

January 17, 2013

Committee Secretary
Senate Standing Committees on Environment and Communications
Parliament House, Canberra

Recent trends in and preparedness for extreme weather events

Dear Sir/Madam,

I have no objection to my submission or contact details being made publicly available.

Summary

- A warmer Australia has serious implications for human health
- A warmer Australia will mean more deaths and hospitalisations for cardiovascular and respiratory disease
- A warmer Australia may result in an increase in preterm birth and stillbirth
- There are ways to lower the risks, but heat warning systems may not be a good investment

Who I am

I am an Associate Professor at the Institute of Health and Biomedical Innovation at Queensland University of Technology. I have been working in the field of environmental epidemiology for nine years. I have published a book and 38 peer reviewed papers in environmental epidemiology, including 16 papers on the health effects of temperature. I have a degree in statistics from University College London and PhD in mathematics from the University of Queensland. I am on the editorial board of the journal *Epidemiology*, a leading journal in the field of public and environmental health.

Terms of reference

(b) based on global warming scenarios outlined by the Intergovernmental Panel on Climate Change and the Commonwealth Scientific and Industrial Research Organisation of 1 to 5 degrees by 2070: (ii) the costs of extreme weather events and impacts on [...] human health

Heatwaves kill more Australians than any other extreme weather event. Heatwaves happen almost every summer, and the IPCC has predicted that heatwaves will become more

frequent and intense in Australia. The heatwave of January 2013 reached most of Australia and was particularly strong.

The full health impact of heatwaves often go unnoticed by the public and the media because the deaths are geographically dispersed and will be due to the common killers of respiratory and cardiovascular disease. For most deaths it is likely that neither the victim's family or treating doctor would make the connection with heat.

How do high temperatures impact on health? Increased temperatures cause increases in blood pressure, heart rate, respiratory rate and inflammation factors in the blood such as C-reactive protein. The risks are greatest in the elderly (who have limited physiological reserve) and those with pre-existing illnesses (e.g., diabetes). Australians may be particularly vulnerable to high temperatures because many homes are poorly insulated, many homes have no air conditioning, and many at-risk people do not appreciate the dangers of high temperatures.

High temperatures also increase the risk of **bushfires** and the smoke from bushfires is a well-known cause of respiratory and cardiovascular death and hospitalisation.

Our recent study estimated that 1,500 years of life are lost across in Brisbane each year due to high temperatures (daily mean temperatures above 23 °C). If the daily average temperature increases by 2 °C we predict that 4,000 years of life will be lost per year to high temperatures. A rise of 4 °C will mean 8,300 years of life lost per year. To put these figures into context, breast cancer currently claims around 3,700 years of life in Brisbane.

Years of life lost is a better way to measure the total impact of disease rather than the number of deaths. It uses life expectancy at death, so if a 50 year old dies with a life expectancy of 82 then 32 years of life are lost, whereas if a 70 year old dies with a life expectancy of 85 then 15 years of life are lost. The death of a younger person therefore has more impact compared with the number of deaths.

Our predictions for Brisbane may be an **underestimate** because they do not account for an ageing population (and the elderly are amongst the most vulnerable to high temperatures). They may also be an **overestimate** because they do not account for improved adaptation, such as future homes being better insulated and having more air conditioning.

It is crucial to note that **the health effects of high temperatures are not limited to extreme heatwave days**, but also occur on hot but not extreme days. I urge the committee to consider the full health impact of high temperatures, and not just the impacts of extreme heatwaves. Our research shows that many more deaths occur on high temperature days, because although these days have lower health risks they are far more frequent than heatwave days.

Another huge potential cost for a warmer Australia is **an increase in preterm birth and stillbirth**. Our recent study of over 100,000 mothers in Brisbane found higher temperatures were associated with shorter pregnancies and stillbirth. Stillbirth is a devastating experience for families and can create long-term impacts on mental health. Shorter pregnancies mean more preterm babies, who have a poorer quality of life during childhood and an increased risk of chronic disease in adulthood. Preterm babies are greater users of health services throughout their life, meaning the costs to society of warmer temperatures will be paid for

many years into the future.

(d) an assessment of the preparedness and the adequacy of resources in the emergency services sector to prevent and respond to extreme weather events

In the last few years a number of places in Australia have implemented **early warning systems** for heat. These aim to warn the public about dangerously hot days and hence prevent deaths and hospitalisations. Unfortunately whilst they may seem to be a good idea, there is no good evidence (from Australia or elsewhere) to show that they work.

It is incredibly difficult to predict the number of deaths caused by a heatwave, because the numbers will depend on many things including: its timing during summer (heatwaves earlier in summer are usually more deadly), if there is a power cut (which means people cannot use air conditioning), whether it occurs during a holiday (as elderly people may be left alone), and the number of vulnerable people which changes from week-to-week. These difficulties mean any early warning system is likely to have frequent false alarms, which may then undermine public confidence so that they then do not react to a well-timed warning.

Money spent on early warning systems for heat would be better spent on interventions that are known to be effective such as building insulation, increasing shade and air conditioning.

I would be happy to discuss these important health issues further.

Yours faithfully,

Associate Professor Adrian Barnett

References

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