

**Hazelwood Mine Fire Health Study  
Scientific Reference Group  
Meeting 1/2020  
Wednesday 21 October 2020  
5.30-6.30pm AEST  
Via Zoom**

**1. In attendance:**

Professor Ross Coppel (Chair), Professor Michael Abramson, Professor Michael Ackland, Professor John Attia, Dr Jillian Blackman, Mr Danny Brazzale, Dr Matthew Carroll, Professor Anna Hansell, Dr Sharon Harrison (Minutes), Dr Melita Keywood, Associate Professor Rebecca Kippen, Professor Alexander (Sandy) McFarlane, Professor Rory Wolfe

**2. Apologies**

Dr Beth Edmondson, Associate Professor Jane Ford, Professor Graeme Zosky

**3. Terms of reference**

The SRG reviewed the its Terms of Reference. It was noted that the SRG does not approve the Study's Annual Reports. Members agreed to amend the Terms of Reference, removing the reference to the SRG approving Annual Reports.

**4. Welcome to new members**

The SRG welcomed two new members:

Danny Brazzale has been appointed to replace Mike Keating. DB is Senior Respiratory Scientist at the Austin Hospital and has an interest in research.

Dr Matthew Carroll has recently taken up the role of acting Co-Principal Investigator (Gippsland), ahead of Professor Judi Walker retirement in late October 2020.

**5. Conflict of Interest**

No conflicts of interest were declared.

**6. Minutes of previous meeting (Att.1)**

The minutes of the previous meeting were accepted.

**7. Study Findings**

*7.1. Exposure to mine fire related particulate matter and mortality*

Jill Blackman reported that the Mortality Report had been returned to DHHS in early 2020. Due to COVID-19 DHHS has yet to provide confirmation that the report may be released.

The key findings of the Mortality Report are:

- an increase in the risk of death from injury in the Latrobe Valley during the 30 day mine fire period, with the greatest increases in risk of death from injury observed in men and in residents aged 80 years and older. There were approximately 11 extra deaths from injury during the mine fire period in the Latrobe Valley, including 3 in Morwell. Researchers do not have detailed information regarding the specific circumstances of these deaths, but anecdotal evidence indicates that these injury-related deaths may have occurred as a consequence of people climbing ladders to remove debris from gutters for example.
- there was an increased risk of death from cardiovascular conditions, particularly ischaemic (coronary) heart disease, in the six months after the mine fire, in the Latrobe Valley and particularly Morwell. Greatest risks were observed in men and residents aged 80 years and older. There were approximately 26 extra deaths in Morwell from cardiovascular conditions in the six months after the mine fire, including 22 deaths attributed to ischaemic heart disease.

Anna Hansell she liked how the results had been presented and noted that there can be differences in how deaths are certified. It was noted that the information recorded on the death certificates under causes of death includes underlying and associated conditions. Anna Hansell suggested that it would be useful to have details of the underlying cause of death.

There was no association between mine fire smoke and an increased risk of death from respiratory conditions, although other HHS findings have shown an increase in respiratory symptoms. This may indicate that preventive action was taken by people with respiratory illness, such as leaving the area, or increased use of oxygen or respiratory medications. MA suggested that it might be a statistical power issue.

Michael Abramson reported that Professor Belinda Gabbe from the Prehospital, Emergency and Trauma Research Unit had reviewed the findings and had advised that similar findings in relation to injury-related deaths have been observed with other disasters. Michael Ackland noted that the bushfires at the beginning of 2020 had led to more traffic accidents due to thick smoke.

Michael Ackland emphasized that it is important to try to get an understanding of the mine fire related deaths, so that recommendations can be made on the basis of the research findings and the findings can be translated and there can be practical learnings. He advised that he would be happy to have a discussion with DHHS.

7.2. *The Latrobe ELF Study – Research Summary: General practitioner visits and medication use amongst young children exposed to the mine fire smoke (December 2019) (Att.3)*

Jill Blackman reported on the findings of the data linkage completed as part of the Latrobe Early Life Follow-up (ELF) Stream. ELF researchers obtained Medicare Benefits Schedule (MBS) data on the number of GP visits, and Pharmaceutical Benefits Scheme (PBS) data on the numbers of prescribed asthma puffers, steroid containing skin creams, and antibiotics dispensed from pharmacies during the period 2014-2016. The parents of 286 ELF Study participants gave permission for the release of MBS and PBS data. Each child's home address and locations during the fire period to estimate how much smoke had been experienced by each child, or mother if pregnant.

The findings of the ELF stream include:

- children exposed to the mine fire smoke during their first two years of life were more likely to have antibiotics dispensed in the year after the fire, compared with those not exposed
- researchers did not find an association between exposure and other symptoms.

7.3. *The Latrobe ELF Study – Research Summary: Monthly diary summaries (December 2019) (Att.4)*

Jill Blackman reported that the monthly symptom diaries were completed by the parents of 289 ELF Study participants. For unborn babies exposed to the fire, researchers found an association between the level of PM<sub>2.5</sub> exposure during their mother’s pregnancy and coughs, runny noses, wheeze, visiting a health care professional, and having a cold, in the two to four years after the fire.

The SRG discussed the mechanism for exposure for children who were *in utero* at the time of the mine fire event. MA noted that the honest answer is that we don’t know, although we do know that ultrafine particles cross into the blood stream.

Graeme Zosky reported that there is a body of literature linking exposure to air pollution during pregnancy with reduced lung function and with recurrent broncho-pulmonary infections in during infancy and childhood. He noted that exposure in utero occurs at during a key window for lung development. Graeme Zosky also noted the increase in gestational diabetes following the mine fire event and emphasized the need to continue following the ELF cohort for longer.

Anna Hansell noted that there is a well-documented study linking birthweight and the structural development of the lungs. It was suggested the findings are significant considering the large population who are exposed to PM<sub>2.5</sub> during bushfires.

7.4. *Respiratory Stream – Research Summary: Coal mine fire smoke exposure and chronic obstruction of lung airflow in adults (September 2020) (Att.5)*

Michael Abramson reported on the spirometry results. Researchers had found that the level of mine fire PM<sub>2.5</sub> exposure was associated with chest tightness and chronic cough more than three years later. Amongst nonsmokers, there was strong evidence of increased levels of PM<sub>2.5</sub> exposure being associated with increased levels of COPD.

Matthew Carroll suggested the findings in terms of abnormal lung function are significant for public health and that the Study will work with the Latrobe Health Assembly and the Gippsland Primary Health Network to disseminate these findings to medical practitioners.

It was agreed that further follow up is required to investigate whether the changes in lung health resolve, persist or worsen over time. It was noted that a dose response relationship between PM<sub>2.5</sub> exposure and COPD was not observed amongst smokers. It was suggested that perhaps the effects of smoking drowned out the effect of PM<sub>2.5</sub> exposure.

Ross Coppel suggested that there are there are clear implications of PM<sub>2.5</sub> exposure and this has significant implications for bushfire events.

7.5. *Respiratory Stream – Research Summary: The impact of coal mine fire smoke on lung health in adults (September 2020) (Att.6)*

Michael Abramson reported on the results of the forced oscillation technique (FOT) testing conducted during Respiratory Stream Clinical Testing Round 1. FOT testing gives insights into other parts of the lung. Researchers found that the level of PM<sub>2.5</sub> exposure was associated with decreased lung stretchiness. There was a clear finding that three and a half years after the mine fire higher levels of smoke exposure were associated with poorer lung mechanics in adults. MA noted that the results of the adult FOT testing suggested slightly stiffer lungs and were similar to the findings of the ELF FOT testing.

7.6. *Cardiovascular stream*

Michael Abramson reported that 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 blood markers for inflammation (hsCRP), heart failure (NT-proBNP) or heart damage (Troponin).

Michael Abramson noted that there were some findings of abnormalities driven by age, sex, smoking, cholesterol and diabetes, with greater abnormalities reported in Morwell.

John Attia noted that there was no nice dose response curve and suggested co-linearity might be causing this. MA agreed. Michael Abramson confirmed that when the model was fitted without the town the results remained the same.

7.7. *Psychological Impacts – Research Summary: Long term psychological health following the Hazelwood mine fire (Att.7)*

Matthew Carroll reported that the the Psychological Impacts Stream analysis has shown that exposure to air pollution during the mine was associated with symptoms of posttraumatic stress reported by adults two and a half years later. Researchers combined the air pollution modelling conducted by CSIRO, calculating each participant's level of exposure to PM<sub>2.5</sub> during the mine fire, and their event-related psychological distress (IES-R score).

7.8. *Psychological Impacts – Research Summary: The Impact of a Mine Fire and Smoke Event on Academic Outcomes for Primary and Secondary School Students Hazelwood mine fire (June 2020) (Att.8)*

Matthew Carroll reported on the findings of the analysis of NAPLAN data as part of the Psychological Impacts Stream's Schools Study. Researchers compared students from schools in Morwell, which were highly exposed to the smoke event, with those from less exposed schools located elsewhere in the Latrobe Valley. Researchers used data from Schools Study survey of 303 students aged 7 to 16 years completed a survey more than one year after the event, which included the Children's Revised Impact of Events Scale (CRIES-13); a measure of distress associated with the mine fire. This survey information was linked with students' NAPLAN scores from the years before and the year after the mine fire event. MC reported that the Schools Study survey included students in Years 3, 5, 7 and 9.

Researchers found that secondary school students from schools most exposed to the smoke had delayed academic development (as measured by NAPLAN scores) after the

event compared to students from less exposed schools. However primary school students from Morwell did not show the same delay in academic development.

Matthew Carroll noted that some schools relocated during the mine fire period, although the evacuation did not happen until 3 weeks after the start of the mine fire. It was also noted that the educational supports may have been targeted at primary schools following the mine fire.

It was noted that work has been done around the implication of stress during mass evacuations of communities. Sandy McFarlane noted that relocation causes stress and splits communities.

7.9. *Community Wellbeing – Research Summary: Community perceptions of the effectiveness of community rebuilding activities (December 2019) (Att.9)*

Matthew Carroll reported on the Community Wellbeing Stream’s Volume 2 report on community perceptions of the effectiveness of rebuilding activities. Researchers held group discussions with community members and interviewed people from community organisations and agencies involved in the emergency response and recovery, local journalists and social media users. They also collected media articles about the mine fire, along with social media posts.

Matthew reported that three years after the mine fire (2014-2017), there were still community concerns regarding the apparent lack of planning for a similar future emergency. Stakeholders identified a need for clear and distinct strategies for managing the recovery phase, and for transitioning from the emergency phase to the recovery phase. A loss in trust in the authorities still persisted. The community’s concerns also shifted in the 3-year period after the mine fire event from a primary concern with physical health, to include a range of concerns: broader wellbeing, job creation and sustainability, and the implications of a transition from coal.

Matthew reported that the Community Wellbeing Stream is commencing a further follow-up.

7.10. *Hazelinks – Research Summary: Hazelwood mine fire smoke exposure and ambulance attendances in the following years (September 2020) (Att.10)*

Jill Blackman reported on the Hazelinks analysis of ambulance attendance data. Researchers used Study participants’ time-location diaries and air pollution modelling conducted by CSIRO to calculate each participant’s level of PM<sub>2.5</sub> exposure during the fire. Consent was given by 2223 of the Adult Survey participants for the researchers to access their Ambulance Victoria attendance records. Researchers looked at ambulance attendances from just after the fire, 1 April 2014 to 31 December 2017.

Researchers found that levels of exposure to smoke-related PM<sub>2.5</sub> were associated with the likelihood that a participant required an ambulance attendance in the following years. There was a consistent signal and evidence for a dose-response relationship. There was an increase in ambulance attendances for respiratory and cardiovascular.

John Attia suggested looking at a case cross over design. MA advised that he would discuss this with Yuming Guo.

## 8. Impact of COVID-19 on HHS activities

MA reported that the ELF and Respiratory Stream fieldwork has been postponed due to COVID-19. Clinical Testing Round 2 was due to commence in April 2020 for the ELF Stream and September for the Respiratory Stream. Staff are not able to travel to Gippsland and the advice of the TSANZ/ANZSRS is that at this stage lung function testing should only be performed where deemed clinically essential by a respiratory physician.

MA reported that team members have been busy with the cleaning, analysis and write-up of data collected in earlier data collection rounds. MC reported that the Community Wellbeing team has conducted some interviews via Zoom or telephone.

MC reported that a total of 713 Morwell participants completed the Adult Psych Impacts follow-up in late 2019 early 2020. This survey period includes the period of the summer 2019/2020 bushfires. Researchers submitted an MRFF grant application for the call for research on the impact of the summer bushfires. This application was not successful, but researchers are looking at other funding opportunities and collaboration opportunities with researchers from the Turner Institute for Brain and Mental Health.

## 9. Other Business

### 9.1. *Post-COVID Survey*

Matthew Carroll reported on the Adult Psych follow up survey was conducted in late 2019 and early 2020. This coincided with the summer bushfires 2019/2020. Researchers will analyse current distress and ongoing stress amongst Study participants. A further follow-up round is planned in two years time.

Matthew Carroll noted that the survey conducted in the first 3 months of 2020 presents an unusual opportunity, as researchers have data from the period immediately before the COVID-19 lockdown.

Sandy McFarlane emphasized the COVID-19 pandemic may present a unique opportunity with this longitudinal study, as the HHS Study must be one of the few longitudinal cohorts where it would be possible to look at the impact of the lock down in two populations with different risk factors where there has been only a low risk of infection. The collection of another wave of data now would be a relatively unique opportunity to assess the impact of the lock down on mental and physical health if it could be organised.

Ross Coppel agreed that this worth exploring these opportunities to leverage the HHS funding.

## 10. Next Meeting

The next meeting will be scheduled in 2021.

## Scientific Reference Group

### ***Preamble***

The Scientific Reference Group (SRG) comprises scientific experts in the various scientific disciplines contributing to the study who will provide input into the study directions. These include, but are not limited to: internal medicine, toxicology, psychiatry, sociodemography, biostatistics etc.

### ***Meetings and Membership***

Meeting once a year, by Zoom conferencing or face-to-face, the SRG is chaired by Professor Ross Coppel. Meetings will be minuted and, following approval, meeting minutes will be posted on the study website.

### ***Terms of Reference***

The specific roles of the SRG are to:

1. Assist the academic leads and stream leaders develop their research plans
2. Monitor the progress of the study's research activities
3. Provide the academic leads and stream leaders with ongoing advice
4. Review protocols and adherence
5. Function as a data monitoring and safety board in the event of adverse responses or complaints
6. Consider proposals for new research activities or streams
7. Identify potential new collaborations and recruits