

What does climate change have to do with bushfires?

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Abstract. A warming climate is increasing the duration of fire seasons and the risk of more extensive and intense bushfires. The Black Summer bushfires that occurred in Australia from September 2019 to early February 2020 were unprecedented in their scale and intensity. The fires led to loss of lives and homes, and widespread destruction of flora, fauna and ecosystems. Dense smoke from these catastrophic fires blanketed major cities and towns for weeks. A Commonwealth Royal Commission and two state inquiries provided recommendations for reducing the risk of future bushfires and for better disaster management processes to support the preparedness, relief, response and recovery to such megafires. While strategies to reduce the risk of bushfires and the damage to our biota and ecosystems are necessary and important, there is also an urgent need for mitigation strategies to reduce or prevent emission of greenhouse gases. If we are to minimise the planetary effects of a warming climate, we need to limit global warming to well below 2°C compared to pre-industrial levels and to reach net zero carbon emissions by 2050. This requires transformative thinking and action by our political leaders that builds on the Australian public and industry’s willingness to play their part.

Australia’s climate is warming with more extremely hot days, decreased rainfall, increasing drought, and an increased number of high fire danger days and the subsequent longer fire seasons for southern and eastern Australia,¹ increasing the risk of bushfires.^{2,3} Landscape fires (e.g. bushfires, peat fires, forest fires) can also emit vast quantities of carbon dioxide, a potent greenhouse gas, further exacerbating global climate warming. For example, the carbon emissions from the massive 1997 Indonesian peat and forest fires were equivalent to 13–40% of the mean annual global carbon emissions from fossil fuels.⁴

The Black Summer bushfires that occurred in Australia from September 2019 to early February 2020 were unprecedented in their scale and intensity. National estimates of the land area burned ranged from 24 to 40 million hectares, with at least 33 deaths, 3 billion animals killed or displaced, and over 3000 homes destroyed.⁵ In New South Wales (NSW), the worst affected state, more than 5.4 million hectares were burned during the 2019–20 bushfire season compared to approximately 300 000 hectares during an average fire season.⁶ During this period, the air quality in Sydney was often poor or very poor, with air pollution levels on the worst days being nearly 10 times above the national air quality standard (<https://www.dppe.nsw.gov.au/air-quality/air-quality-data-services>).

Apart from the direct fire-front related health impacts (deaths and injuries), the 2019–20 bushfires were also responsible for

a range of other adverse health effects. In a national poll conducted in early January 2020, just over half the respondents (57%) reported experiencing some effect from the bushfires or smoke, with 26% reporting illness or health effects from the smoke.⁷

Nationally, the bushfire smoke was responsible for an estimated 429 premature deaths, 3230 cardiorespiratory hospitalisations, and 1523 visits to the emergency department for asthma, and the health costs of the 2019–20 bushfires were approximately A\$2 billion (in 2018 dollars), approximately 10 times the average annual health costs for the previous 19 fire seasons.⁸ The tangible economic cost – these are costs that are easily measured, for example, destroyed homes and vehicles, and deaths – of these fires is estimated to be approximately A\$100 billion (in 2020 dollars).⁹

Although there is little published data on the mental health impacts of the 2019–20 bushfires, highly affected communities in the 2009 Victorian Black Saturday bushfires continued to suffer from post-traumatic stress disorder, depression and psychological distress 3 to 4 years after the fires.¹⁰ The prolonged 2019–20 bushfires also called into question the ability of the health system to cope with the crisis.¹¹

The catastrophic bushfire smoke period, with fine particle levels reaching hazardous levels for weeks, was a unique challenge for health professionals. One of the immediate

concerns during the bushfires was minimising the acute health effects of smoke exposure. The general health advice from health agencies to reduce the public's risk from bushfires centred around personal behaviours to reduce smoke exposure, for example, by staying indoors, and wearing masks and minimising vigorous physical activity when outdoors. However, the evidence supporting such advice is either lacking or limited.¹² Importantly, we also know very little if prolonged exposure to bushfire smoke over weeks and months leads to health problems in subsequent years.

So, what needs to be done to reduce the risk of future catastrophic bushfires and to manage the devastating impact on our flora, fauna (including humans) and ecosystems? In the wake of the 2019–20 bushfires, inquiries were established at federal and state levels.^{5,13,14} The Commonwealth's Royal Commission into National Natural Disaster Arrangements,⁵ published in October 2020, focused more broadly on natural disasters rather than the bushfires *per se*. Recommendations salient to the health system include developing national air quality forecasting capabilities, developing arrangements that facilitate greater inclusion of primary healthcare providers in disaster management, supporting localised planning and the delivery of appropriate mental health services following a natural disaster, and developing consistent and compatible methods and metrics to measure health impacts (including mental health) related to natural disasters.

The NSW Bushfire Inquiry¹⁴ focused on recommendations to ensure that in the future there is less damage to property and the environment, and to minimise the loss of lives. Only one of the 76 recommendations from the NSW Bushfire Inquiry is relevant to health or health services, *viz.* that there is investment in public health research and policy development. The Inquiry into the 2019–20 Victorian Fire Season¹³ investigated the preparedness for and response to the 2019–20 fire season and the effectiveness of the recovery arrangements. These inquiries focused on recommendations for reducing the risk of future bushfires and for better disaster management processes to support the preparedness, relief, response and recovery to such megafires.

However, the elephant in the room is climate change, with recent papers highlighting the relationship between climate change, bushfires and health.^{15,16} Despite denialism and inaction on climate change at the highest levels of government, it is heartening that both the NSW and Victorian Inquiries and the Commonwealth Royal Commission acknowledged the relationship between climate change and bushfires.

It is vital that we plan and implement strategies to reduce the risk of bushfires and the damage to our biota and ecosystems as part of a suite of adaptation strategies for a warming climate. We also urgently need to implement mitigation strategies to reduce or prevent emission of greenhouse gases from all sources, including bushfires. If we are to minimise the planetary impacts of a warming climate, we need to limit global warming to well below 2°C compared to pre-industrial levels and to reach net zero carbon emissions by 2050. This will require reductions in energy demand, decarbonisation of electricity generation, and reductions in agricultural emissions.¹⁷ Achieving net zero carbon emissions by 2050 requires transformative thinking and action by our political leaders that

builds on the Australian public and industry's willingness to play their part.

Competing interests

The authors declare that they have no competing interests.

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