning-amplification resources will be freely available for adaptation or use by others. This poster will present the initial plans of the three-year project, which commenced in October 2023, along with the underlying needs analysis which informed the project, and the topics of the proposed micro-credentials.

Keywords: Climate Change, Healthy Ageing, E-learning, Micro-credentials, Health and Social Care Professionals, Learning