

SHORT TERM EFFECT OF HIGH TEMPERATURES ON MORTALITY IN MEDITERRANEAN CITIES: RESULTS FROM THE EU-FUNDED CIRCE PROJECT (CLIMATE CHANGE AND IMPACT RESEARCH: THE MEDITERRANEAN ENVIRONMENT)

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Background and aims: Current scenarios indicate that the Mediterranean area will be especially vulnerable to future climate change. The effect of heat has been widely studied in Europe while to a less extent in North Africa and the Middle East. In the CIRCE project, we estimated the short-term effect of Maximum apparent temperature (Tappmax) on total and cause-specific mortality, (by gender and age groups) during summer (April-September) in 10 Mediterranean cities (Athens, Bari, Barcelona, Istanbul, Lisbon, Palermo, Rome, Telaviv, Tunis and Valencia). The presence of harvesting effect was also evaluated.

Methods: Two time series approaches were performed: a linear threshold model (GEE) and a distributed lag nonlinear model (DLNM) to overcome the assumption of linearity. The first model estimated the overall effect of Tappmax (lag0-3) above a city-specific threshold, while the second estimated the effect of 1°C step increases considering different time windows (up to 30 days).

Results: For most cities, J-shaped curves, with differences in the threshold and the impact of high temperatures were observed. The relationship was weak in the hottest cities (Telaviv, Tunis and Valencia). The greatest effect on total mortality was found in the 65+ age group. The second analysis shows a difference in the effect of Tappmax for 1°C step increases along the temperature and lag distribution. The harvesting effect was observed only in few cities.

Conclusions: The results show that the effect of heat and its temporal structure differs between cities. The weaker effect in North-African cities can be explained by the lower proportion of elderly and local population adaptation to heat. On the contrary, the progressive aging in European people will increase the fraction of susceptible population. Differences in local demographic characteristics may explain the heterogeneity of the harvesting effect.