

Reflective roofs can reduce overheating in cities and save lives during heatwaves

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A new modelling study from the University of Oxford and collaborators has estimated how changing the reflectivity of roofs can help keep cities cooler during heatwaves and reduce heat-related mortality rates.

Cities are generally a few degrees warmer than the countryside, due to the urban heat island effect. This effect is caused partly by a lack of

moisture and vegetation in cities compared with rural landscapes, and because urban building materials store up heat. During heatwaves, daytime temperatures can get dangerously high in cities, leading to serious health effects and increasing mortality risk.

The idea of 'cool' roofs is to make [roof](#) surfaces more reflective to sunlight (for example by painting roofs a lighter colour) thereby reducing local temperatures.

Scientists used a regional weather model to look at how temperatures changed across the study [city](#) of Birmingham and the West Midlands, depending on the extent of cool roof deployment. They looked at the hot summers of 2003 and 2006, and found that the intensity of the urban heat island (the urban-rural temperature difference) reached up to 9 degrees C for Birmingham city.

Previous work has shown that the extra heat associated with the urban heat island is responsible for around 40 to 50 percent of heat-related mortality in the West Midlands during heatwaves.

This latest study, published in *Environment International*, suggests that implementing cool roofs across the city can reduce peak daytime local temperatures by up to 3 degrees C during a heatwave. This reduction in [temperature](#) could potentially offset around 25 percent of the heat-related mortality associated with the urban heat island during a [heatwave](#).

The urban heat island effect is most pronounced at night, because urban materials slowly release their stored [heat](#) overnight. But the biggest benefits of [cool roofs](#) were seen to be during the hottest part of the day when sunlight was reflected away. The type of building made a difference, too—modifying only half of all the industrial and commercial buildings had the same impact on lowering temperatures as modifying all the high-intensity residential buildings.

Co-author Dr. Clare Heaviside, of the University of Oxford's Environmental Change Institute, says, "Climate change and increasing urbanisation mean that future populations are likely to be at increased risk of overheating in cities, although building- and city-scale interventions have the potential to reduce this risk. Modelling studies like this one can help to determine the most effective methods to implement in order to reduce health risks in our cities in the future."

More information: Potential benefits of cool roofs in reducing heat-related mortality during heatwaves in a European city, *Environment International*, doi.org/10.1016/j.envint.2019.02.065

Provided by University of Oxford

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