



AUSTRALIAN ACADEMY OF HEALTH AND MEDICAL SCIENCES: SUBMISSION TO THE ROYAL COMMISSION INTO NATIONAL NATURAL DISASTER ARRANGEMENTS, APRIL 2020 [SUBMITTED ONLINE]

In your experience, what needs to change to improve arrangements for preparation, mitigation, response and recovery coordination for national natural disaster arrangements in Australia?

The Australian Academy of Health and Medical Sciences (AAHMS) is Australia's Learned Academy for health and medical sciences. Our mission is to advance health and medical research in Australia and its translation into benefits for all, by fostering leadership within our sector, providing expert advice to decision makers, and engaging patients and the public. The Academy, through its Fellows, is the impartial, authoritative, cross-sector voice of health and medical science in Australia.

We welcome the opportunity to make a submission to this Royal Commission. Bushfires can impact on physical and mental health in multiple ways. Health must therefore be seen as a crucial component of preparation, mitigation, response and recovery. This is especially true since Australia is likely to see higher frequency and severity of fires over the coming decades. We must also incorporate health into the ongoing recovery efforts from the 2019/20 fires.

We have published a fully referenced evidence document that provides further detail and references on the issues raised in this submission [available from: <https://aaahms.org/news/aaahms-publishes-evidence-report-on-the-health-impacts-of-bushfires-in-australia/>].

Health impacts

The extent, duration and intensity of the 2019/20 fires affected an extraordinarily high proportion of the population, bringing new health challenges, some of which are not well understood. The health impacts of bushfires include:

- **Respiratory health:** exposure to bushfire smoke can cause respiratory complications, including breathing difficulties and coughing, due to the complex mixture of molecules including varying levels of carbon monoxide, sulphur dioxide and nitrogen dioxide, as well as particulate matter (fine particles found in the air). Small particles (known as PM_{2.5} because they have a diameter of 2.5µm or less) pose a serious risk, especially for individuals with pre-existing conditions such as heart, lung diseases, asthma and diabetes, and those in vulnerable population groups such as the elderly, children and pregnant women.
- **Mental health:** a range of psychological factors result from the processing of trauma following bushfire events, especially for the individuals and communities directly impacted, and for first responders. Mental health impacts can include anxiety, depression, post-traumatic stress disorder (PTSD) and other forms of psychological distress. Recovery from bushfires is a long process – mental health impacts can emerge at any time and can last for

years. For example, we know that one in five individuals in regions affected by the Black Saturday fires in 2009 still had a psychological disorder five years later. We also know that women living in highly affected communities are more likely to experience domestic violence than those living in less affected communities. The subsequent COVID-19 pandemic could exacerbate mental health problems by delaying community recovery and adding additional stress to individuals and families, for example those with businesses that have already been damaged by the fires.

- Eye health: Bushfire smoke can cause eye irritation – dust, fumes, gases and fine particles can irritate the eyes. Individuals with pre-existing conditions such as dry eye, eyelid inflammation or allergic conjunctivitis can be particularly sensitive to irritation from smoke, which can sometimes trigger severe symptoms of stinging, grittiness, burning and itching.
- Health effects of fire and heat exposure: Bushfires and heat stress pose a severe risk for anyone in proximity to the flames, but those nearby can also be affected by radiant heat. Burns to widespread parts of the body can be life-threatening or lead to lasting disabilities that require long-term medical treatment and support. Heat can be a serious stressor, causing dizziness, confusion, dehydration, nausea, exhaustion and heat stroke, which in extreme cases can be fatal. Firefighters and volunteers are at greatest risk of sustaining burn injuries and suffering from heat stress, but other population groups can also be affected. For instance, heat stress in pregnancy has been linked to preterm births.
- Digestive health, food and water: Runoff from bushfires can cause contamination of drinking water supplies, which increases the risk of gastroenteritis, the symptoms of which (e.g. diarrhoea and vomiting) can cause dehydration and weakness in those affected. The burned materials can also hinder water treatment processes. Impacts on the energy grid can cause a loss of power for refrigeration, which can increase the risk of salmonella, campylobacter infections and other pathogens from spoiled foods.
- Health effects of other contaminants: Beyond bushfire smoke, contaminants can arise from the burning of household chemicals and materials (e.g. asbestos), fuel or other materials, as well as firefighting foam. When they enter the bloodstream, whether through the lungs, ingestion, the skin or otherwise, these contaminants can cause harm and can potentially endure in the body for long periods.

Opportunities to change and improve arrangements for the future

Climate models suggest that there will be more fires over the coming decades and that those fires will be more intense. We therefore need to be able to deal with the health impacts highlighted above and provide appropriate information for patients, communities, publics and health professionals.

Impacts on vulnerable populations

Some groups are especially vulnerable to the health impacts of bushfires and it is crucial that future preparedness takes this into account so that impacts can be mitigated as far as possible. Vulnerable groups include individuals with pre-existing conditions such as asthma, chronic respiratory diseases, and cardiovascular conditions, individuals that have age-related frailty or disabilities. Aboriginal and Torres Strait Island Peoples and communities can be vulnerable in the event of bushfire emergencies and smoke haze, partly because they are more prone to pre-existing conditions like respiratory infections, which can be exacerbated by bushfire smoke.

We need to know how air pollution from bushfires affects pregnant women, unborn and newborn infants. Some international studies have linked extended exposure to fine particle pollution from fires to pregnancy outcomes such as pre-term births and lower birth weight. We also do not know whether fine particles and other toxins are transferable through breastmilk to babies, or how heat stress or the stress of an emergency situation may affect pregnant women and infants. It is critical that we understand these impacts so that we can provide the best health advice in the Australian context.

Children are vulnerable to the effects of smoke due to their level of activity, developing respiratory system and their relatively high air intake compared to their body size. We are not currently able to provide targeted health/health protection advice for families with children. For example, much of the advice this season was to remain indoors, but if children have to spend time outdoors, appropriately sized facemasks are not readily available, nor is advice on how to use them.

Health inequalities are potentially exacerbated by emergency situations, where access to services and information, including on the management of pre-existing conditions may be lacking. Housing standards may not provide adequate protection from air pollution and socio-economic factors can make it difficult to implement recommended measures such as staying indoors and using air conditioning or purifiers.

Building our understanding and evidence base

We need to fill the gaps in our knowledge so that we are better prepared to mitigate and adapt in future. The scale and intensity of the 2019/20 fire season, and the widespread exposure to smoke and other effects across the country, mean we have a prime opportunity to undertake research to fill these gaps, including:

- We do not fully understand the mental health impacts on first responders. Research to track long-term outcomes for first responders in Australia has been limited, but we know from examples such as 9/11 that they can be considerable. Appropriate long-term follow-up is crucial if we are to support first responders through the full range of mental health impacts, some of which may not emerge for many years.
- We have only a limited understanding of the physical health impacts of prolonged exposure to bushfire smoke and other contaminants on firefighters, other first responders and the general population.
- We do not fully understand the underlying biological mechanisms for how air pollution from bushfire smoke causes respiratory problems and exacerbates existing conditions. In addition, we do not have an appropriate way of measuring the health impacts at particular levels of air pollution. We can potentially use biomarkers (which measure the biological processes involved when the body is exposed to toxins) to do so, but we have not yet identified appropriate options. Work in this field would help set clear guidelines, based on known health risks at different levels of pollution, resulting in more informative health advice.
- We need to be better prepared to deal with co-occurring physical and mental health problems, the complexity of which may require long-term support.

Developing appropriate plans and advice

The 2019/20 season revealed several areas where plans and advice need to be improved, including:

- Emergency plans and evacuation measures must cater for pregnant women, postnatal women and their infants in the event of bushfires and smoke haze. Emergency and health services need

better information about how to support these populations, including clear guidelines on when and how to evacuate them and policies to support infant feeding.

- The uptake of mental health services provided during recovery is often sub-optimal – we need to understand and address the drivers here so that we can provide the most appropriate support to impacted communities.
- Future health system needs, and the associated costs, must be assessed. The communities most directly impacted are often rural or remote communities with limited services. Mechanisms are therefore needed to augment their access to medical specialists, potentially at short notice. We know that the quality of the acute response can determine long-term outcomes.
- If facemasks are part of future mitigation and adaptation strategies, we need more evidence on their effectiveness and proper use, to enable appropriate advice. Masks only work if they are correctly fitted and this is easily compromised by factors such as facial hair. Incorrect use of facemasks can lead to a false sense of security, meaning the user may be unknowingly exposed to unhealthy levels of air pollution.

This submission has been informed by input received from AAHMS Fellows and other experts in fields including environmental health, respiratory health, mental health, maternal and child health, burns, Indigenous health, public health and eye health.