RP2005

HOW TO ASSESS & INCREASE URBAN HEAT STRESS RESILIENCE

Problems

Heatwaves are the **deadliest natural hazard** which also drives peak electricity demand caused by air-conditioning, contributing to soaring electricity prices and energy poverty. **Air-conditioning** also increases carbon emission, contributes to urban heat island effects and can increase dependence on it.

How can we increase our resilience to heat?

Analysis methods

Firstly, the connections between the intensity and the impacts of heatwaves, such as heatwave-related, excess ambulance-call-outs, electricity demand and water consumption have been analysed. Secondly, the level of population's vulnerability and adaptation, the heat stress resistance of the built environment were surveyed, and their interplay was analysed. Thirdly, the heat stress resistance of a typical dwelling type with different star ratings and design was compared using AccuRate energy simulation software.

Results

- **The excess heat factor was found to be a superior predictor of heat-related morbidity in Adelaide but not in Sydney.**
- The **excess water** use in Adelaide and Sydney on heatwave days reach 20 per cent, nearly as much as excess peak demand in electricity.
- One-fifth of the population reported negative **heat-related health** issues during heatwaves in Adelaide.
- **The real-world benefits of heat stress resistant design features, such as roof insulation and double-glazing, on health during heatwaves were confirmed.**
- **Pre-existing health conditions** and **tenancy** predict higher than average heat-related health issues due to lack of awareness and poor housing conditions, respectively.
- **The availability and the level of air-conditioning diminish other forms of adaptation and increase reliance on mechanical cooling.**
- **Heat health messages** about recommended adaptation techniques should be tailored for different social groups to increase their efficiency.
- **High star rating does not necessarily indicate a building with high heat stress resistance. The integration of overheating risk in the Australian Nationwide House Energy Rating Scheme would be warranted.**

Conclusions

The framework devised (Figure 1) integrates heat stress resistance, public health, energy and water resources to help resource management in preparation for and during heatwaves.

Impacts of research

Heatwave warnings can be issued more effectively with the introduction of the validated **excess heat factor** in Adelaide. The **broader negative impacts of heatwaves** on self-reported public health and daily routines were revealed, which will assist policy makers to comprehend the real magnitude of the consequences of heatwaves.

The results of the representative survey highlighted the **increased risk** among people living in **tenancies**, suffering from energy poverty and/or **pre-existing health conditions.** These findings assist the evaluation of potential policy changes, government subsidies and **community education** campaigns for increased heat stress resilience.

The importance of **heat stress resistant built environment** demonstrated is useful for policy makers and professionals working in the realms of housing and urban planning to **create guidelines and regulations** for heat stress resistant building design and retrofitting.

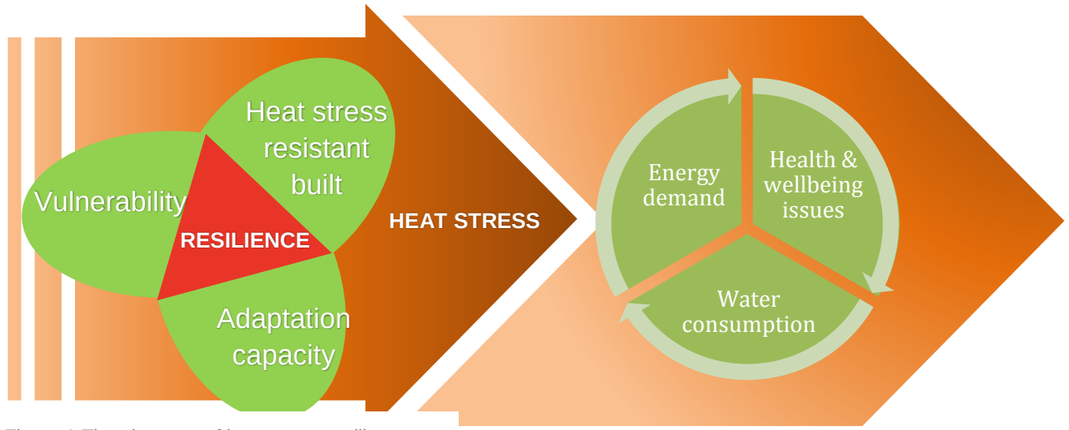

Figure 1 The elements of heat stress resilience

To increase heat stress resilience, health, energy and water use have to be considered.

For more information

http://www.lowcarbonlivingcrc.com.au/research/program-2-low-carbon-precincts/rp2005-urban-micro-climates

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