

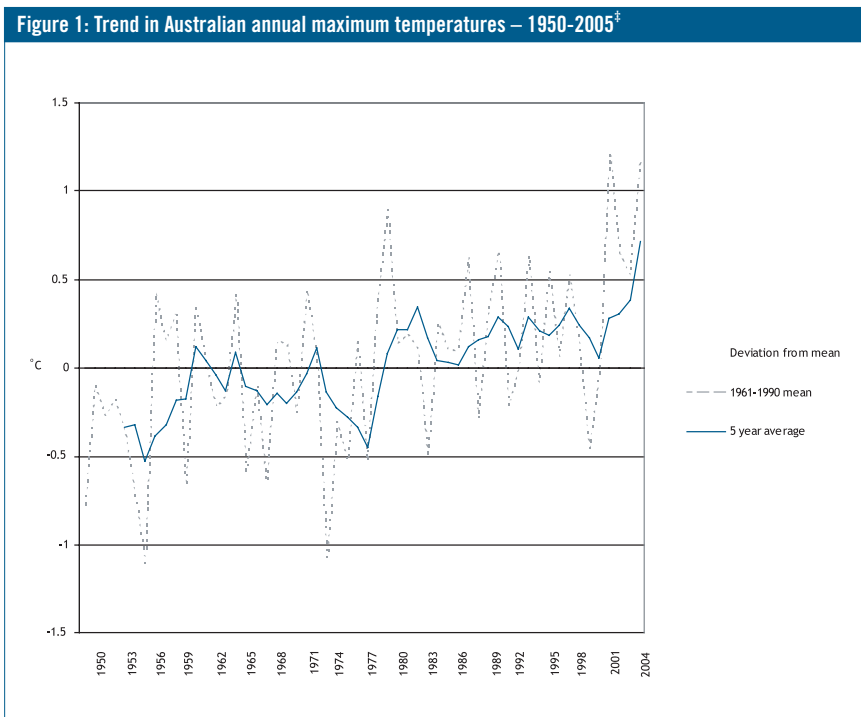
# HEATWAVES

**“The most direct and clear-cut effect of the increase in global mean temperature over the past century is an increase in the probability of high temperature extreme events – heatwaves.”**

— Professor Will Steffen, Australian National University<sup>1</sup>

Heatwaves are among the most under recognised natural hazard in Australia.<sup>2\*</sup> Between 1803 and 1992 heatwaves caused more fatalities than either tropical cyclones or floods.<sup>3,4</sup> Recent assessments suggest extreme temperatures currently contribute to the deaths of more than 1,000 people aged over 65 each year in Australia every year.<sup>5</sup>

Since 1950, Australian average temperatures and the number of extremely hot days have increased. Most of this warming is likely to be a result of increased levels of greenhouse gases in the atmosphere.<sup>6,7</sup>



\*For an overview of heatwaves see: Bureau of Meteorology, Heatwaves, <http://www.bom.gov.au/weather/wa/sevwx/perth/heatwaves.shtml>  
<sup>‡</sup>Deviation from 1961-1990 average annual maximum temperature and five year running average. Data source: Bureau of Meteorology.

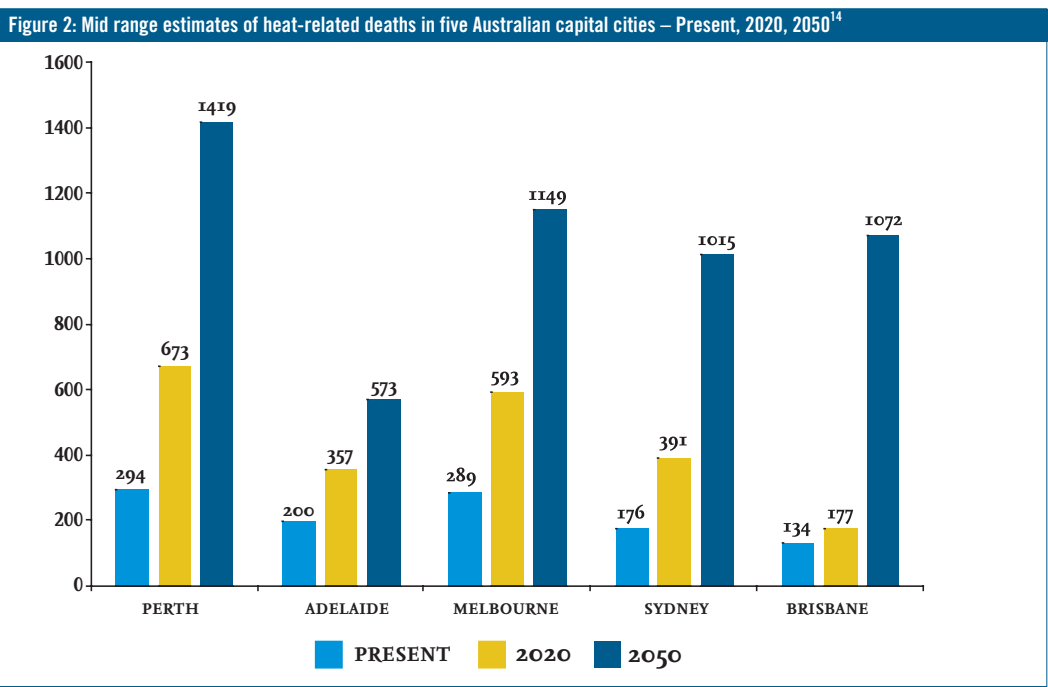
With no action to reduce greenhouse gas emissions Australia is projected to warm by between 0.4-2.0°C by 2030 and 1.0-6.0°C by 2070.<sup>8</sup> This warming trend is expected to drive large increases in the frequency, intensity and duration of extreme temperature events. For example by 2030, the yearly average number of days above 35°C could increase from 17 to 19-29 in Adelaide and from 9 to 10-16 in Melbourne.<sup>9</sup>

### HEATWAVES AND HUMAN HEALTH

**This heatwave is “the most significant medical emergency in the south-east corner on record.”** — Queensland Ambulance Service Commissioner, February 2004<sup>10</sup>

The most studied consequence of an increased frequency and intensity of heatwaves is the impact on human health. Heat waves can cause deaths through heart attack, stroke and heat exhaustion/stroke. The most vulnerable include the elderly, people under intense physical stress and those with cardiovascular (e.g. heart) disease.

In Australia a number of studies have shown that in the absence of adaptive measures<sup>^</sup>, climate change is projected to result in a substantial increase in heat-related deaths.<sup>11,12</sup> For example, a 1-2°C increase in global temperature could increase the number of heat related deaths among the elderly in Australia’s capital cities by 89–123%.<sup>13</sup>



<sup>^</sup> For example, the development of heat early warning systems and changes to the Australian Building Code, housing design and urban planning to buffer individuals and communities from high temperatures.

The impact of heatwaves extends further than increased heat-related mortality. High temperatures have been linked to:

- increased hospital admissions relating to heat stress, sun burn and dehydration
- increased rates of certain crimes particularly those related to aggressive behaviour such as homicide
- increased number of work-related accidents and reduced worker productivity
- significant economic impacts through livestock/crop losses and damage to roads, railways, bridges, power infrastructure and electrical equipment
- increased electricity demand to power equipment like air conditioners leading to black outs
- an increased risk of bushfire.<sup>§</sup>

## ENDNOTES

- 1 Will Steffen (2006), *Stronger Evidence but New Challenges: Climate Change Science 2001-2005*, Australian Greenhouse Office.
- 2 Andrews (1994), *The consequences of heatwaves in Australia*, Master of Science thesis, Macquarie University.
- 3 Ibid.
- 4 Coates (1996), *An Overview of fatalities from some natural hazards in Australia*, in Heathcoote, Cuttler, Koetz (eds), Natural Disaster Reduction (NDR96): conference proceedings, Institute of Engineers Australia.
- 5 McMichael, Woodruff, Whetton, Hennessy, Nicholls, Hale, Woodward, Kjellstrom (2003), *Human health and climate change in Oceania: a risk assessment*, Commonwealth Department of Health and Ageing.
- 6 Karoly, Braganza (2005a), *Attribution of Recent Temperature Changes in the Australian Region*, Journal of Climate: 18: 457-464.
- 7 Karoly, Braganza (2005b), *A new approach to detection of anthropogenic temperature changes in the Australian region*, Journal Meteorology and Atmospheric Physics 89: 57-67.
- 8 CSIRO Marine and Atmospheric Research (2001), *Climate Change: Projections for Australia*, CSIRO Marine and Atmospheric Research.
- 9 CSIRO Marine and Atmospheric Research (2006), *Climate change scenarios for initial assessment of risk in accordance with risk management guidance*, Australian Greenhouse Office.
- 10 Quoted in Steffen, Love, Whetton (2006), *Approaches to defining dangerous climate change: a southern hemisphere perspective*, in Schellnhuber, Cramer, Nakicenovic, Wigley, Yohe (eds), *Avoiding Dangerous Climate Change*, Cambridge University Press.
- 11 McMichael, Woodruff, Whetton, Hennessy, Nicholls, Hale, Woodward, Kjellstrom (2003), *op cit*.
- 12 Woodruff, Hales, Butler, McMichael (2005), *Climate change health impacts in Australia, Effects of dramatic CO<sub>2</sub> emission reductions*, Report to the Australian Medical Association and the Australian Conservation Foundation.
- 13 Preston, Jones (2006), *Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions*, CSIRO Marine and Atmospheric Research.
- 14 Mid range estimates calculated from low and high estimates presented in CSIRO Marine and Atmospheric Research (2006), *op cit*.

§ See separate Climate Institute media brief on bushfires at <http://www.climateinstitute.org.au/cial/index.php>