

Physical and Mental Health Effects of Bushfire and Smoke in the Australian Capital Territory



Australian National University

Rachael M. Rodney^{1,2*}, Ashwin Swaminathan³, Alison L. Cleave⁴, Bruce K. Christensen⁵, Aparna Lal¹, Jo Lane¹, Zoe Leviston⁵, Julia Reynolds⁵, Susan Trevenar¹, Sotiris Vardoulakis¹ and Iain Walker⁵

Background

This study describes an assessment of the health impacts of prolonged exposure to hazardous levels of bushfire smoke in the ACT and surrounding area during the 2019–20 bushfire season.

This bushfire season in south-eastern Australia was one of the most severe in recorded history and the frequency and intensity of bushfires in Australia is expected to increase. Bushfire smoke-related air pollution reached hazardous levels in major metropolitan areas, including the Australian Capital Territory, for prolonged periods of time. Bushfire smoke has direct effects on respiratory and cardiac function, but can also indirectly affect health, wellbeing and quality of life. Few previous studies have examined the specific health effects of bushfire smoke, separate from direct effects of fire, and looked beyond physical health symptoms to consider effects on mental health and lifestyle in Australian communities.

Methods

- An online survey captured information on demographics, self-reported physical and mental health and sleep (see Table 1), and medical advice seeking from 2,084 adult participants (40% male, median age 45 years).
- The survey (conducted Mar-Apr 2020) asked participants about experiences during the previous bushfire season (Dec 2019 - Feb 2020).
- Analyses were conducted in Stata (v15.1, College Station, TX StataCorp LLC) to examine the prevalence of self-reported physical health, sleep and mental health symptoms and medical advice sought, and to identify factors that were associated with higher health burdens.

| | Number experiencing the symptom n (%) | | |
|---------------------------------|---------------------------------------|------------|---------------|
| | All n=2084 | Male n=832 | Female n=1231 |
| Physical symptoms | | | |
| Eye irritation or watery eyes | 1525 (73.1) | 544 (65.3) | 967 (78.6) |
| Throat irritation or dry throat | 1469 (70.4) | 506 (60.8) | 950 (77.2) |
| Cough | 1056 (50.6) | 346 (41.5) | 702 (57.0) |
| Headache | 797 (38.2) | 184 (22.1) | 607 (49.3) |
| Breathlessness | 457 (21.9) | 126 (15.0) | 326 (26.5) |
| Sneezing | 437 (21.0) | 153 (18.4) | 278 (22.6) |
| Wheeze or whistling chest | 416 (19.9) | 103 (12.3) | 307 (24.9) |
| Chest tightness or pain | 314 (15.1) | 71 (8.5) | 242 (19.7) |
| Diarrhea or gastroenterological | 51 (2.4) | 6 (0.7) | 44 (3.6) |
| Other condition not listed | 67 (3.2) | 19 (2.3) | 47 (3.8) |
| Mental health symptoms | | | |
| Anxiety | 945 (45.3) | 265 (31.9) | 670 (54.4) |
| Feeling depressed | 447 (21.4) | 129 (15.5) | 314 (25.5) |
| Sleep-related symptoms | | | |
| Disrupted or poor sleep | 776 (37.2) | 234 (28.1) | 535 (43.5) |
| Fatigue or feeling tired | 677 (32.5) | 187 (22.5) | 482 (39.2) |

Table 1. Proportion of surveyed ACT region residents that experienced health-related symptoms attributed to bushfire smoke during the 2019-20 bushfire season. Difference between gender $P < 0.001$ for all other than sneeze $P = 0.022$, and other $P = 0.05$.

Key Findings

- Almost all participants (97%) experienced at least one physical health symptom that they attributed to smoke, most commonly eye or throat irritation, and cough (Table 1).
- Over half (>55%) of responders reported symptoms of anxiety and/or feeling depressed, approximately half reported poorer sleep.
- Women reported all symptoms more frequently than men.
- Participants with existing medical conditions or poorer self-rated health, parents and those directly affected by fire (in either the current or previous fire seasons) also experienced poorer physical, mental health and/or sleep symptoms.
- Approximately 17% of people sought advice from a medical health practitioner, most commonly a general practitioner, to manage their symptoms.

Conclusions and Implications

- Bushfire smoke can have considerable and underestimated effects on physical and mental health, beyond those associated with direct contact with fire and the acute effects of smoke inhalation.
- Previous studies may have substantially underestimated the health effects of smoke. The prevalence of people seeking medical advice as a result of bushfire smoke is almost certainly much lower than the actual number of people affected.
- Greater understanding of mental health and long-term health effects is needed, particularly for at-risk groups including parents, and those with existing health conditions, or prior exposure.
- Improved public health communication is needed to strengthen individuals' ability to prevent harm and protect the health of themselves and their families for future events.

¹ National Centre for Epidemiology and Population Health, Research School of Population Health, The Australian National University; ² Fenner School of Environment and Society, The Australian National University; ³ Departments of General Medicine and Infectious Diseases, The Canberra Hospital; ⁴ Centre for Mental Health Research, Research School of Population Health, The Australian National University; ⁵ Research School of Psychology, The Australian National University.