

## Research Summary

### Long-term effects of extreme smoke exposure on vulnerability to COVID-19

May 2023



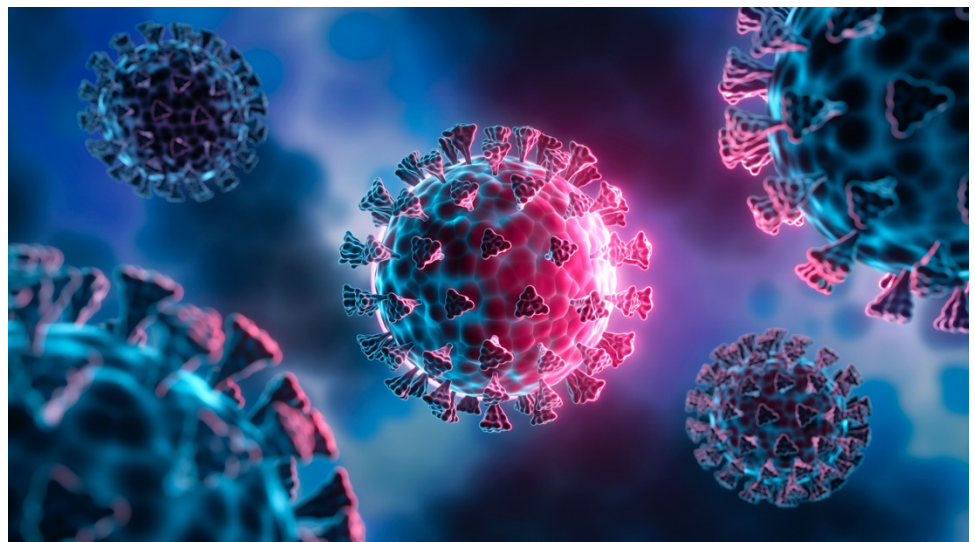
## Background

The fire in the Morwell open cut brown coal mine adjacent to the Hazelwood Power Station blanketed the town of Morwell and the surrounding area in smoke and ash for six weeks in February and March 2014. The smoke event was recognized as one of the most significant air quality incidents in Victoria's history, with the concentration of smoke contaminants reaching high levels. The smoke event caused considerable concern within Morwell and the broader community. In response to these concerns, and following extensive community consultation, the Hazelwood Health Study (HHS) was established to examine the impacts of the mine fire.

More recently, the COVID-19 pandemic has impacted the Latrobe City region with more than 32,000 confirmed cases. International researchers have shown a link between exposure to air pollution, such as smoke and traffic exhaust, and the risk of being infected with COVID-19. One theory is that air pollution increases the number of receptors in the body that the COVID-19 virus uses to bind to and infect cells.

### Meet the team

Tyler Lane  
Matthew Carroll  
Brigitte Borg  
Tracey McCaffrey  
Catherine Smith  
Caroline Gao  
David Brown  
David Poland  
Shantelle Allgood  
Jillian Ikin  
Michael Abramson



## What we did

We surveyed 408 adults from Morwell and 204 from Sale approximately eight years after the mine fire. Using air pollution modelling conducted by CSIRO, we calculated each participant's level of exposure to smoke-related fine air particles < 2.5 micrometres in diameter (PM<sub>2.5</sub>) during the mine fire. We then compared rates of COVID-19 infection in people with different levels of exposure. When we analysed the data we took into account other factors that influence lung health such as age, body mass, socioeconomic status, prior chronic respiratory conditions and tobacco smoking.

### Analysis aims

Our research aimed to investigate whether adults who had been heavily exposed to air pollution from the 2014 mine fire were more likely to become infected with COVID-19 than adults who were less or minimally exposed.



## What we found

From the 612 participants, 271 (44%) reported either that they had been diagnosed with COVID-19 or had symptoms consistent with COVID-19. We found that people who were most highly exposed to the mine fire smoke in 2014 were slightly more likely to have had COVID-19 than people who were less exposed. However, the finding of a link between smoke exposure and COVID-19 infection was quite weak and may have been a chance finding.

A detailed paper describing the findings from this analysis is freely available at [www.medrxiv.org/content/10.1101/2023.04.12.23288500v1](https://www.medrxiv.org/content/10.1101/2023.04.12.23288500v1)



### Considerations

The self-report of COVID-19 diagnoses or COVID-19 like symptoms may not have always been accurate. Further, there was the possibility that factors other than the mine fire air pollution were responsible for the small observed difference in COVID-19 infections reported by highly exposed compared with less exposed participants. However, it was also possible that previous smoke exposure did in fact increase vulnerability to COVID-19 and that measures to protect people from future air pollution events are important.



## Where to from here?

The finding will be shared with relevant health and emergency services to ensure they are used to guide current health service provision and future responses to smoke events. The HHS is continuing to investigate the long term effects of smoke from the mine fire through health surveys and clinical testing.

The HHS is led by Monash University with collaborators from Menzies Institute for Medical Research, Federation University, The University of Adelaide, and CSIRO.

The research was funded by the Department of Health.