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Policy Measures to Innovate Synergistic Co-actions for People's Health and Global Environment under Climate Change with Urban Heat Wave in Vulnerable Aging Society

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The purpose of this research is to analyze and evaluate the impact of deterioration of the heat environment due to climate change on an evidence basis, develop support tools and design a process for a “Living Lab” to realize synergistic co-actions for people's health and the global environment in light of an aging society and future urban vulnerability. There are three subgroups collaborating with each other by collecting detailed data related to heat stroke and developing models to predict its risk; by creating and implementing evaluation models and visualization, along with various adaptation measures at a detailed district level using spatio-temporal data; and by developing and implementing methodologies for co-creation processes through the establishment and operation of Living Labs.

Subgroup 1 has developed highly accurate heat stroke emergency transport prediction models by using independently obtained heat-stroke-related emergency transport data and correlating detailed location information with weather information by individual attribute. The model has brought greater accuracy, especially at peak times, and provides effective information for alerting citizens. The model also estimates numbers of emergency heat stroke cases under future climate conditions.

Subgroup 2 has developed models to evaluate vulnerability to heat stroke on a town-by-town and character-by-character basis by proposing a new index called the Urban Functional Agglomeration Index. For risk assessment, we propose a method of using the cumulative time of WBGT (set bulb globe temperature) as a new alert indicator and have developed a risk assessment model for each grid unit of outdoor space using the cumulative time of MRT (mean radiant temperature) and human flow data. In addition, we are developing a guidebook for heat stroke prevention, a causal structure model for behavior change, and a navigation system for avoiding heat stroke. Furthermore, as an adaptive infrastructure for outdoor spaces, we propose heat shelters using wood and membranes, and clarify their heat mitigation effects based on the heat environment and physiological responses of the human body.

Subgroup 3 has established a Living Lab and implemented it for realizing a co-creation process among industry, government, academia and the private sector. Facilitator manuals, a process model and evaluation models that promote co-creation are being developed and applied in practice. This has demonstrated that the adaptation measures work effectively and have a significant social impact.

These results are being integrated to provide suggestions for heat stroke prevention guides, behavior change support tools for individuals, adaptation policy platforms for policy and decision-makers, and heat environment mitigation technologies, which are important as intervention policies.

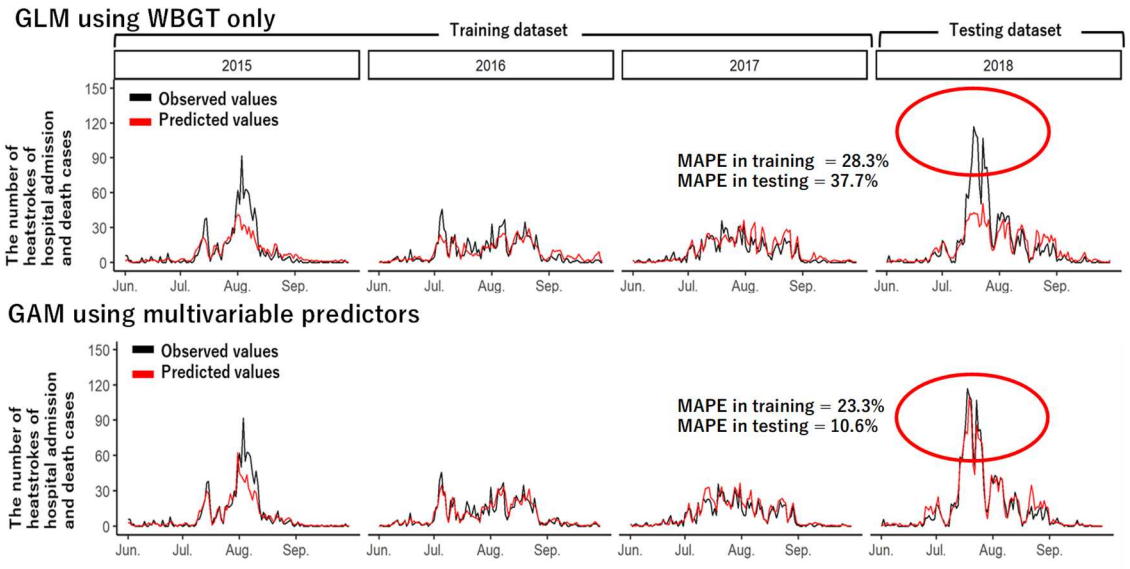

Fig. 1 Prediction performance for heat strokes among hospital admission and death cases.

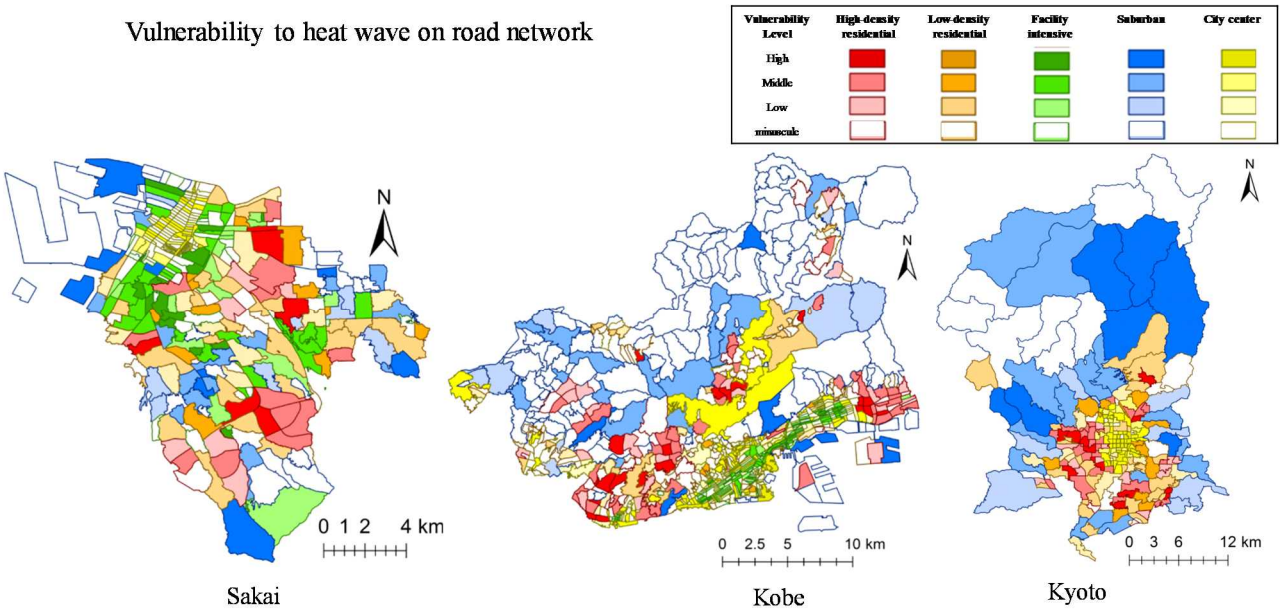

Fig. 2 Visualizing vulnerability to heat waves.

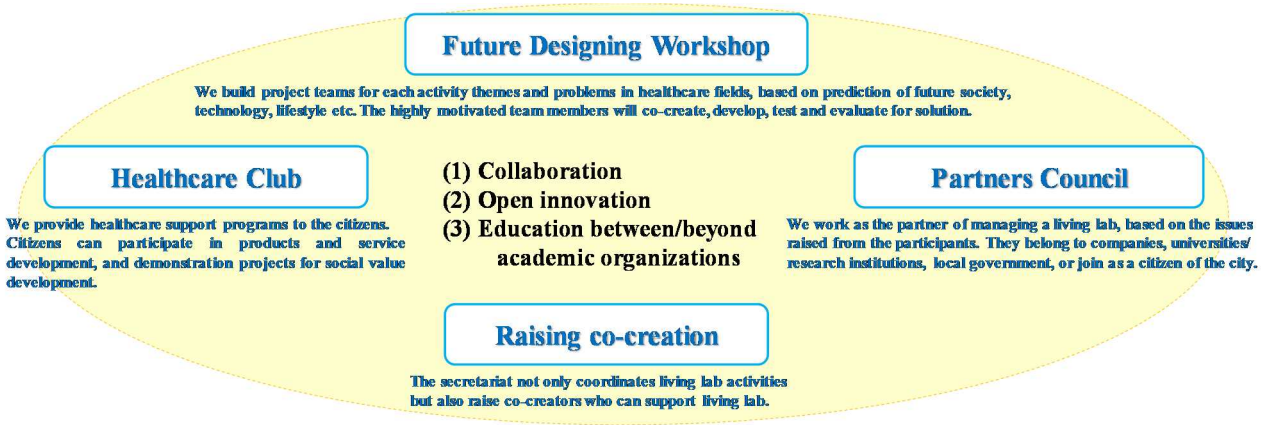

Fig.3 Scheme of the Living Labs.