Heat-Related Health Risks and Heat Vulnerability in Japan

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Heat-related health impacts have been increasing in Japan. Annual heat illness ambulance transports averaged about 75,000 between 2020 and 2024, and in 2025 the number exceeded 100,000 for the first time. As nearly one-third of the population is aged 65 years or older, overall vulnerability to heat is considerable. Recent studies suggest that heat-related mortality may substantially exceed officially reported heatstroke deaths. Projections indicate increases in heat-related mortality and emergency ambulance demand toward the end of the century, with some scenarios showing summer demand surpassing winter levels. These findings suggest potential shifts in the seasonal distribution of health burdens. Nationwide analyses suggest that although the Heatstroke Alert was associated with increased ambulance transports, no statistically significant reduction in mortality was observed. This may indicate that alerts influence care-seeking behavior but do not necessarily translate into mortality reductions, particularly among highly vulnerable groups. A recent analysis estimating Wet Bulb Globe Temperature (WBGT) thresholds required to meet the national goal of halving heatstroke mortality by 2030 indicates that a threshold of around 31° C could be needed. In contrast, the current threshold of 33° C would be expected to prevent only a small proportion of deaths. Optimal thresholds vary by season, region, and age group, with early summer, colder regions, and older adults generally requiring lower thresholds. Overall, Japan demonstrates notable heat vulnerability, and heat-related health impacts may increase as temperatures continue to rise. While existing countermeasures provide certain benefits, further refinement—such as region-specific warning thresholds and strengthened medical and social support systems—may be necessary to enhance population resilience to extreme heat.

Biography

Professor Masahiro Hashizume is a physician and environmental epidemiologist. Trained in pediatrics in Tokyo, he obtained MSc in Environmental Health and Policy as well as Ph.D. from the London School of Hygiene and Tropical Medicine. Prof. Hashizume served as a lead author of the IPCC Sixth Assessment Report and Special Report on Climate Change and Cities and is a member of the WHO's Technical Advisory Groups on Global Air Pollution and Health, as well as Climate Change and Environment in the Western Pacific Region.

Climate change and maternal and child health: what can epidemiologists do?

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Climate change is increasingly recognized as a serious threat to maternal and child health. In Japan, epidemiological studies have reported associations between higher ambient temperatures and increased risks of preterm birth, asthma exacerbations in children, and the hospitalization of Kawasaki disease. These findings highlight how environmental stressors—many of which are amplified by climate change—can adversely affect vulnerable populations, even in high-income countries. Epidemiologists must take both, planetary and life course perspectives, to understand these impacts. Environmental exposures during pregnancy and early childhood can have lasting effects on health, influencing developmental trajectories and disease risk across the lifespan. For example, prenatal heat exposure may increase the risk of preterm birth, which in turn can affect long-term respiratory or cognitive outcomes. These effects are further shaped by social and biological factors such as socioeconomic status, access to healthcare, and genetic susceptibility. Importantly, climate-related exposures rarely act alone. Temperature, air pollution, and social vulnerability often interact dynamically (e.g., through food production), creating complex and context-specific risks. Traditional epidemiological models, which often use “independent” variables, may not fully capture this complexity. There is a growing need for methods that reflect the dynamic, interdependent nature of environmental health—such as systems dynamics modeling. By generating evidence that captures these complexities, epidemiologists can inform effective, equitable interventions and policies. Addressing maternal and child health in the context of climate change is not only a scientific challenge—it is a public health imperative.

Biography

Dr. Fujiwara earned his MD and PhD from Tokyo Medical and Dental University and an MPH from Harvard. He has been a professor of public health since 2016 and, since 2024, serves as Director General of the Institute of Future Science at the Institute of Science Tokyo.

International Collaboration on Planetary Health: An Environmental Epidemiology Perspective

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International Collaboration on Planetary Health (PH) is rapidly expanding worldwide. A central framework is the Planetary Health Alliance, which has been catalysing a global movement to create a livable future for humanity and all life on Earth. The alliance was established in 2015 by the Rockefeller Foundation-Lancet Commission on Planetary Health, following the publication of its landmark report "*Safeguarding human health in the Anthropocene epoch*" in The Lancet. This influential report marked a turning point in the expansion of the PH concept, which now celebrates its 10th anniversary. Today, the alliance comprises over 500 member organisations across 80 countries. In April 2024, it released the *Planetary Health Roadmap and Action Plan*and launched six working groups: "Measuring PH", "Communicating PH", "Educating to Achieve the Great Transition", "Building Holistic Governance", "Balancing Business and PH", and "Mainstreaming PH". In 2025, a seventh group, the "AI & Innovation", was added. These developments highlight the need for epidemiologists to consider their roles within this global movement. Within this evolving global framework, the role of the epidemiologist becomes increasingly significant. This includes addressing not only the direct health effects from environmental factors but also their indirect impacts, and integrating the principles of environmental and Planetary Health justice into research. The health risks from environmental changes, such as those driven by climate change, are unequally distributed across and within national borders. Epidemiologists must therefore document these disparities, prioritise vulnerable populations, and promote comprehensive and holistic interventions. In an era that demands a "great transition", our field must redefine and expand the scope of environmental epidemiology to address the interconnected challenges of human and environmental well-being.

Biography

Saori KASHIMA: PhD (Dr. of Environmental Science), Director of the Center for the Planetary Health and Innovation Science (PHIS), Professor (Special Recognition) of Environmental Health Sciences Laboratory, Hiroshima University. An environmental epidemiologist and a Public Health expert. Member of the International Society for Environmental Epidemiology, associate member of the Science Council of Japan, and so on. Now, she is leading the transdisciplinary research on the Planetary Health Community.

Practical Food System in Planetary Health

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The concept of Planetary Health has gained increasing recognition as a framework to address both human and environmental well-being in an integrated manner. While theoretical foundations of food system and sustainable diet have been extensively developed, their translation into practice remains a critical challenge. This presentation focuses on a practical implementation of the food system transformation within a university setting in Japan, where a department of nutrition and dietetics is placed. As an initial step taken in 2023, the university cafeteria was utilized as a real-world platform to incorporate principles of a sustainable food system. Menu modifications were introduced to align with planetary health principles, including a reduced environmental footprint with appropriate nutritional value and quality. This initiative was implemented in collaboration with faculty members of the Department of Food Science and Nutrition, and cafeteria staff. Building on this foundation, the next phase involves embedding planetary health-oriented food system education into the curriculum for dietetics students. Further environmental impact assessments and user feedback would also be considered. This includes learning opportunities that allow students to engage directly with issues such as food system sustainability, climate change, dietary transitions, and behavior change strategies. By equipping future registered dietitians with the knowledge and practical skills necessary to advocate for and implement sustainable dietary practices, we aim to accelerate the social diffusion of the Planetary Health concept. Through this dual approach—real-world implementation and capacity-building in professional education—this case demonstrates how theoretical insights can be effectively translated into practical action. This case study highlights the critical role of universities in shaping sustainable food environments in the context of Planetary Health.

Biography

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