

Investigating Bushfire Smoke Impact on Brain Health of Vulnerable Communities

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Abstract:

- Climate change is leading to a rapid and sustained increase in bushfire frequency and intensity across Australia and internationally.
- Bushfire smoke is a major form of air pollution.
- A large body of work has demonstrated critical links between air pollutants and brain impairment, including dementia.
- However, the relationship between bushfire smoke generated air pollution and human brain health remains poorly studied.
- We are spearheading a new research focus to uncover the impact of increasing bushfire smoke exposure on human brain function and disease, particularly for those who are the most highly affected.
- This includes front-line rural firefighters and rural communities, as well ageing populations.
- Our unique research program integrates broad expertise in neurodegenerative diseases at the cell and molecular level with cohort biomarker studies, and epidemiological impacts of bushfire smoke on brain health.



Fig. 1: SMOKEsentry: We will determine the brain health impact of landscape fire smoke and identify at-risk people for intervention.

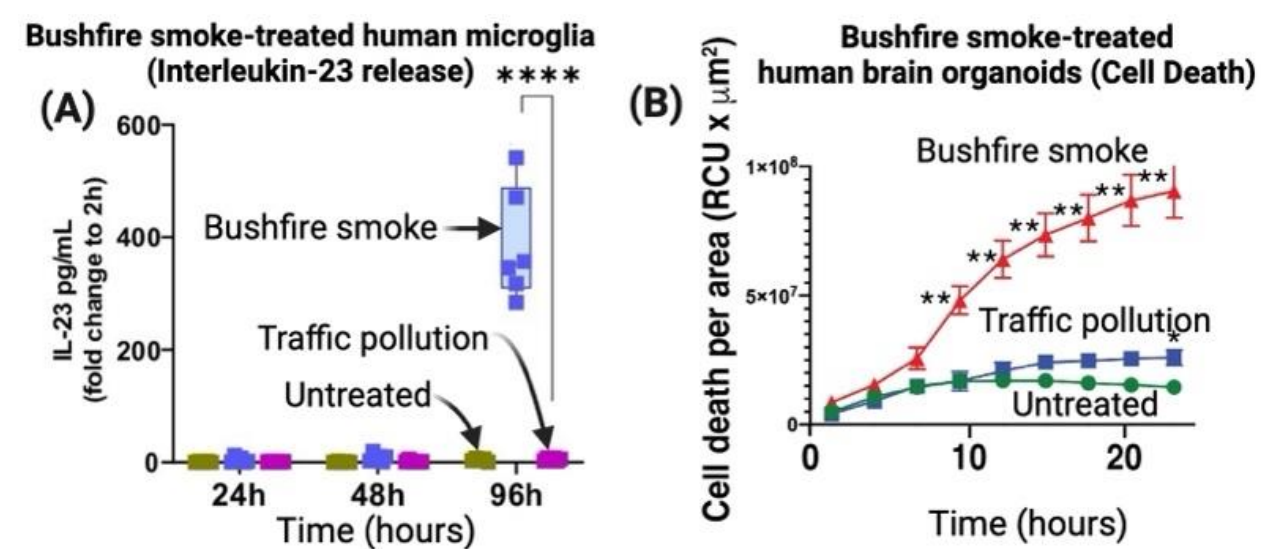


Fig. 2: Landscape (bushfire) smoke induces inflammatory responses in human brain immune cells (microglia). (A) Bushfire smoke induce a 400x increase in pro-inflammatory cytokine IL-23 in aged human microglia (>50 years old), while traffic pollution had no effect. (B) Bushfire smoke induces cell death in human brain organoids, while traffic pollution has limited effect.

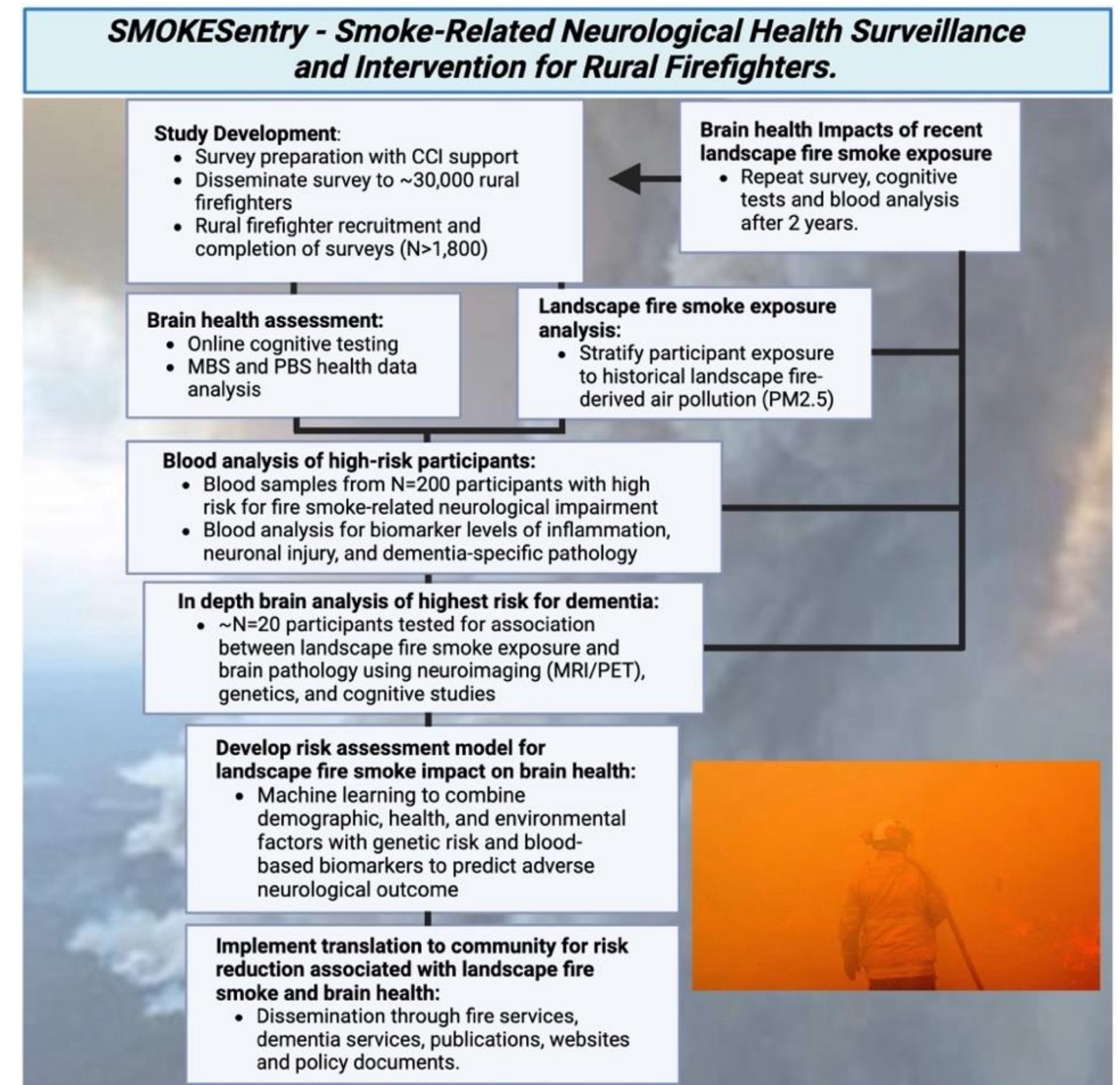


Fig. 3: Schematic of proposed SMOKEsentry proposal.

