Heatwaves can kill – research uncovers the homes most vulnerable to overheating

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Around 19% of EU households get uncomfortably warm during the summer and in some countries, the figure is close to 50%. It isn't simply a matter of comfort, though – overheating in homes can be fatal. In the UK, there were 892 excess deaths resulting from summer heatwaves in 2019, with many occurring in houses and care homes.

In recent years, there have been long and intense heatwaves in cities throughout Europe. Extreme temperatures are likely to become more familiar as the climate warms, but the risk to life is particularly high during the COVID-19 pandemic. With many people facing an unusually long stretch indoors in summer 2020, knowing what determines the likelihood of overheating could save lives.

Drawing from thousands of household surveys across four European cities – Gdansk in Poland, Prague in the Czech Republic, Budapest in Hungary, and Skopje in North Macedonia – our recent research has uncovered why particular people and places are at greater risk of overheating than others.

Patterns of overheating

Within each city, overheating was most commonly reported in districts dominated by large apartment blocks and with higher rates of poverty. What explains these patterns? Overall, we found that the design of individual homes was crucial for determining their risk of overheating. Skopje was the city with the smallest number of people complaining about overheating during the summer, despite having the highest average outdoor temperatures.

The most vulnerable homes tend to have large windows facing the south or west, which exposes their interior to the sun's rays during the hottest parts of the day. Shutters and awnings can help, but we found they were less common on low income rental housing, especially in Gdansk, Prague and Budapest.

Shutters can bring shade during the hottest moments of the day

Those living in the smallest apartments with very few windows tend to struggle most with getting enough ventilation. Some apartments we visited were extremely cramped and had only a single window, making it very difficult to create a draught that might lower temperatures inside. Again, it was often the poorest and most disadvantaged people who lived in these conditions.

Homes built primarily of concrete or asphalt can also have a higher risk of overheating. These materials absorb the sun's heat and release it slowly into the building and wider neighbourhood. But they have become increasingly common in building construction since the latter half of the 20th century, especially in low-income housing due to their cheaper manufacturing and construction costs.

How to adapt

Some of the people we interviewed had renovated their homes to reduce the risk of overheating, by installing shutters to shade their windows, filling walls with insulation to prevent heat seeping from the outer walls to the inside of the home, and air conditioning. These measures all helped, but many of the poorer households couldn't afford them.

In normal circumstances, people might spend more time in cooler places away from home, like a friend's house, an air conditioned shopping centre, or an outdoor park. But some of the people we interviewed were lonely and had few friends or family they could visit. High quality green space is also harder to reach for ethnic minorities, people on low incomes, women, older people and people with disabilities.

Worryingly, these inequalities are likely to be exacerbated by COVID-19. Although lockdown measures have eased in some countries as summer approaches, many people are still confined to their homes for long periods, especially those deemed particularly vulnerable to COVID-19. Due to their age or pre-existing health conditions, these same people may also be less able to cope with overheating.

The summer heatwaves of 2003 caused more than 70,000 excess deaths across Europe

Our research confirms that overheating in homes is not a problem limited to warmer climates, but an imminent threat in cities throughout Europe. But encouraging people to install air conditioning should be avoided as far as possible, as this will supercharge energy demand and contribute to wider climate change.

Instead, governments should help people retrofit their homes with shutters and awnings, and ensure new build and rental properties have enough shading and ventilation. Guaranteeing access to green space for all communities is also vital.

The poorest and most vulnerable face the greatest threat from climate change, even in their own homes. That's why adapting to the heat extremes of the future must start at home too, and should help those most in need first.

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