**Honda**

Methods

We obtained daily data for number of deaths and maximum temperature from respective governmental organizations of Japan, Korea, Taiwan, the USA, and European countries. For future projection, we used the Bergen climate model 2 (BCM2) general circulation model, the Special Report on Emissions Scenarios (SRES) A1B socioeconomic scenario, and the mortality projection for the 65?-year-old age group developed by the World Health Organization (WHO). The heat-related excess mortality was defined as follows: The temperature–mor- tality relation forms a V-shaped curve, and the temperature at which mortality becomes lowest is called the optimum temperature (OT). The difference in mortality between the OT and a temperature beyond the OT is the excess mor- tality. To develop the model for projection, we used Jap- anese 47-prefecture data from 1972 to 2008. Using a distributed lag nonlinear model (two-dimensional non- parametric regression of temperature and its lag effect), we included the lag effect of temperature up to 15 days, and created a risk function curve on which the projection is based. As an example, we perform a future projection using the above-mentioned risk function. In the projection, we used 1961–1990 temperature as the baseline, and temper- atures in the 2030s and 2050s were projected using the BCM2 global circulation model, SRES A1B scenario, and WHO-provided annual mortality. Here, we used the ‘‘counterfactual method’’ to evaluate the climate change impact; For example, baseline temperature and 2030 mortality were used to determine the baseline excess, and compared with the 2030 excess, for which we used 2030 temperature and 2030 mortality. In terms of adaptation to warmer climate, we assumed 0 % adaptation when the OT as of the current climate is used and 100 % adaptation when the OT as of the future climate is used. The midpoint of the OTs of the two types of adaptation was set to be the OT for 50 % adaptation.

Results

We calculated heat-related excess mortality for 2030 and 2050.  
Conclusions Our new model is considered to be better fit, and more precise and robust compared with the previous model.

Chart, line chart

Description automatically generated

In 2002, the World Health Organization reported for the first time the health impact of climate change [1]. In the report, however, heat-related impact was not included in the final aggregate total number, because it was not easy to model the relationship between ambient temperature and mortality for projecting future impact of climate change.

**Gasparrini**