

Research Summary

Blood vessel health in young children 7 years after the coalmine fire

October 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 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.

Analysis aims

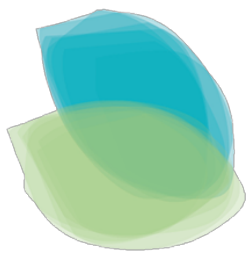
Seven years after the mine fire event, this research aimed to discover whether smoke from the fire affected the health of blood vessels in very young children from the Latrobe Valley, including children whose mothers were pregnant with them at the time. The study also aimed to determine if usual levels of background air pollution were associated with blood vessel health in early childhood.



What we did

We invited children from the ELF Study who were exposed to mine fire smoke during infancy or in the womb to attend clinical testing in 2017 (3-year follow-up) and/or 2021 (7-year follow-up). We measured blood vessel thickness and stiffness using ultrasound, in 248 children at the 3-year follow-up and 163 children at the 7-year follow-up.

We worked out how much smoke each child had been exposed to by looking at where the child was each day during the fire and how polluted the air was in that area. When we analysed the data, we considered other factors that can affect lung function such as age, sex, height, and exposure to tobacco smoke.



What we found

In children who were up to 2 years of age at the time of the fire, the 2017 clinical testing showed weak evidence that higher smoke exposure was linked to very small increases in blood vessel stiffness, indicating poorer blood vessel health 3 years after the event. However, the 2021 clinical testing showed a modest improvement in blood vessel stiffness, indicating possible recovery 7 years after the event.

In children whose mothers were pregnant with them at the time of the fire, the 2017 testing showed no link between higher smoke exposure and poorer blood vessel health. However, the 2021 testing did show a link between higher smoke exposure and a mild increase in vessel stiffness, indicating poorer blood vessel health 7 years after the event. This group of children also had increased vessel stiffness linked to exposure to background air pollution.

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



Considerations

We cannot rule out the possibility that the results occurred by chance, or were due to other unmeasured factors that can affect blood vessel health. Vessel growth varies a lot between children of different ages and genders. Vessel stiffness does not automatically mean that children will later develop blood vessel or heart problems. Stiffer blood vessels are one of many things, including genetic make-up, smoking tobacco, stress, diet and physical activity that can influence the risk of heart disease in later life.



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. A 3rd round of clinical testing is scheduled for 9 years after the fire.

Meet the team

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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.

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