Background and Aims: Regional climate models (RCM) allow to assess health impacts. The authors studied how climate-change modify heat-related mortality by different validation methods.

Methods: We assessed 1961-1990 and 2021-2050 heat-related mortality impacts in Budapest by applying temperature projections from 20 RCMs (ENSEMBLES project) and for validation the Budapest station data of the Hungarian Meteorological Service. Based on a previous study, daily mortality increases by 1.03(1.02-1.05) cases/1°C increase resp. by 1.06(1.04-1.07) in the age groups of <75 resp. ≥75-year old population on days with mean temperature above 95% percentile.

Four computation methods were used: only reference and scenario of climate models; observed data compared to scenarios; assuming that excess mortality occurred on equal number of days, resp. assuming the same number of excess deaths occurred in the observed and reference datasets.

Results: In three models 95% percentile daily mean temperature of the reference period was higher than the maximum values of observed data; in two models the maximum temperature of predicted future was less than the observed maximum. The number of hot days above threshold temperature (23.9°C - 548 days) in observed data fell between 49-1787 days in the reference data. Increase of excess mortality due to climate change was between 16-780%, 7-680%, 21-314%, 21-320% in the computation models. In the last model the yearly heat-related excess mortality was 87(58-145) resp. 174(116-203) in the younger vs. older age group in 1961-1990. The yearly excess mortality predicted by the models will be between 106-366 resp. 212-733 for the younger resp. older age groups between 2021-2050.

Conclusions: When the effect of heat can be modelled for the real past period, the validation should be based on it to produce more reliable prediction. This project is supported by the New Hungary Development Plan (Project ID:TÁMOP-4.2.1/B-09/1/KMR-2010-0005).