Muggy cities will feel future heat even more

January 6 2015, by Stephanie Jacobs And Ailie Gallant

Several Australian cities, such as Adelaide and Perth, have greeted 2015 with scorching weather as summer hits its stride – the kind of conditions that leave us crying out for an air conditioner, rather than dreaming of barbeques and beach trips.

Yet new research shows that Australians could end up feeling even hotter than expected over the next few decades, as changing weather conditions make climate change feel even more severe than it is. That's bad news for Sydney and Brisbane, where sweltering humidity is set to rise.

In contrast, freshening summer winds in Perth, Adelaide and Melbourne could grant residents some relief by mitigating the apparent effects of rising temperatures. The mercury will still rise, but perhaps it won't feel quite as sweltering as we would expect.

Feeling the heat

Days upon days of extreme heat make us feel irritable, uncomfortable and, in the worst cases, unable to cool down at all. Stifling conditions during the day, with no relief at night, place physical stress on our bodies. During heatwaves, vulnerable citizens such as the elderly, young children and the physically ill have a higher risk of adverse health effects. In some cases the stress can become too much, resulting in death.

In January 2009, a week before the devastating Black Saturday bushfires, 374 people lost their lives as a result of heat-related stress during a three-day record heatwave in Melbourne. This was more than twice the number that died during the fires. Despite the implementation of heatwave alert systems in some Australian cities, many people are still vulnerable. An estimated 167 people lost their lives during Melbourne's heatwave in January 2014.

Keep your cool

The human body's ability to withstand heat stress depends on being able to shed excess heat, often through sweating, to keep our core temperature at an optimal 37C. Very warm outdoor temperatures, or excessive exposure to the sun, heat our bodies. However, shedding that heat depends not only on the surrounding air temperature, but also on factors such as humidity and wind speed, both of which affect our ability to sweat effectively.

This can mean that the heat we think we feel is not necessarily the same as the air temperature we measure. That's why a 35C day in Brisbane can feel so much worse than a 35C day in Melbourne!

Taking account of these factors allows meteorologists to predict what the weather conditions will "feel like" to an average person. For example, the Bureau of Meteorology uses a measure called the apparent temperature. Measuring weather conditions in this way provides a better idea of when conditions are dangerous to health, so that appropriate warnings can be issued.

Which cities will fare the best?

Many recent studies show that extreme heat is increasing around Australia, mostly as a result of human-induced climate change. But are we actually feeling any hotter? Recent work by one of us (S.J.) showed that alongside the increase in air temperature, the apparent temperature (how we feel), has also changed across Australia.

In Sydney and Brisbane, the apparent temperature has increased by 1C since the 1950s, but the actual temperature has only increased by 0.5C. This means that what felt like 29C in the 1950s now feels like over 30C, on average. This is because the humidity has increased and it is slightly less windy on average in both locations. These muggier conditions make the weather feel hotter, as the body is unable to shed excess heat as effectively.

Perth, Adelaide and Melbourne fared better. Although, on average, it is nearly 1C warmer now than in the 1950s, people in these cities may not actually feel warmer. This is because it is also typically windier, so sweat can evaporate more effectively when it is hot, making us feel cooler than the real temperature suggests.

The largest trends in apparent temperature were found in Western Australia, with the Pilbara and the Wheatbelt hit hardest. In these regions, what felt like 38C in the late 1970s now feels like 41C, on average, potentially increasing the risk of heat stress to miners and farmers alike.

It's getting hot in here

In the future, Australian heatwaves will likely become hotter, longer and more frequent as the climate changes. But what are the consequences for the risk of heat stress?

Future changes in apparent temperature are somewhat uncertain. While we are confident of the forthcoming increases in temperature, we are less certain about how humidity and wind will change. Regardless, the data suggest that apparent temperatures will increase in most Australian regions – so wherever you are, it's likely you'll feel the rise in temperatures.

But the speed of the perceived warming is also important if humans are to adapt. If things get too hot to handle too quickly, communities will have little time to adjust, resulting in a dangerous situation for health.

The largest changes will be in Australia's southeast, where climate models suggest that for the millions of people in Melbourne and Sydney, future summers will feel like they are warming even faster than the real temperature suggests, because of an increase in humid days. Residents in these cities will therefore be at a higher risk of heat stress when a heatwave strikes.

Meanwhile, in the southwest, Perth's drying climate will act to slow the rate of perceived warming, enabling residents to adapt more easily to the new conditions.

Human-induced climate change is happening and we are already starting to feel the effects. Coping with the infamous Australian summer is already difficult, but in the future it might become even more stressful for some.

Source: The Conversation