

Planetary Health

Research Symposium by Cambridge Zero, the Centre for Research in the Arts, Social Sciences and Humanities, and Cambridge Public Health

This symposium will explore the interconnectedness of our planetary and public health and its associations to inequality, (in)accessibility to sustainable solutions and tech, and the short- and long-term consequences of climate change on health, among other things. It will discuss how correlation and causation between planetary and public health are ascertained and why these are important, what one tells us about the other, and how we can translate our research to policy, public, and other academic communities.

Date and time: 29th November 2023, 13:00-18:00

Venue: Alison Richard Building, room SG2

Keynote presentations will be 15mins followed by 5mins of Q&A. Early Career Researchers will have a joint Q&A at the end of each session.

13:00 LUNCH

13:30 Keynote: Pathways to a healthy ‘net zero’ future: The Pathfinder Initiative.
Dr Sarah Whitmee, Assistant Professor, Centre on Climate Change and Planetary Health and Pathfinder Initiative, London School of Hygiene and Tropical Medicine

Urgent action is required to keep global warming within the 1.5°C target of the Paris Agreement. Demonstrating the benefits to human health from climate mitigation can increase motivation and capacity for climate action among decision makers. The Pathfinder Initiative analysed evidence from modelled and implemented mitigation actions that impact health across a range of sectors, scales and regions. Pathways to health include reduced air pollution, consumption of healthy, low greenhouse gas (GHG) emission diets and increased physical activity.

Modelled studies assessed using an umbrella review approach, provided evidence of impacts on GHG emissions and health from sectors, including energy, industry, transport, agriculture, food and the built environment. Case studies of implemented mitigation actions with measured climate and health benefits were also gathered as part of the project. Examples include national policies to transition from fossil fuels to clean renewable energy, city-level initiatives to encourage active travel, and nature-based solutions.

In its next phase, the Pathfinder Initiative plans to launch a new Coalition on Climate Action for Health that will bring together committed actors, including national, local or state-level government, NGOs and other organisations. The aim is to provide evidence for effective action, advocate for adequate finance and access to appropriate technologies (particularly for low- and middle-income countries), strengthen capacity to evaluate progress, ensure accountability and to advocate for a systems approach to climate mitigation action to better address trade-offs, synergies and promote health while delivering net zero GHG emissions.

13:50 Keynote: Planetary health: What is the role of healthcare?

Dr James Smith, Assistant Director of Public Health Studies, Department of Public Health and Primary Care

Planetary health recognises that human health depends on healthy natural systems and our wellbeing cannot be separated from that of the rest of life on earth. For too long the healthcare sector has acted independently from our natural environment, not acknowledging the harms it causes to the environment or the dependencies it has on it. This is starting to change. Engaged health professionals have been central to this. The healthcare sector accounts for approximately 5% of global carbon footprint and in England has set itself a net zero target 10 years ahead of national legislation. Healthcare professionals can also be powerful advocates for change in other sectors such as transport and dietary change. In this talk Dr Smith will describe the role of the healthcare sector and healthcare professionals in particular and argue that the sector has the potential to be the driving force behind faster and more radical action towards improved planetary health.

14:10 Keynote: The built environment as a planetary health action

Dr Ronita Bardhan, Associate Professor of Sustainable Built Environment, Deputy Head of Department and Director of Research, Department of Architecture

The talk will elaborate on the concept of "built environment as a planetary health action". The focus will be on how built environment design can be used considered as precision prevention, an approach to health that tailors strategies to prevent disease based on the specific characteristics of various populations. Using examples from rapidly growing global south cities, the talk will demonstrate the critical links between the built environment and public health.

Such housing projects present unique opportunities and challenges which require a transdisciplinary approach from architecture, engineering social scientists and public health to enhance the health potential. Meeting this will ensure that the spaces meet the needs of the community and contribute to planetary health. The fusion of these disciplines can lead to the creation of living spaces that not only prevent disease but also promote health resilient sustainable future for our planet. The holistic vision underscores the interconnectedness of human health and the health of our environment.

14:30 Systematic review of dry powder inhaler use in children and in acute exacerbations of asthma

Louisa Yapp, 4th year Medical Student, School of Clinical Medicine

Metered dose inhalers have a disproportionately high carbon footprint, predominantly due to their use of hydrofluoroalkane propellants. There are alternative low carbon inhaler types, notably dry powder inhalers, which do not use these propellants. Clinicians in the UK have been cautious about the use of dry powder inhalers - both in children generally, and for acute exacerbations in adult patients. Dry powder inhalers are not commonly recommended in the UK for use in patients below 12 years of age. In contrast, some Scandinavian countries typically prefer the use of dry powder inhalers for younger children and for the relief of acute asthma attacks. Our literature review seeks to establish the evidence to address these two concerns, with a view to informing national guidance in the UK. The findings so far will be presented in the session.

14:40 Improving Education on Sustainable Healthcare -The role of a Climate Change Education Fellow

Dr Rebecca Davis, Climate Change Education Fellow and GP, Department of Public Health and Primary Care

Since August this year, the Clinical School of Medicine has created a new position, entitled Climate Change Education Fellow. The principle purpose of this is to better integrate knowledge of how human and planetary health are interconnected within the medical school's curriculum. Incorporated into this, is teaching on solutions to reduce the carbon footprint and environmental impacts of healthcare itself.

The work builds on teaching already delivered within Public Health lectures, though aims to expand awareness by working with faculty from other departments and 'peppering' concepts through numerous lectures and seminars. The overall aim is to help support development of a next generation of sustainable clinicians.

In this talk Dr Davis, who is currently undertaking the role, will provide an overview of education on sustainable healthcare, provide an update on the work done to date and upcoming plans.

14:50 Development of physical infrastructure interventions to protect public health from climate-related hazards

Maria Ikonomova, PhD Researcher, Department of Engineering

Decision-makers can develop preventive infrastructure measures to reduce climate–health risks. Existing research and policies, however, have not holistically explored what infrastructure interventions are required to protect public health from climate-related hazards. Furthermore, existing literature has not explored that the development of preventive infrastructure measures to reduce climate-related health risks requires new infrastructure management practices including:

- 1) Methods to understand how the performance of infrastructure systems influences exposure to climate-related hazards
- 2) Sources of information to identify sensitive receptors facing higher health risks due to climate-related hazards
- 3) Partnership working to develop preventive infrastructure measures to protect the health of vulnerable residents
- 4) Appraisal mechanisms to capture the value of preventive infrastructure measures to reduce climate-health risks

This talk will provide examples from three case study cities (London, Ottawa, and Belfast) illustrating the innovative preventive infrastructure measures that these cities have developed to protect public health from climate-related hazards.

15:00 Q&A

15:10 BREAK

15:25 Keynote: Urbanisation, climate change and health- a planetary syndemic

Prof Tolullah Oni, Clinical Professor of Global Public Health and Sustainable Urban Development, MRC Epidemiology Unit

The talk will explore the concept of interlinked and interdependent planetary and population health risks in cities as a syndemic. Professor Oni will explore the critical role that cities play in shaping this syndemic. With a particular focus on rapidly growing cities, she will discuss her perspective on the transdisciplinary research approaches and skills needed to generate evidence to inform and augment urban infrastructure development for planetary health

15:45 Keynote: War and planetary health

Prof James Woodcock, Professor of Transport and Health Modelling, Programme Lead for Public Health Modelling, MRC Epidemiology Unit

TBD

16:05 Keynote: Forgotten, neglected, and underutilised beans: diversifying sustainable plant protein sources for planetary health

Dr Nadia Radzman, Research Associate at the Sainsbury Laboratory

Crops from the legume or bean family can provide a sustainable protein source due to their nitrogen-fixing ability. This unique ability allows legume crops to thrive in a low nitrogen environment without relying on synthetic nitrogen fertilisers and can replenish the soil with nitrogen. Diversifying our crops by including more legume crops, particularly the forgotten, neglected, or underutilised legumes, could help to ensure a better and resilient food system. Amongst these neglected legume crops are tuberous legumes – an example of this is the African Yam Bean (*Sphenostylis stenocarpa*) that can be consumed for both its beans and tubers. Although this high-protein crop used to be grown across Africa, it is now neglected and grown only by old farmers in rural Nigeria. Moreover, the physiology of the high protein tuber formation is currently understudied, hence improving these tuberous legume crops for better quality and productivity is challenging. Nonetheless, new biotechnology techniques could be used to accelerate the breeding programme of these high-protein crops. Improvements of these legume crops is crucial to reduce global reliance on soybean and to provide a more sustainable and diverse food system that can ensure better planetary health.

16:25 Plastic is a Virus: A Novel Framework for Understanding Plastic Pollution

Phoebe McElligott, MPhil Student, Department of Land Economy

While the majority of plastic pollution research has historically focused on the impacts on wildlife, new studies are revealing the harmful effects of microplastics on human health. In the age of COVID-19, the threat of a spreading health hazard has been shown to incite rapid action. What if Canadian policymakers treated plastic pollution as much of an emergency as COVID-19? To compare plastic pollution to an infectious disease like COVID-19, I draw on the epidemiological triad. Under my framework, the pathogen of the disease of plastic pollution is plastic, the host is humans, and the environment is Western culture.

16:35 Heat stress and immunity

Johanna Jung, PhD Researcher, Department of Medicine

Rising temperatures can impair the body's ability to fight infections. Yet despite evident repercussions for entire ecosystems, the intricate effects of temperature on immunity remain poorly understood. Here, we characterise

immune cell dynamics and function in mice under heat stress. Notably, heat stress profoundly inhibits the development of new immune cells in the bone marrow, which may detrimentally affect infection defence. We are currently exploring this phenotype in more detail by examining individual cells' genetic activity and diversity. Ultimately, we aim to understand the mechanism behind heat-impaired immunity.

16:45 Evaluating Emerging Food Supply Chains from a Resilience and Cost Perspective: A Study on the Alternative Protein Industry

Mariel Alem-Fonseca, PhD researcher, Department of Engineering

Food systems resilience is critical to ensure food security and nutrition. However, developing resilience may come at a cost. Alternative protein supply chains must balance cost-effectiveness and resilience to remain competitive and viable in such a disruptive environment. While reducing costs is important for companies to compete in the market and make innovative products affordable, ensuring resilience is essential for supply chains to withstand disruptions and guarantee consistent food availability. This presentation addresses this issue by examining the relationship between resilience and cost at each sustainability pillar (i.e., economic, environmental, societal) in alternative protein supply chains.

16:55 'App'preciating User Needs Early in Digital Health Innovation

Dev Malya Sarkar, PhD researcher, Department of Engineering

Most firms struggle with innovation and for many, innovation remains quite a frustrating hit-and-miss exercise. In healthcare, failed innovation hits its key beneficiaries the hardest and misses out on staggering impact opportunities. For instance, promising healthcare innovations such as health apps often fail to improve patient outcomes: concerningly, 4 in 5 health apps are unreliable, limiting their ability to deliver intended impact.

While success for these apps relies on multiple parameters, developing a useful solution begins with an insight into users' unmet needs and application context. However, given the uncertainty in the early part of innovation, firms find it challenging to identify users' needs, which limits the utility and adoption of these innovative solutions. One way to address this problem can be to involve users (patients, caregivers, clinicians) and utilise their knowledge to better identify needs early in innovation to improve product-market fit. However, current research in this area is limited, highly fragmented, and unspecific regarding what helps and in what context.

This talk will provide an overview of our ongoing research focussing on addressing this critical gap by exploring the role of early-stage user involvement in unmet need identification for user-centric health apps. Such an understanding can help firms develop personal health tools that truly appreciate a person's needs, contributing to better public health outcomes.

17:05 **Q&A**

17:15 **RECEPTION**

18:00 **END**