

Research Summary

Lung function changes in children exposed to mine fire smoke in infancy

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 recognised as one of the most significant air quality incidents in Victoria's history. It caused considerable community 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. The HHS involves multiple research streams targeting different health outcomes and different vulnerable groups.

The **Latrobe Early Life Follow up (ELF) Study** is the part of the Hazelwood Health Study that follows the health and growth of children who were younger than two years old when the fire occurred. This includes children whose mothers were pregnant with them at the time.



What we did

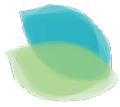
We invited children from the ELF Study who were exposed to mine fire smoke during infancy to attend clinical testing 7 years after the fire. We did a simple lung function test known as the forced oscillation technique on 115 children. It uses small vibrations to measure how easily air moves in and out of the lungs while the children breathe through a tube. We measured resistance to air flow and the stiffness of the lungs. By looking at where each child was on each day during the fire and how polluted the air was in that area, we were able to work out how much smoke they had been exposed to. When we analysed the data, we considered other factors that can affect lung function such as age, sex, height, and exposure to tobacco smoke.

Analysis aims

Seven years after the mine fire, this research aimed to discover whether there were changes in the lung function of children who were exposed to mine fire smoke during infancy and if the changes previously observed persisted over time.

Meet the team

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What we found

During testing previously undertaken 3 years after the fire, we found a link between mine fire smoke exposure and slightly increased lung stiffness. Further testing undertaken 7 years after the fire didn't find any link between mine fire smoke exposure and increased lung stiffness. Instead, there were moderate improvements in lung stiffness between the 3 and 7 year follow-up, of children exposed to smoke during infancy. This suggested that reductions in lung function observed at the 3-year follow-up had improved over time.

A detailed paper describing the findings from this analysis can be requested from the study team by emailing contact@hazelwoodhealthstudy.org.au

Considerations

Childhood is a period of rapid lung growth and varies considerably between children of different ages. Those variations, plus other factors that influence lung health, such as genetic makeup and exposure to tobacco smoke, may have impacted on our measurements.



Where to from here?

Further studies are needed to confirm these results. Childhood is a rapid period of lung development and growth. Therefore, lung function should be evaluated at further timepoints to fully understand the health implications of mine fire smoke exposure during infancy.

The Latrobe ELF Study is led by the Menzies Institute for Medical Research at the University of Tasmania with collaborations from Melbourne University and the Telethon Kids Institute.

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

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