Country brief: **Australia**

The Limits of Livability

The emerging threat of smoke impacts on health from forest fires and climate change

'Not one of us was prepared for a bushfire smoke problem. It wasn't in our imagination, it's not in our past experience, it doesn't fit into the framework of our understanding of the environmental hazards in Australia ... the next one could be worse'.[1]

Dr Arnagretta Hunter, Cardiologist, ANU, Canberra, Australia

CLIMATE AND HEALTH ALLIANCE

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Climate Change, Wildfires and Smoke Pollution

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In 2019-20 the worst bushfires in Australia in living memory ravaged the country. While thousands of lives were saved through the tireless efforts of the fire services, the authorities were not prepared for climate impacts that have been described by scientists[2] for over three decades.

Recent years have witnessed an increase in extreme wildfire events around the world with growing evidence that climate change is implicated.[3] The risk of wildfires is projected to increase in most areas of the world as climate change intensifies,[4,5] bringing more frequent heat waves of longer duration[5] and changes in rainfall patterns that affect vegetation growth. Larger populations, including urban populations far from the forests, are being exposed to harmful and prolonged levels of wildfire smoke.

This country brief accompanies a report released by the Global Climate and Health Alliance in June 2021. The report highlights that government response to wildfires has largely centered on emergency response to the immediate impacts of the fires themselves, with limited attention, preparation and response to address either short- or long-term impacts of wildfire smoke exposure. Smoke from landscape fires causes an estimated 339,000 premature deaths per year worldwide, many more deaths than those lost directly[6] yet receives relatively little focus.

'Smoke is just one of many problems that will intensify with the increasing frequency and severity of major bushfires associated with climate change. Expanded and diversified approaches to bushfire mitigation and adaptation to living in an increasingly hot and fire-prone country are urgently needed'.[7]

Australian bushfires 2019/2020

In 2020 Australia's Royal Commission into National Natural Disasters was established in response to the bushfires of 2019-2020, in recognition of the devastating 'loss of life, property and wildlife and environmental destruction'.[8] The Royal Commission noted that Australia endured the worst wildfire season in recorded history with 33 lives lost, over 3,000 homes destroyed, and an estimated three billion animals killed or displaced. Air quality was ten times hazardous levels in Melbourne, Canberra and Sydney. As communities recovered and rebuilt from the crisis, impacts were also noted on mental health.

Key observations on air pollution from Australia's Royal Commission into National Natural Disaster Management Arrangements (also known as the Bushfire Royal Commission)[8]

"The unprecedented 2019–20 Australian bushfires ... saw intense smoke and air pollution hit areas of Australia. While the immediate threat to life has passed, the long-term impacts on our health are not yet fully known."[9]

During the fires

- 80% of the population of the country was affected by poor air quality.
- 429 premature deaths, 3,320 hospital admissions for cardiovascular and respiratory conditions and 1,523 presentations to emergency departments for asthma were estimated.
- AU$1.95 billion (US $1.51 billion) in health costs, associated with premature loss of life and admissions to hospitals.
- People with asthma were 94% more likely to report respiratory symptoms and seven times more likely to report requiring medication (Asthma Australia's Bushfire Survey).

Needs and recommendations:

- Greater consistency in emergency warnings and air quality information to allow communities to take preventative action, such as seeking cleaner air spaces, sealing an indoor environment, or taking preventative medication
  - develop close to real-time, nationally consistent air quality information,
  - greater community education and guidance,
  - targeted health advice to vulnerable groups.
- Smoke Plans, including identification and preparation of clean air locations for those needing to seek shelter - such as libraries, shopping malls, community centres, or schools that have tightly sealed windows and appropriate heating, air-conditioning and ventilation systems fitted with high-efficiency particulate air (HEPA) filters.
- Invest in research — AU $3 million (US $2.4 million) was committed to identify the
  - physiological impacts of bushfire smoke
  - respiratory impacts of bushfire smoke on vulnerable groups
  - physiological impacts of bushfire smoke on emergency responders and outdoor workers
  - efficacy of facemasks in filtering bushfire smoke.

'It was so hot; it had not rained and there was no water. We had plants and trees dying, animals dying. It got too hot for [pet] animals too. You can't go outside, you can't breathe the air, the water's unreliable. That really starts to get to the edge of what you want to go through'.[1]

Dr Arnagretta Hunter, Cardiologist, ANU, Canberra, Australia

Health impacts

Although bushfires are characteristic of Australia's natural environment, the risk has increased as climate change drives longer fire seasons that start earlier and finish later.[10] Until fairly recently, Sydney was recorded as having severe pollution from fires for around 4-5 days in any one year, on average.[11]

In February 2009, a fire that became known as 'Black Saturday' was the second largest fire on record in Australia with 173 deaths and over 350,000 hectares devastated. The death toll was nearly five times as high as the 2019/2020 fires, but the fires and the smoke production was less prolonged.[12]

The 2019-2020 bushfires, coined the 'Black Summer' fires, exposed millions of people to hazardous levels of air pollution,[10,13] with 80% of Australians affected by bushfire smoke during the months the fires burned.[14]

The 2019-2020 bushfires burned for 19 weeks in many forested areas of the country impacting people across the states of New South Wales (NSW), Queensland, the Australian Capital Territory and Victoria. Levels of $PM_{2.5}$ frequently exceeded the national air quality standard of 25 µg/m^3. On 14 January, 2020, for example, $PM_{2.5}$ exposure was recorded as 98.5 µg/m^3 which is fourteen times the historical population-weighted mean 24-hour $PM_{2.5}$ value of 6.8 µg/m^3.[7]

During Australia's bushfire season, mortality rates increase with high bushfire smoke pollution as do admissions to hospital, emergency attendances, ambulance call-outs and visits to general practitioners.[10]

Between November 2019, when the emergency started, and 8 January 2020, NSW Health announced that it had issued 15 health warnings and distributed one million P2 masks to bushfire areas.[15] Response plans included issuing a temporary special authority to pharmacists to be allowed to supply increased quantities of prescription medicines.

Hospitals were reported as coping well although with increased emergency presentations. The number of patients attending for asthma and other breathing problems increased by 34.5% from a daily average of 829 (averaged over 5 years) compared to the daily average of 1,115 (averaged from Dec 30 to Jan 5).

The Australian Institute of Health and Welfare (AIHW), the federal government agency on data and statistics, released a set of interactive graphs in its assessment of the short-term health impacts of the bushfires. Maximum $PM_{2.5}$ levels in Canberra, Australia's Federal Capital city, were recorded at 2,496 µg/m3 during the week of Jan 5-11 and prescriptions for inhalers for shortness of breath increased by 73%.[16]

The AIHW concluded that "The unprecedented 2019–20 Australian bushfires … saw intense smoke and air pollution hit areas of Australia. While the immediate threat to life has passed, the long-term impacts on our health are not yet fully known" … "there are likely to be a range of long-term health effects from the 2019-20 bushfires that will not be evident for some time".[9]

Studies of lung function among firefighters have shown that function can return to baseline over a long follow-up but the cumulative impact of repeat effects is unknown.[17] A large-scale research project has been funded to look at the medium-term health impacts of smoke and ash exposure, including mental health, for frontline responders and affected communities.[16]

Further research to assess the long term health impacts of the smoke has been delayed to 2021 because of the need to focus on the Covid-19 pandemic.

Emergency preparation and response

Australia's health protection advice is currently limited to advising on short-term exposure of a few hours or days. The 2019-2020 bushfires created smoke conditions that lasted for weeks and months. With large population centres affected, there is a need for clear and consistent health advice now which can help people adapt over these longer time periods.

The AIHW found that frequently updated air quality data and forecasts enabled individuals to manage their exposure to hazardous levels of air pollution. Real time data was used to inform evacuation alerts by text message. Available data included bushfire burn-area mapping, air-quality, pharmaceutical, Medicare and hospital emergency department data.[16]

'More government investment is needed in air quality monitoring, forecasting and research on public health messaging, and exposure reduction measures to protect Australians from bushfire smoke'.[10]

Good practice

In response to the fires the Analysis and Policy Observatory published a practical guide for governments, fire and land management agencies and communities to help reduce the risk of bushfires under worsening climatic conditions which is summarised here.[18]

Readiness

- Create an Indigenous-led National Cultural Fire Strategy to complement and inform fuel management by agencies
- Increase the affordability and uptake of insurance for properties in disaster prone areas, a key factor in community resilience
- Review and update Australian building standards in bushfire-prone areas

Response

- Better resource fire and land management agencies to manage fuels, and rapidly detect and attack new outbreaks
- Add a self-sufficient Australian medium and large aerial firefighting capability to fire services
- Better utilise Australian Defence Force support capabilities in emergencies

Recovery

- Set up a national climate disaster fund to meet climate-fuelled disaster costs and build resilience—paid through a fossil fuel producer levy
- Better coordinate and resource wildlife recovery efforts
- Develop and implement a national climate change, health and well-being strategy

"While unprecedented, this tragedy was not unforeseen. For decades climate scientists have warned of an increase in climate-related disasters, including longer and more dangerous bushfire seasons."

Indigenous fire practice

Fire is used in carefully controlled ways by Indigenous communities around the world in forested areas to suppress undergrowth in order to discourage big fires and to encourage new plant growth, attracting wildlife and bush food.[20–22] Noel Webster Indigenous fire stick practitioner from New South Wales, Australia explained what are known as 'cultural burns' in an interview to GCHA.[22]

In cultural burns, fires are controlled and move at walking pace. They do not have the ferocity of wildfires, nor of hazard reduction burns, and as such do not damage the soil microflora and fauna, in what is described as a cool burn. In addition, these gentle, managed fires do not dry the land out, which may happen after hazard reduction burns or bushfires because they are so hot and intense.

In Australia, Indigenous knowledge has been passed down through millenia and is shared with the community through storytelling and spending time in Country (the name for the land/Earth) doing cultural burns and introducing young people to these techniques. The approach is one of prevention and connectedness. Through understanding the ecological connections of Country, the approach to land management is one which reduces fire risk and intensity of fire and supports new growth.

The 2020 Royal Commission formulated two key recommendations about the use of cultural burns. These included the sharing of knowledge and understanding about cultural burns and further investigation into how cultural burning could be used to improve forest and fire management in Australia.

'What we're saying is, look after Country properly. We don't have to be a firefighter and we're not firefighters. We want people to be fire practitioners, to start caring for the land and apply the right fire for the right Country type. But they don't do that, they got one fire methodology. And that applies right across the landscape. Our aspiration is to work with the fire agencies and change their fire practice, use Indigenous knowledge systems to start looking after Country when it comes to their fire practice. Yeah, that's our aspiration, to change it'.[22]

Noel Webster, Indigenous fire stick practitioner
New South Wales, Australia

Conclusions and recommendations

The 2019/2020 fires were a devastating wake-up call for Australia which, among high income countries, is probably the most vulnerable to climate change impacts. Going forward, the recommendations of the Royal Commission must be implemented without delay including real engagement with Indigenous forest management techniques. Meanwhile better public health messaging is needed to communicate both fire and smoke risk along the lines of the practical guide above from the Analysis and Policy Observatory.

On the international stage, the federal government of Australia has the opportunity, means and motive to make far greater progress on climate change than it has to date. Australia has substantial potential for renewable energy development, offering health benefits while supporting the Paris Agreement to limit warming to 1.5°C. An end to public subsidies for new coal, gas and oil exploration would signal the Australian government's serious commitment to tackle global climate change and reduce national vulnerability and impacts.

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To read the full report, find supporting materials, and report details, go to: https://climateandhealthalliance.org/forest-fire-smoke-health-climate/

About GCHA

The Global Climate and Health Alliance (GCHA) is the leading global convenor of health professional and health civil society organizations addressing climate change. We are a consortium of health and development organisations from around the world united by a shared vision of an equitable, sustainable future, in which the health impacts of climate change are minimized, and the health benefits of climate solutions are maximised. GCHA works to elevate the influential voice of the health community in policy making to address the climate crisis.

Contact: info@climateandhealthalliance.org
@GCHAlliance
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Authors: Frances MacGuire, Milena Sergeeva
Design: Russell Shaddox