

Extreme climate, air pollution and health



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Climate change, air pollution and health in Australia



Blueprint sets out the necessary actions to minimize the risk of climate change and air pollution to human health in Australia

Goals and recommendations

(interconnected- acting on one will have benefits for the others)

- 1. Strengthen air pollution regulations
- 2. Commit to 100% renewable energy by 2050
- 3. Promote sustainable, livable cities
- 4. Manage health risks resulting from poor air quality

http://www.grandchallenges.unsw.edu.au/climatechangeblueprints







Air quality exceedances by event type





Wildfires

o Loss of life

• Property damage

 Difficult/expensive to control



Hazard Reduction Burning

Reduce severity of bushfires.

 Area treated by hazard reduction burns increased by 45% by 2016.





Monthly frequencies of HRB days, all years: 2004 to August 2016









Fire management and health implications Challenges

- Longer fire seasons under climate change- less time for hazard reduction burns
- Deaths from smoke vs wildfires (NSW):
 - **197** premature deaths from **smoke**, all fire events 2001-13. (Horsley et al. 2018)
 - 77 deaths directly attributable to wildfires 1901 2011 (Horsley et al. 2018)
- Ecological, economic and property losses from wildfires

Solution

- Improve the decision making process for scheduling hazard reduction burns
 - reduce their potential impacts on air quality in populated areas
 - reduce severity of wildfires



For burn days, compare meteorology for high versus low PM_{2.5}



Key finding

Conditions in early morning more conducive to high pollution



Delay burns by a matter of hours (Di Virgilio et al. 2018)

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Low PM₂₅

 M_{25}

Heat and health Historical changes in heatwaves



cumulative heatwave exposure



Perkins-Kirkpatrick and Lewis (2018)- submitted

Berkeley Earth





... and we expect <u>more</u> heat in Australia's future.

Alexander and Arblaster (2017)



Heat health in Australian cities Impacts of urbanisation





Ma et al. (2018)- JAMC Ma et al. (2017) - Int J Climatology



Heat health in Australian cities





When citizen science meets urban climate Impacts of urbanization, energy use, and global climate change



Schools Weather and Air Quality

- Citizen science project
- Meteorology and air quality sensors in Sydney schools
- Engagement of students in STEM research
- Students will collect and analyse research quality data in curriculum-aligned classroom activities
- Data will also be freely available online to the public and researchers

www.swaq.org.au



