Heart and blood vessel health in older adults exposed to smoke from the Hazelwood mine fire

Research Summary

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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 vulnerable groups.

The **Cardiovascular Stream** is the part of the Hazelwood Health Study that has measured markers of heart and blood vessel health in older adults who were exposed to the mine fire smoke.

Analysis aims

Three and a half years after the mine fire, this research aimed to discover whether adults who were exposed to the smoke had poorer heart or blood vessel health, compared to adults who were not exposed.

Meet the Team

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What we did

We tested 365 adults from Morwell who were exposed to the smoke, and 162 adults from Sale who were not exposed. Participants were aged between 55 and 89 years. They underwent a number of tests including Flow Mediated Dilatation (FMD) with ultrasound to measure blood vessel health and electrocardiography (ECG) to measure electrical activity of the heart. Blood samples were tested for markers of elevated risk of heart disease. In particular, blood was tested for high sensitivity (hs) C-reactive protein (CRP) which can detect inflammation, N-terminal pro B-type natriuretic peptide (NT-proBNP) which can indicate heart failure, Troponin which is released into the blood when there is heart damage and cholesterol which is a measure of heart disease risk. We took into consideration other factors that could influence heart or blood vessel health, such as age, sex, cigarette smoking, alcohol consumption and physical activity.

A more detailed paper describing the findings from this analysis can be found at https://hazelwoodhealthstudy.org.au/study-findings/publications

Hazelwood HEALTH STUDY

What we found

In adults from Morwell who were exposed to the smoke, compared to adults from Sale who were unexposed, we found no differences in FMD measures of blood vessel health, nor in electrical activity of the heart measured by ECG. There were also no differences between the Morwell and Sale participants in their blood pressure or in their blood markers for inflammation (hsCRP), heart failure (NT-proBNP) or heart damage (Troponin). However, cholesterol levels were slightly higher in Sale participants, indicating slightly increased risk of heart disease. Overall, this study found no association between Hazelwood mine fire smoke exposure and cardiovascular disease evident four years after the fire. However, there were associations between both cigarette smoking and obesity, and inflammation increasing the risk of heart attack.

Considerations

The researchers used a number of statistical methods to correct for known differences between Morwell and Sale participants which might influence health. However, there remains the possibility that such factors other than the mine fire air pollution influenced the findings. Further, because a large proportion of adults from Morwell and Sale did not participate in the baseline Adult Survey from which the Cardiovascular Stream participants were drawn, it is possible that the findings do not truly reflect the two communities. Because these tests were undertaken four years after the fire, it is also possible that shorter-term associations between smoke exposure and markers of cardiovascular disease were missed.

Where to from here

Future research planned by the Hazelwood Health Study includes investigation of lung, heart and blood vessel health in young children; lung health and psychological health in adults; and psychological wellbeing of school aged children who were exposed to the Hazelwood mine fire smoke.

The HHS is led by Monash University with collaborators from Menzies, Federation University, the University of Adelaide, the Alfred and CSIRO.

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