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Retrofitting Australian precincts for heatwave resilience

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Abstract: As the frequency and intensity of heatwaves are growing in Australia, strategies to combat heat are becoming more vital. Cities are exposed to urban heat islands (UHIs) due to excess urbanisation. In this study, a definition of urban heatwave (UHW) is conceptualised that will be used to investigate combined impacts of UHIs and heatwaves. The negative effects of UHWs will be measured by indicators such as excess morbidity, electricity and water consumption. This research will identify adaptation and mitigation techniques to retrofit existing precincts against UHWs. Strategies will be evaluated in terms of energy and carbon efficiency, financial affordability and perceived acceptability by population.

Precinct scale case studies will be undertaken in metropolitan regions of Adelaide and Sydney to define the resilience of each precinct to UHWs. The indicator and intensity of UHWs will be used to calculate precinct resilience. Intensity is calculated using the unit of excess heat factor, developed by the Australian Bureau of Meteorology. Three groups of factors will be considered as influential to precinct resilience:

- the demographic characteristics of population vulnerability to UHWs
- the level of exposure to UHWs in built environment
- UHI contributors in built environment.

Through a classification and regression tree analysis influential factors will help to identify the best precinct specific retrofitting techniques. To measure the retrofitting strategies acceptance by inhabitants and their heatwave perception survey will be undertaken. Findings will result in a new 'cool mitigation tool' (CMT). The CMT will serve as an evidence base for future programs and policy changes.