



The role of adaptation measures in contrasting heat-related health effects among vulnerable groups: a review from the EXHAUSTION European project

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Abstract

BACKGROUND AND AIM: The health burden associated with extreme heat depends on population vulnerability, intensity of the exposure and the population's adaptation capacity. A systematic literature review was conducted in Pubmed and Web of Science, between 1990- 2020, to provide evidence on how adaptation interventions may affect heat-related health effects. **METHODS:** Both MeSH and free-text terms were included in the search. Studies were categorized based on the type of intervention: (1)public health response plans; (2)indoor and outdoor thermal environmental interventions (air conditioning and passive cooling, green spaces); (3)behavioral change interventions. Studies were evaluated considering whether they provided direct or indirect evidence of the intervention in terms of changing health-effect estimates. **RESULTS:**Of the 58 studies retained, 75% were based in north America and Europe, and the remaining studies were located in Asia or Australia. Only 5 studies (9%) directly assessed the effect of a specific intervention, through an experimental or a quasi-experimental design, while the remaining 53 studies (91%) were indirect evaluations (21 studies compared effect-estimates before-after the evaluation, 25 studies analyzed the effect modification due to presence/absence of the intervention, and 7 with a cross-sectional approach). 24 studies assessed heat plans, 29 evaluated thermal environment interventions and 5 considered behavioral measures. Although heterogenous, several studies reported a reduction in heat-related mortality\morbidity over time indirectly related to the introduction of heat plans and warning systems especially among the elderly. Studies also assessed differences by socio-economic status and people with chronic disease most at risk during heat waves. Evidence of beneficial effects of green areas and indoor cooling was promising, but inconsistent. Among workers, changes in work clothing such as cooling vests and working in cooled environments improved productivity and reduced health effects. **CONCLUSIONS:**The review provides updated evidence on heat response measures and evaluation methods necessary to enhance public health response and drive policy. **KEYWORDS:** Temperature extremes and variability, climate, review

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