

Hazelwood

HEALTH STUDY

Hazelwood Health Study

Annual Report 5

15 November 2019

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Abbreviations

CAC	Community Advisory Committee
CRG	Clinical Reference Group
hs-CRP	high sensitivity C-Reactive Protein (inflammatory marker)
DHHS	Victorian Government Department of Health and Human Services
ELF	Latrobe Early Life Follow Up Stream
HHS	Hazelwood Health Study
LRH	Latrobe Regional Hospital
MAC	Ministerial Advisory Committee
MBS	Medicare Benefits Schedule
NAPLAN	National Assessment Program – Literacy and Numeracy
NDI	National Death Index
PBS	Pharmaceutical Benefits Scheme
PM_{2.5}	Particulate matter with an aerodynamic diameter of 2.5 thousandths of a millimetre or less
PMG	Project Management Group
PSC	Project Steering Committee
PTSD	Post Traumatic Stress Disorder
SORPP	Strategic overview and revised project plan
SRG	Scientific Reference Group

1 Executive Summary

This is the fifth Annual Report to be submitted to the Department of Health and Human Services as part of the milestones for the Hazelwood Health Study. This report provides a summary of progress made since the 4th Annual Report was submitted in November 2018.

In its fifth year, the Hazelwood Health Study has primarily involved analyses of the large volume of data already collected and reporting of the findings. Several streams have also been gearing up for future rounds of follow up data collection.

The [Project Management Group's](#) focus has remained around ensuring good research practice standards, monitoring the budget and successfully delivering the Study's contractual requirements. An additional task for the Project Management Group has been the preparation of, and consultation around, a strategic overview (SO) of the first 5 years of the Hazelwood Health Study and the revised project plan (RPP) for years 6 to 10. The strategic overview and revised project plan (SORPP) was delivered to DHHS in mid July 2019. Following advice from the Chief Health Officer, the project plan specific to years 6 and 7 was refined and submitted in mid-September 2019.

The key research and advisory groups have continued to meet regularly and provide oversight of all aspects of the Hazelwood Health Study. Areas of particular focus have been the development of the SORPP, the dissemination of key findings and solutions to budgetary constraints expected in years 6-10.

Since the previous Annual Report, the [Latrobe Early Life Follow-Up \(ELF\) Study](#) has released findings in relation to possible associations between mine fire emissions and perinatal outcomes, obstetric outcomes such as gestational diabetes, future atherosclerosis, health service and medication usage, and parent-reported atopic and respiratory illness in young children. Additional analyses are in progress, including emergency department and hospital admissions, a description of common sources of indoor air pollution among participants in the ELF Study, a summary of available data on background outdoor air pollution in the Latrobe Valley, and how movement within the Latrobe Valley during February and March 2014, affected the estimated exposure to air pollution from the mine fire. The ELF Stream is preparing for follow up data collection in 2020.

The [Psychological Impacts](#) Stream has released findings in relation to round 2 qualitative data from Schools Study participants. Further Schools Study analyses in progress include round 2 survey data, NAPLAN outcomes in both the Schools Study cohort and broader population, and psychiatric health service use in the Latrobe Valley region. In cross-stream activities with the Adult Survey and Older People research teams, the Psychological Impacts team have also released findings in regard to the determinants of PTSD

symptoms. Higher PM_{2.5} exposure was found to be associated with increased distress, and older age associated with reduced distress. The Psychological Impacts Stream are about to commence recruiting Adult Survey participants into a follow up psychological health and wellbeing survey.

The [Impact on Community Wellbeing](#) Stream has completed two extensive volumes of findings in regard to community perceptions of the impact of the smoke event on community wellbeing, effectiveness of communication and the effectiveness of community rebuilding efforts. The “Our Hopes for the Future of Morwell” photographic exhibition has recently been included in the prestigious 2019 Ballarat International Foto Biennale (<https://ballaratfoto.org/>)

In regard to [adult respiratory and cardiovascular health](#), the HHS has released several reports and scientific manuscripts. These include findings on the relationship between mine fire smoke, housing materials and self-reported respiratory symptoms; as well as findings on self-reported cardiovascular symptoms, ambulance call outs, asthma control, lung function and biomarkers of cardiovascular disease, including serum high sensitivity (hs) C-reactive protein (CRP) and ultrasound markers of endothelial function. Several further analyses are in progress or planned, including of linked hospital outcomes, chronic obstructive pulmonary disease (COPD) and small airway function data.

The researchers have recently completed a report describing analyses of anonymised [mortality](#) data for the period July 2009 to June 2015. During the mine fire period, the *overall* risk of death in Morwell and other smoke impacted areas was found to be similar to that expected. However, there was an increase in risk of death from injury in Morwell during the mine fire. There was also some evidence of an increase in mental health-related deaths in women in the Latrobe Valley during the mine fire period. In the six months after the mine fire, there was an increased risk of death from cardiovascular conditions, particularly ischaemic heart disease, observed in Morwell and in the broader Latrobe Valley areas. There was no association observed between the mine fire and respiratory-related deaths.

[Community engagement](#) continues to be a high priority, with the focus being on dissemination of findings, keeping the community up to date on HHS activities, maintaining contact with the participating cohorts and seeking feedback on the development of the SORPP. Mechanisms for engagement have included e-newsletters, plain language Research Summaries, media releases, presentations to key stakeholder and advisory groups and social media. We are continuing to look at strategies to widen the reach of our dissemination strategies. The major annual Community Engagement Session, typically held in the second half of the year, was brought forward to 11 June 2019 to maximise the community’s opportunity to provide feedback on the SORPP. The event was well attended, with participants broadly supportive of the proposed research activities for the next five years.

2 Introduction

This is the fifth Interim Report to be submitted to the Department of Health and Human Services (DHHS) as part of the milestones for the Hazelwood Health Study (HHS). This report includes a summary of progress made in the year since the fourth Annual Report was submitted in November 2018. Copies of all Annual Reports can be found at <http://hazelwoodhealthstudy.org.au/study-findings/study-reports/>.

The HHS comprises a number of research Streams with their own aims, participants and methods. Combined, the research Streams bring together participant-reported health and wellbeing information, administrative health data, clinical measurement data and media-derived information. Participants include infants, school-aged children, adults, including older adults, community groups, the media and both Government and non-Government authorities. These activities provide a comprehensive overview of the long-term impact of the 2014 Hazelwood mine fire upon the Latrobe Valley community. The first three to four years of this project primarily comprised collection of a large volume of data by each of the research Streams. This fifth year of the Hazelwood Health Study has focussed on analyses of the data and reporting of the findings, both to the community and to scientific audiences. Several streams have been preparing for follow up rounds of data collection. In addition, the development of the SORRP involved considerable effort in terms of stream and cross-stream review and planning, and very extensive community engagement over the first half of 2019.

3 Previously completed contract milestones

Since commencement of the HHS in November 2014, and prior to the submission of this 5th Annual Report, 25 contractual milestones have been completed. Those milestones, with their delivery dates, are presented in Table 1.

Table 1 Contractual Milestones completed prior to this 5th Interim Report

	Contractual milestone	Delivered
1	Project plan	17 December 2014
2	Community and stakeholder engagement strategy	17 December 2014
3	Organisational agreements with sub-contractors	9 February 2015
4	Research ethics submission	9 February 2015
5	Advisory groups established	10 March 2015
6	Outline of Ageing Policy Review	8 May 2015
7	1 st Interim Report	15 June 2015
8	1 st Annual Community Briefing	11 August 2015

	Contractual milestone	Delivered
9	1 st Annual Report	13 November 2015
10	1 st Recruitment Report	15 March 2016
11	2 nd Interim report	15 June 2016
12	Ageing Population Policy review	30 November 2016
13	2 nd Annual Community Briefings	29 November 2016
14	2 nd Annual Report	15 November 2016
15	2 nd Recruitment Report	19 March 2017
16	3 rd Interim report	15 June 2017
17	Contract review & revised project plan	17 July 2017
18	3 rd Annual Community Briefings	9 Oct 2017 Morwell & 10 Oct 2017 Sale
19	3 rd Annual Report	16 November 2017
20	4 th Interim Report	22 June 2018
21	4 th Annual Community Briefing	22 August 2018
22	4 th Annual Report	16 November 2018
23	5 th Interim Report	21 June 2019
24	5 th Annual Community Briefing	11 June 2019
25	Contract review & revised project plan	17 July 2019

4 Project Governance

The HHS governance structure is documented and reviewed on a regular basis. It can be viewed on the HHS website at <http://hazelwoodhealthstudy.org.au/about/governance/>.

4.1 Project Management Group

The Project Management Group (PMG) has continued to meet regularly, providing oversight to the operationalisation of the Project Plan, reviewing study progress, managing staff appointments, monitoring the budget and ensuring adherence to good research practice standards and the successful delivery of contractual milestones.

Routine PMG activities include:

- participation in meetings of the DHHS Contract Committee, Ministerial Advisory Committee, HHS Community Advisory Committee, Scientific Reference Group, Clinical Reference Group, with the Latrobe Health Advocate, the Latrobe Health Assembly and the Gippsland Primary Health Network.

- reviewing preliminary and final drafts of all reports, papers, abstracts, research summaries and newsletters arising from HHS research;
- facilitating the submission of all HHS findings to DHHS for approval;
- overseeing the public release of HHS findings via the HHS website, media and other internet sites;
- tracking all HHS publications and dissemination products;
- monitoring monthly budget reports, adjusting planned expenditure accordingly;
- monitoring adherence to all obligations as laid out in the Head Agreement including delivery of interim and annual reports and preparing documents necessary for each contract review;
- preparation and oversight of sub-contracts with collaborators.

4.1.1 Strategic overview of the HHS and revised project plan

On 20 December 2018, the Minister for Health and Minister for Ambulance Services requested that the Hazelwood Health Study PMG expand the Revised Project Plan due in July 2019 to undertake a strategic overview of the HHS and advise the department on what the overall study findings meant for the health of the Latrobe Valley community and the future scope of the study for years 6 to 10. Dubbed the SORPP, the Strategic Overview and Revised Project Plan was a major activity for the PMG in the first half of 2019.

Subsequent to this request, an Implementation Strategy was developed by the PMG to describe the underlying principles, the process and the timeline for the delivery of the SORPP including an extensive consultation process with key groups and stakeholders. The consultation process included presentations and discussions with the DHHS Contract Committee and Chief Health Officer, the HHS Scientific Reference Group, Community Advisory Committee, Clinical Reference Group, the Latrobe Health Advocate, the Latrobe Health Assembly and the Gippsland Primary Health Network.

The consultation process also included presentations by the PMG to the Ministerial Advisory Committee (MAC) on 14 March and 11 April 2019, describing HHS findings to date, and a further presentation on 9 May 2019 describing the revised project plan for years 6 to 10. Consequent to the 9 May meeting, the MAC requested that the PMG provide documentation describing the background to the proposed refinements to the original HHS project plan. That document, titled “Advance summary for the Ministerial Advisory

Committee. Hazelwood Health Study strategic overview; including findings from years 1 – 5 and revised project plan for years 6 – 10” was submitted to DHHS on 5 June 2019.

The Implementation Strategy timeline for the SORPP included a Community Engagement Session on 11 June 2019 facilitated by the Chair of the Latrobe Health Assembly with commentary by the Latrobe Health Advocate. An additional opportunity for community members to comment on the HHS revised project plan was via a SpeakUp online portal developed by the DHHS in collaboration with the PMG, <https://speakup.healthassembly.org.au/HazelwoodHealthStudy>. The SpeakUp portal closed on 28 June. The SORPP was submitted to DHHS on 17 July 2019.

Following further consultation with, and advice from, the Chief Health Officer, the project plan for years 6 and 7 was refined and submitted in mid-September 2019.

4.2 Community Advisory Committee

Denise Collis has joined the Community Advisory Committee (CAC) as a community representative. Ruth Churchill has left her position as the Central Gippsland Health Service representative, but continues to be a strong advocate for the study and is now a community representative from Sale. There have been four meetings held in the past year, brief details of which are as follows:

12 December 2018

The main focus of this meeting was discussion on upcoming reports. These included discussions led by:

- Associate Professor Yuming Guo: Hazelinks: Ambulance attendances during the Hazelwood mine fire
- Dr Shannon Melody: Overview of ELF analysis of state-wide perinatal data
- Dr Jillian Blackman: Adult Survey Volume 2 overview

Ms Melissa Peppin sought feedback for the committee’s terms of reference. Key feedback was around membership recruitment. Members agreed that membership should be extended to encourage participation from the wider Gippsland region, instead of focusing solely on membership from Morwell and Sale.

27 February 2019

Dr Matthew Carroll described some recent findings on the ongoing experiences of school students following the Hazelwood mine fire.

Professor Michael Abramson provided an overview of the progress of the HHS to date, including current status and answers to the research questions to date.

Professor Judi Walker briefed the committee on an Interim Report to the Minister submitted by the Ministerial Advisory Committee in September 2018 and the Minister of Health's subsequent request to expand the Revised Project Plan due in July 2019 to undertake a strategic overview of the HHS and advise the department on what the overall study findings meant for the health of the Latrobe Valley community and the future scope of the study. Professor Walker invited the committee to provide their feedback on a community consultation process.

Prior to the meeting, committee members completed an annual CAC performance review. The main concern raised was around membership of the committee.

3 April 2019

This extraordinary meeting was held at the request of the CAC, and was held as a joint workshop with the Clinical Reference Group (CRG) and the CAC.

Members of the CRG and the CAC were asked to reflect on what the broader findings of the study meant to them, and provided feedback on the initial proposed research directions. Participants were asked for suggestions for alternative activities and reflected on the roles of the CAC and the CRG in years 6 to 10 of the study.

29 May 2019

This meeting was also held as a joint session with the CRG to discuss the strategic overview and HHS future research directions.

Members were asked to provide feedback on the research directions for years 6 - 10, and to comment on the proposed future of the CAC and CRG, in response to suggestions from the previous workshop. Participants provided feedback on the HHS community consultation process and provided advice on the upcoming Community Engagement Session and the use of the online platform, SpeakUp.

Community Engagement Session 11 June 2019

Several members of the CAC also attended the Community Engagement Session on 11 June 2019. This enabled them to both share their knowledge of the Study and its future plans with the community attendees and listen to community feedback.

4.3 Clinical Reference Group

The CRG continues to meet as required in response to the study's need for local clinical advice. The Group has chosen to meet jointly with the CAC on two occasions to maximise a diversity of opinions and discussion. A brief overview of meetings held in the last year is as follows:

5 December 2018

The CRG welcomed new Group member, Dr Julian Rong.

The main focus of this meeting was discussion around new findings which were soon to be released. These included discussions led by:

- Dr Shannon Melody: Birth outcomes using anonymous Victorian Perinatal Data Collection Records.
- Associate Professor Yuming Guo: Hazelinks: Ambulance attendances during the Hazelwood mine fire.
- Dr Jillian Blackman: Adult Survey Volume 2.

Due to the high turnover of specialists, clinicians and GPs in the Latrobe Valley, the CRG advised the HHS to actively seek to engage with the medical and health professional community to increase awareness and understanding of the importance and relevance of the findings.

Members reviewed the terms of reference and suggested adding in an item about focusing on the important public health messaging from the findings.

20 March 2019

The following researchers joined the meeting to brief the Group on upcoming findings:

- Dr Sasha Taylor: The impact of coal mine fire smoke on asthma.
- Dr Matthew Carroll: The ongoing experiences of school students following the Hazelwood mine fire.
- Professor Judi Walker: Community perceptions of the impact of the smoke event on community wellbeing and of the effectiveness of communication during and after the smoke event.

Professor Walker provided a summary of the consultation process to undertake the SORPP, noting that the values espoused in the Latrobe Health and Wellbeing Charter would inform this process.

Prior to the meeting, four members of the Group participated in the anonymous performance review of the CRG. The findings were presented and discussed, with the Group noting the importance of increasing membership and HHS's continued engagement with the wider clinical community in the Latrobe Valley.

3 April 2019

As described above (see section 4.2), this meeting was held as a workshop with the CAC to discuss the early stages of the SORPP.

29 May 2019

As described above (see section 4.2), this was a joint meeting with the CAC to discuss the next iteration of the SORPP.

Community Engagement Session 11 June 2019

The CRG Chair, Dr Fred Edwards, also attended the Community Engagement Session on 11 June 2019. This enabled him to both share his knowledge of the Study and its future plans with the community attendees and listen to community feedback.

24 July 2019

Associate Professor Fay Johnston presented findings on visits to GPs and use of asthma inhalers, steroid skin creams and antibiotics by the Early Life Followup infant cohort. Professor Walker discussed the Cardiovascular Stream findings and the potential impact on health service planning and delivery. The up-to-date status of the SORPP was presented, and feedback from the Community Engagement Session was discussed.

Professor Walker also described her recent meeting with the GPHN to discuss education opportunities through their network. Plans for a GP Engagement Forum were discussed.

The Group debated the frequency and operations of the CRG moving forward. The Group declined to merge with the Community Advisory Committee, noting the distinct work that the CRG does. The Group agreed to continue to meet on a needs basis.

4.4 Scientific Reference Group

Professor John McNeil stepped down from the SRG and was replaced by Professor John Attia in April 2019. Professor Attia is Professor of Medicine and Clinical Epidemiology and Director of the Clinical Research Design, IT and Statistical Support Unit at the University of Newcastle, NSW. He has expertise in population, clinical, molecular and genetic

epidemiology. Professor Attia is also still active in clinical medicine as a general physician. He is independent of Monash University and the investigators.

Two meetings of the Scientific Reference Group (SRG) have been held since the 4th Annual Report. Brief details are as follows:

13 December 2018

At the 13 December 2018 meeting, the SRG reviewed a number of reports including: Adult Survey Report (Volume 2); Psychological Impacts (Adult: mixed methods paper and Schools Study – paper on round 1 interviews); Hazelinks Data Linkages (Ambulance Victoria Report); and Early Life Follow-up (Volume 2 report respiratory testing, Volume 3 report cardiovascular testing, and paper on anonymous VPDC data).

6 May 2019

The focus for the 6 May 2019 meeting was the SORPP. The SRG reviewed draft Revised Project Plans for years 6-10, discussing the proposals for each Research Stream at length and providing advice. Independent SRG member, Professor Anna Hansell also provided detailed feedback on the Revised Project Plans out-of-session.

Out of session

Out of session, a number of individual SRG members have been consulted in regard to the review of study findings for which they have particular expertise. For example, Professor Attia reviewed the paper titled “Markers of cardiovascular disease among adults exposed to smoke from the Hazelwood coal mine fire”. Professor McNeil reviewed the paper titled “Factors associated with hypertension and its management among older rural Australians” and Professor Ackland reviewed the paper titled “Is asthma associated with exposure to smoke from a coal mine fire?”, Dr Edmondson reviewed the two volumes of the Community Wellbeing Stream technical report. Professor Wolfe has liaised throughout the year with the HHS senior biostatistician in regard to the statistical methods being utilised across the various analyses of data.

The next SRG meeting is scheduled for 26 November 2019.

4.5 Project Steering Committee

The Project Steering Committee (PSC) provides overall strategic guidance for the Hazelwood Health Study. PSC membership comprises each of the Stream leads and the Project Management Group members. With only a few exceptions, the PSC was meeting

monthly until September 2019. The meeting frequency has now been extended to once every two months. Eight formal meetings have been held since the 4th Annual Report plus numerous out-of-session consultations and contributions to reports and strategic decisions.

Key agenda items have included:

- the response to the request from the Minister for Health for the SORPP;
- the resultant review of HHS research activities to date and the development of plans for the next five years, with PSC members involved in reviewing the proposed activities for all stream areas;
- stakeholder consultation with respect to the SORPP;
- appropriate avenues of engagement with the Latrobe Health Assembly, Latrobe Health Innovation Zone and Latrobe Health Advocate;
- Study Stream progress;
- review of the process for Hazelwood Health Study researchers to propose, write up and disseminate findings;
- contingency planning around staff leave;
- review of all proposals for analysis and write up of HHS findings;
- review of budgetary constraints and cost-effective solutions;
- refinement of the SORPP to specify the project plan for years 6 & 7.

5 Stream coordination retreat

The Study's fifth Stream coordination retreat was held at Monash University's School of Public Health and Preventive Medicine, Alfred campus, on 6 February 2019. The retreat involved members of all HHS research Streams, overarching project staff, as well as CRG Chair Dr Fred Edwards. Guest participants included Dr Tamara Schikowski, Head of the Research Group, Environmental epidemiology of lung, brain and skin aging, Leibniz Research Institute for Environmental Medicine, Düsseldorf; Professor John Catford, Chair, Latrobe Health Assembly, and Ms Jane Anderson, Latrobe Health Advocate.

Key activities included:

1. Discussion around a report written by the MAC in 2018 and the subsequent request from the Minister for Health and Minister for Ambulance Services for the HHS to expand the Revised Project Plan due in July 2019 to undertake a strategic overview of the HHS and advise the department on what the overall study findings mean for the health of the Latrobe Valley community and the future scope of the study.
2. Plan and map systematically the dissemination of expected results and research outputs in 2019.

3. Discussion around plans for years 6 to 7 in the context of the changed environment in the Latrobe Valley and the 10-year study and beyond.
4. Identify potential research collaborations for progressing HHS research funding opportunities.



Hazelwood Health Study researchers and other participants at the Stream coordination retreat in February 2019

6 Research updates

6.1 The Latrobe Early Life Follow-up (ELF) Study

In the last year the ELF Study has progressed a number of analyses and has presented the following reports and scientific manuscripts to DHHS for approval for public release.

Reports

- The Latrobe Early Life Follow-up (ELF) Cohort Study Volume 4. An extended analysis of possible associations between mine fire emissions and perinatal outcomes.
- The Latrobe Early Life Follow-up (ELF) Cohort Study Volume 6 The impact of exposure to coal mine fire smoke in early life on parent-reported indicators of childhood atopic and respiratory illness.

Manuscripts

- Melody *et al.* Maternal exposure to fine particulate matter from a large coal mine fire is associated with gestational diabetes mellitus: a prospective cohort study.

- Zhao *et al.* Exposure to coal mine fire and tobacco smoke during early life increase the risk of early atherosclerosis: vascular assessments in the Latrobe Early Life Follow-Up Study.
- Shao *et al.* Exposure to air pollution during the first 1000 days of life and subsequent health service and medication usage in children.

These recent reports/manuscripts contribute to the large volume of findings previously released by ELF. A summary of the ELF findings from years 1 – 5 of the HHS is shown below.

ELF: Summary of main findings thus far



Exposure to mine fire emissions during pregnancy was associated with:

- Higher incidence gestational diabetes mellitus (GDM), increased birthweight in babies born to mothers with GDM
- Parental reports of runny nose/coughs, wheeze, health care visits, and doctor diagnoses of upper respiratory infections 2-4 years after the fire




Exposure to mine fire emissions between birth and two years of age was associated with:

- Antibiotic dispensations the year after the fire
- Parent reports of runny nose/cough and use of asthma puffers 2-4 years after the fire
- Increased respiratory system and blood vessel stiffness measured 3 years after the fire



Other important exposures:

- Maternal or other adult smoking in pregnancy or in the home, stress in pregnancy, ambient air pollution and unflued gas heaters



Caution

- The evidence for some outcomes was weak and requires confirmation with further studies
- Some results are preliminary, confidential and could change before finalisation and public release

Additional analyses are in progress, including emergency department and hospital admissions, a description of common sources of indoor air pollution among participants (eg. second hand smoke, unflued gas heaters), a summary of available data on background outdoor air pollution in the Latrobe Valley and a summary of how movement within the Latrobe Valley during February and March 2014 affected the estimated exposure to air pollution from the mine fire.

The ELF Study is preparing for follow up data collection in 2020.

6.2 Psychological Impacts

In the last year the Psychological Impacts Stream has progressed a number of analyses and have presented the following report and scientific manuscripts to DHHS for approval for public release.

Report

- Hazelwood Health Study Schools Study report of round 2 qualitative findings.

Manuscripts

- Maybery *et al.* The psychological impact and experiences of children following the Hazelwood mine fire and subsequent smoke event.
- Broder *et al.* The factors associated with distress following exposure to smoke from an extended coal mine fire.

This recent report and manuscripts contribute to the large volume of findings previously released by the Psychological Impacts Stream. A brief summary of findings from years 1 – 5 of the HHS is shown below:

Psychological Impacts: Summary of main findings



Schools study – moderate levels of distress, which have reduced over time. Increased reporting in younger children and those in Morwell. Specialist school personnel and students experienced particular difficulties.



NAPLAN - Morwell students in year 7 and 9 had lower NAPLAN performance than expected in the post-mine fire 2015 testing.



Adult Survey – moderate levels of distress reported in Morwell, increasing in line with level of PM_{2.5} exposure. Vulnerable groups included those with pre-existing respiratory or mental health conditions.



There was a moderate increase in medications dispensed for mental health conditions which was associated with mine fire smoke.



Among men, but not women, there was an increase in mental health consultations associated with mine fire smoke



Some evidence of increases in mental health ambulance call outs and hospital admissions.



Findings are moderate, with the bulk of people not reporting concerns

The Psychological Impacts Stream has a number of further analyses in progress, relating to the Schools Survey round 2 survey data, NAPLAN outcomes in the Schools Study cohort and broader population, and psychiatric health service use in the Latrobe Valley region based upon MBS and PBS data.

Also, in a cross-stream collaboration with the Adult Survey and Older People research teams, a Masters student working with the Psychological Impacts Stream has just completed a thesis looking at the impacts of the event on older people, making use of Adult Survey data. That thesis explored differences in PTSD symptoms in older adults and the influence of factors such as age, health status, prior mental health diagnoses and previous traumatic exposures. The core finding was that older age was associated with reduced likelihood of distress. This work has been followed up with an article (see Broder *et al* above) further exploring determinants of psychological distress related to exposure to the event that is currently under journal review. Discussions are underway with the student regarding the possibility of another publication arising from the thesis. In addition, the finding that older age was protective will inform a paper on disaster communications and the importance of not labelling older people as vulnerable.

The Psychological Impacts Stream has also been busy preparing to roll out their first follow-up of Adult Survey participants. The Stream has collaborated widely to develop the most effective protocol for this data collection. For the longitudinal component of the Adult Survey, the protocol includes re-administration of key psychological health instruments which were included at baseline. However, new instruments have also been included. For example, cross-stream collaboration with the Community Wellbeing Stream has seen the addition of a Community Wellbeing Scale. The protocol has recently been approved by the Monash University Human Research Ethics Committee. The sampling strategy has been developed, the recruitment and data collection databases written and piloting is underway. Recruitment and data collection are anticipated to commence in November 2019.

6.3 Impact on Community Wellbeing

In the last year the Community Wellbeing Stream has completed two extensive volumes of findings titled:

- Volume 1: Community perceptions of the impact of the smoke event on community wellbeing and of the effectiveness of communication during and after the smoke event.
- Volume 2: Community perceptions of effectiveness of community rebuilding efforts.

As reported in the 4th Annual Report, the photographic exhibition “Our Hopes for the Future of Morwell” moved to the Mid-Valley Shopping Centre, in Morwell, where it remained until December 2018. The exhibition has recently featured in the 2019 Ballarat International Foto Biennale which is one of Australia’s most prestigious photographic festivals. Entered by significant Australian and international photographers, the Biennale has attracted more than 180,000 visitors since its foundation in 2005.

Discussions continue with the Latrobe Health Assembly on progressing the conversation about the future stimulated by this photographic exhibition.

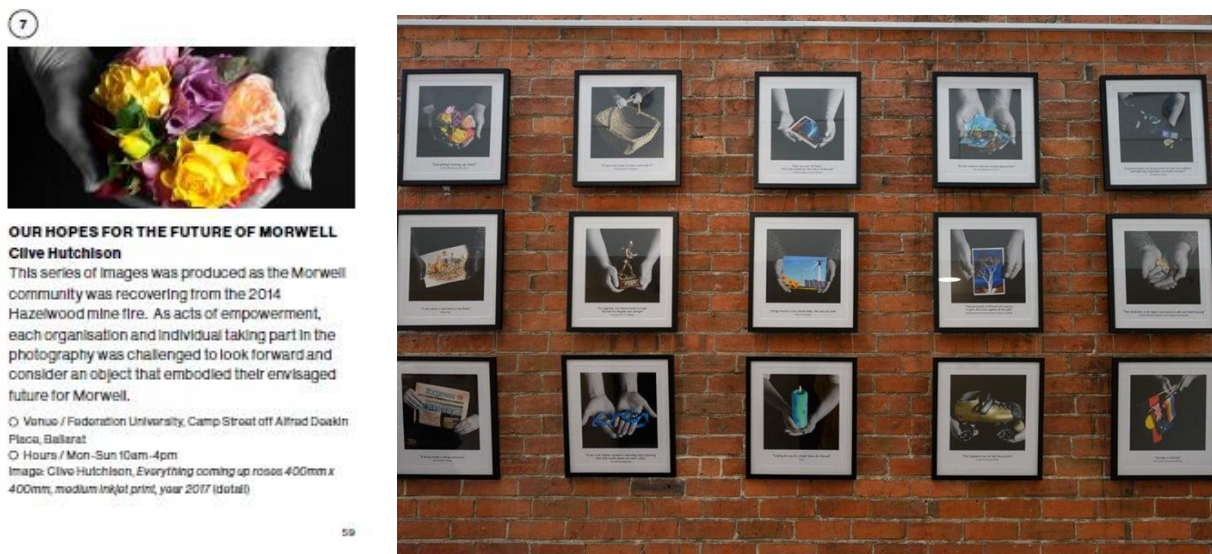


Figure 1 *Our Hopes for the Future of Morwell* exhibition featured in the program for the 2019 Ballarat International Foto Biennale (left) and on display (right).

Community Wellbeing: Summary of main outcomes



First volume of a major report on community perceptions of the impact of the event on community wellbeing released with second volume in final drafting.



Photographic exhibition which has continued to be displayed in community locations and which is informing discussions with the Latrobe Health Assembly around the ongoing recovery of Morwell and the wider region.

The core themes from the community wellbeing research to date include:



- Loss of trust with the relevant authorities



- Problems with communication during the event



- The role of social media in filling the communications gap



- The ongoing recovery process for the community

The findings demonstrate that the Hazelwood mine fire event had a substantial impact on community wellbeing, most notably a loss of trust in authorities when dealing with a crisis. Problems with official communication played a prominent part in the community's distress, with social media being important to filling the communication gap.

Recovery is ongoing and has been complex. A range of recovery initiatives were undertaken by various agencies, but not all the work that was done was recognised or valued by the community. Three years after the mine fire and smoke event, there were still community concerns regarding the apparent lack of planning for a similar future emergency. The question of 'recovery to what' was very important to this community, as was the development of a long-term vision.

The study team are planning a journal article on optimal communication during a complex disaster with health impacts, which will draw on the findings from the Older Persons Policy Review and the Community Wellbeing Stream.

6.3.1 Older people

Following the merging of the Community Wellbeing and Older People research streams, efforts have continued to maintain an ongoing focus on the impacts of the Hazelwood event on older people. As described above, a cross-stream collaboration with the Adult Survey and Psychological Impacts Streams has produced a Master's thesis and paper recently submitted for review, looking at the impacts of the event on older people. The finding that older age was protective will inform a paper on disaster communications in regard to older people.

Matthew Carroll and Judi Walker have contributed a chapter on Older People: Disasters and Climate Change for a new major Routledge handbook on Rural Gerontology: Towards Critical Perspectives on Rural Ageing, which is expected to be published next year.

6.4 Respiratory and cardiovascular health in adults

Combined, the Adult Survey, Hazelinks, Respiratory Stream and Cardiovascular Stream all include research in relation to adult respiratory and cardiovascular health outcomes associated with the Hazelwood mine fire. In the last year the HHS has produced a number of reports and scientific manuscripts and an abstract in relation to adult respiratory and cardiovascular health.

Reports

- Hazelwood Health Study Adult Survey Volume 2 The relationship between Hazelwood mine fire smoke exposure and health outcomes.
- Hazelinks Ambulance Victoria data: Time series analyses (first data extraction)

Manuscripts

- Taylor *et al.* Is asthma associated with exposure to smoke from a coal mine fire?
- Betts *et al.* Markers of cardiovascular disease among adults exposed to smoke from the Hazelwood coal mine fire.
- Betts *et al.* Factors associated with hypertension and its management among older rural Australians.
- Johnson *et al.* Associations between respiratory health outcomes and coal mine fire PM_{2.5} smoke exposure.
- Ikin *et al.* Cohort Profile: The Hazelwood Health Study adult cohort.

Abstract

- Prasad *et al.* Chronic Obstructive Pulmonary Disease is associated with exposure to fine particles from a coal mine fire.
(Submitted for consideration by the American Thoracic Society 2020 International Conference.)

Hazelinks has also updated findings from a manuscript titled “Coal mine fire-related fine particulate matter and medical service utilisation in Australia: a time series analysis from the Hazelwood Health Study” which was previously approved by DHHS. The updated manuscript has been resubmitted to DHHS. Similar updates are needed for the report titled “Hazelinks Medicare Benefits Schedule and Pharmaceutical Benefits Scheme data: Time Series Analyses” which has been taken down from the Hazelwood Health Study website. A further manuscript is near completion, based on the findings previously presented in the November 2018 Hazelinks technical report on Ambulance Victoria data.

Further to these, Michael Abramson submitted the abstract titled “Chronic cough is related to cumulative PM exposure from a coal mine fire” for consideration by the 2019 European Respiratory Society Congress. This was accepted as a poster which is reproduced in Figure 2.

Chronic cough is related to cumulative PM_{2.5} exposure from a coal mine fire

Michael J Abramson¹, Jill Blackman¹, Matthew Carroll², Caroline Gao¹, Anthony Del Monaco¹, David Brown¹, Christina Dimitriadis¹, Amanda Johnson¹, Yuming Guo¹, Malcolm R Sim¹, Judi Walker²
Schools of 1. Public Health & Preventive Medicine, and 2. Rural Health, Monash University, Melbourne, Australia

INTRODUCTION

- A fire burned in the Hazelwood open cut brown coal mine (far right) for 6 weeks in 2014, showering the nearby town of Morwell with smoke and ash.
- Aim:** To assess whether adults heavily exposed to smoke from the fire, reported more respiratory symptoms than those less exposed.

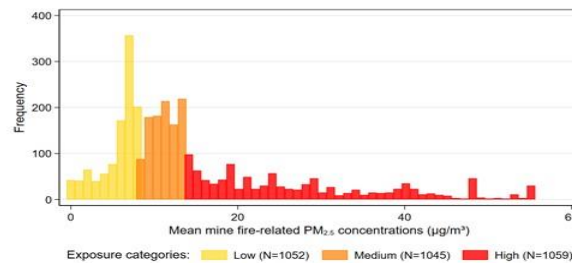
METHODS

- Samples of adults from Morwell and the comparison town of Sale completed a survey 2 years after the fire, which included ECRHS respiratory questions.
- Sale was chosen because of similar population characteristics, but experienced no exposure to smoke from the coal mine fire.
- Concentrations of fine particles <2.5µm (PM_{2.5}) for each day and night of the fire were estimated by CSIRO utilising coupled dispersion and atmospheric models.
- Cumulative individual exposures incorporated time-location diaries from the survey.
- Multivariable log binomial or Poisson regression models were fitted to adjust for differences in gender, age, education, employment, smoking, drinking risk and occupational exposures.

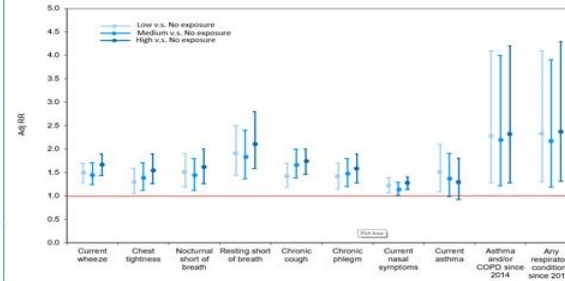
RESULTS

- Participants:** The sampling frame was the Victorian Electoral Roll.
- There were 9,013 eligible adults in Morwell and 4,206 in Sale.
- We eventually recruited 3,096 (34%) adults in Morwell and 960 (23%) in Sale.
- A majority were female (Morwell 55%, Sale 57%).
- There was also over-representation of older people, with almost half ≥ 60 years old.
- Exposure:** Average 24 hour exposure to mine fire related PM_{2.5} exposure was estimated across the 51 days and nights of the fire.
- The distribution is shown below:

Frequency of participants across mean cumulative 24-hour fire-related PM_{2.5} levels



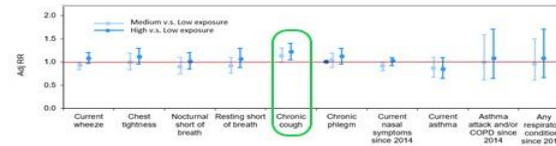
Risk of respiratory symptoms or conditions in participants with low, medium or high exposure, each compared to those with no exposure (red line)



RESULTS (ctd)

- The groups were: High (n=1,059; range of PM_{2.5} >14.1-56.0 µg/m³), Medium (n=1,045; >8.3-14.1), Low (n=1,052; 0.01-8.3) or no exposure (n=900).
- Comparisons were made with unexposed participants (mostly Sale residents).
- Symptoms:** Almost all respiratory symptoms were significantly more common in high, medium or low exposed participants compared to the unexposed.
- Any respiratory condition since 2014 was also significantly more common, but current asthma was only more common in the low exposure group.
- The Pekkkan asthma symptom severity score was also slightly higher in the low exposure compared to unexposed participants with asthma (not shown).
- When comparisons were restricted to the exposed groups, **chronic cough** was 1.22 (95%CI 1.05, 1.42) more common in the high and 1.15 (1.00, 1.33) in the medium compared to the low exposure group (below).

Respiratory symptoms and conditions reported by Morwell participants with medium or high mine fire PM_{2.5} exposure, each compared to those with low exposure (red line)



Photograph courtesy of Keith Pakenham, County Fire Authority, Vic, Australia

CONCLUSIONS

- The high exposure group in Morwell was exposed for over 6 weeks to PM_{2.5} concentrations known to be associated with adverse health effects
- There was some evidence for a dose-response relationship between cumulative mine-fire related PM_{2.5} exposure and chronic cough, which is a physiological mechanism to clear inhaled particles.
- Whilst other respiratory symptoms and conditions were also significantly more common in mine fire smoke exposed compared to non-exposed participants, we could not exclude reporting bias or residual confounding.
- These findings are consistent with some previous studies of wildfire smoke and urban background ambient particulate air pollution
- Further analysis is examining potential modifying effects of the types of construction materials used in Morwell homes.

CONTACT DETAILS

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- Web <http://hazelwoodhealthstudy.org.au>

Funding: Victorian Department of Health & Human Services. This poster presents the views of the authors and not the Department



Figure 2 Poster presented at the European Respiratory Society Congress in October 2019

Brief summaries of all adult respiratory and cardiovascular health findings are shown below.

Respiratory health in adults: Summary of main findings



Mine fire-smoke exposure was associated with increased respiratory symptom reporting 2.5-3 years after the fire.



Increased exposure was associated with increased odds of symptoms and lung function consistent with COPD. No differences between exposed and unexposed adults with asthma, in asthma-related symptoms or severity, lung function or airway inflammation, but some evidence of poorer asthma control 3.5 to 4 years after the fire.



During the mine fire period, there were approximately 42 additional ambulance attendances for respiratory conditions. Increases in smoke levels were followed by increases in ambulance attendances for respiratory conditions for about 5 days.



Increases in smoke levels were associated with increases in emergency presentations and hospital admissions for COPD combined with asthma, and with increases in emergency presentations for “all” respiratory diseases.



Among men, but not women, there was an increase in visits to respiratory health specialists/services associated smoke levels.



There was an increase in dispensation of respiratory medications associated with smoke levels.

Cardiovascular health in adults: Summary of main findings



Mine fire-smoke exposure was associated with increased self-reporting of high blood pressure and heart attack in the 2.5-3 years since the fire, however numbers of cases were very small.



There were no differences between exposed and unexposed adults in markers of underlying cardiovascular disease, reduced heart function, heart muscle damage, irregular heart rhythm or blood vessel health 3.5 to 4 years after the fire.



There was no association between mine fire smoke and ambulance attendances for cardiovascular conditions.



There was no increase in emergency presentations or hospital admissions for cardiovascular conditions associated with mine fire smoke.



There was no increase in visits to cardiovascular specialists/services associated with mine fire smoke.



There was an increase in dispensation of cardiovascular medications associated with mine fire smoke.

In relation to adult respiratory and cardiovascular health, there are a number of further analyses either near completion, in progress or planned. These include analyses of:

- linked hospital outcomes in Adult Survey participants;
- COPD in Respiratory Stream participants;
- small airways function in Respiratory Stream participants; and
- predictors of endothelial (vascular) function in Cardiovascular Stream participants.

The Respiratory Stream has begun preparation for its followup round of data collection. This has included negotiations with the Latrobe Regional Hospital (LRH) Executive in regard to a possible collaboration where LRH facilities and potentially, staff might be utilised during the next round of Respiratory Stream clinics.

6.5 Mortality

A report has been completed describing analyses of anonymised death data for the period July 2009 to June 2015. The analyses investigated whether there was an increased risk of death overall associated with the mine fire, and/or an increased risk of death from specific conditions.

Mortality: Summary of main findings



During the mine fire period the 'overall' risk of death in Morwell and other smoke impacted areas was similar to that expected. There was some evidence of an increased risk of death in Morwell in the six months after the mine fire.



During the mine fire, in Morwell and in the broader Latrobe Valley, there was an increased risk of death from injuries. Greatest risk was observed in men and residents aged 80 years and older.



During the mine fire, in the Latrobe Valley, there was some evidence of an increase in risk of death from mental health conditions amongst women.



In the six months after the mine fire, in Morwell and in the broader Latrobe Valley, there was an increased risk of death from cardiovascular conditions, particularly ischaemic (coronary) heart disease. Greatest risk was observed in men and residents aged 80 years and older.



There was no association between mine fire smoke and an increased risk of death from respiratory conditions.



The results of the analyses are based on small numbers and may reflect chance findings.

7 Community Engagement

Community engagement continues to be a priority to the Hazelwood Health Study. Whilst there has not been the need to recruit participants in the last year, community engagement has focused on dissemination of findings, keeping the community up to date on HHS activities and maintaining contact with the participating cohorts.

The HHS has continued to distribute e-newsletters on an as needs basis. Recent e-newsletters have been distributed on 12 Nov 2018 to 2,309 subscribers, 22 May 2019 to 2,287 subscribers and 6 June 2019 to 2,256 subscribers. Recipients included cohort participants, interested individuals and key stakeholders.

As described in section 4.1.1, the community consultation process for the SORPP was diverse and included the Chief Health Officer, the HHS Scientific Reference Group, Community Advisory Committee, Clinical Reference Group, the Latrobe Health Advocate, the Latrobe Health Assembly and the Gippsland Primary Health Network. Further to this process, the annual Community Engagement Session was brought forward from August 2019 to 11 June 2019. This allowed the wider community the opportunity to hear an overview of findings from the first five years of the study and provide feedback on proposed refinements to the project plan for years six to ten. In addition to providing comment at the open forum, residents were invited to provide comment via the Latrobe Health Assembly SpeakUp platform at <https://speakup.healthassembly.org.au/HazelwoodHealthStudy>.

There has been significant engagement with the LRH Executive, the Chair of the Latrobe Health Assembly and the Gippsland Primary Health Network Executive during September and October 2019, to explore and progress proposals to formalise collaborations to assist efforts to improve the health and wellbeing of the Latrobe and wider Gippsland communities. These proposals should be finalised before the end of the year.

As the volume of findings arising from the HHS has increased, our plain language Research Summaries have been an important mechanism for disseminating findings to the community in a digestible format. Copies of Research Summaries released in year 5 are compiled in Appendix 1. Whilst these have routinely been emailed to key stakeholders, included in the e-newsletters and posted via social media, we are also looking at options to have hard copies on display at public venues such as libraries, community centres and council offices.

Media releases have also accompanied some reports, manuscripts and Research Summaries in the last year. These are compiled in Appendix 2. Some of the print media coverage from the last year is shown in Appendix 3.

The HHS also continues to make regular use of social media, via our website hazelwoodhealthstudy.org.au, Facebook facebook.com/hazelwoodhealthstudy, Twitter twitter.com/HazelwoodHS and YouTube youtube.com/channel/UCTY7oS9e2b8sKxRrTfn8OKw/videos.

8 Appendices

Appendix 1

Research Summaries released since November 2018 Page 25

Appendix 2

Media releases prepared since November 2018 Page 41

Appendix 3

Print media featuring the Hazelwood Health Study since November 2018 Page 46

Ambulance attendances during the Hazelwood mine fire Research Summary

December 2018

Analysis aims

This study aimed to investigate whether there were increased ambulance attendances during the mine fire period, compared to other times before and after the mine fire. The study also aimed to determine whether those attendances were associated with changes in mine fire-related air pollution levels.



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 was established to examine the impacts of the mine fire. The HHS involves multiple research streams targeting different health outcomes and different vulnerable groups.



Photo Credit: Keith Pakenham, Country Fire Authority

Meet the team

Associate Professor Yuming Guo
Dr Caroline Gao
Dr Joanna Dipnall
Professor Rory Wolfe
Dr Jillian Blackman
Christina Dimitriadis
Professor Malcolm Sim
Professor Karen Smith
Professor Michael Abramson



What we found

When the mine fire period was compared to other times before and after the mine fire, the analysis showed an overall 15% increase in ambulance attendances. This corresponded to approximately 236 additional ambulance attendances during the mine fire period for all conditions. When ambulance attendances for respiratory conditions were investigated separately, there was a 41% increase during the mine fire period compared to other times. This corresponded to approximately 42 additional ambulance attendances for respiratory conditions during the mine-fire period.

When we looked at changes in the levels of mine fire-related air pollution, we could see that increases in pollution levels were followed by increases in ambulance attendances for respiratory conditions for about 5 days.

A full report describing the findings from this analysis can be found at hazelwoodhealthstudy.org.au/study-findings/study-reports



What we did

Daily ambulance attendances data for the period July 2010 to March 2015 were obtained from Ambulance Victoria for Morwell and surrounding towns.

Air pollution estimates were based on fine air particles measuring less than 2.5 thousandths of a millimetre in diameter (PM_{2.5}). These were modelled by the Commonwealth Scientific and Industrial Research Organisation for the areas impacted by the mine fire smoke. Daily maximum temperatures were collected from the Australian Bureau of Meteorology.

A statistical method called time series analysis was used to examine whether ambulance attendances increased during the mine fire period and to measure the association between ambulance attendances and daily average PM_{2.5} levels. The analysis took into account the influences of other contributing factors such as season and temperature.



Photo Credit: Monash Rural Health Latrobe Valley & West Gippsland

Considerations

Within each affected town, ambulance counts were too small to allow for comparisons between areas with higher and lower air pollution levels. Therefore we may have underestimated the impact in the most highly exposed areas. It is important to note that the data was not sufficient to link any individual person's ambulance call out to mine fire smoke exposure and that ambulance data were collected for administrative purposes and, therefore, may not provide accurate diagnostic information.

Where to from here

Researchers will be conducting further analyses using ambulance attendance, hospital admission, emergency presentation and cancer datasets.

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

The research was funded by the Department of Health and Human Services.

Birth outcomes using anonymous Victorian Perinatal Data Collection Records Research Summary

December 2018

Analysis aims

We aimed to find out whether babies born to pregnant mothers exposed to mine fire smoke were born earlier or smaller compared to those born to mothers who were not exposed during pregnancy.

Meet the team

Fay Johnston
Shannon Melody
Alison Venn
Karen Wills
Jane Ford
Marita Dalton
Grant Williamson



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 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 happened. This includes children who were in the womb and had not been born yet.



What we found

In general, we found that babies born to mothers who were exposed to the coal mine fire smoke during pregnancy, compared to mothers who were not exposed, were no different in their birthweight, were not more likely to be born small nor to be born too early. This supports findings that we have previously reported, where we collected birth details through a survey of families enrolled in the Latrobe ELF Study.

However, we did find that smoke exposure was linked to birthweight in some babies, but only if the mother had a diagnosis of gestational diabetes. These babies were more likely to be heavier at birth by approximately 100 grams, compared to babies born to exposed mothers without gestational diabetes. This effect was in addition to the higher birthweight that you would expect from gestational diabetes alone.

To request a copy of the full technical report, please call 1800 985 899 or email contact@hazelwoodhealthstudy.org.au

Website: www.hazelwoodhealthstudy.org.au/study-reports



@hazelwoodhealthstudy



@HazelwoodHS



What we did

- After obtaining ethical approval for this research, we obtained anonymous birth records held by the Victorian Perinatal Data Collection for all babies born in the Latrobe Valley before, during and after the fire (born 1st March 2012 to 31st December 2015).
- To estimate how much mine fire smoke pregnant women had been exposed to during the fire, we used air pollution data provided by CSIRO and the recorded home address at the time the baby was born.
- We looked to see if different amounts of mine fire smoke exposure were associated with birthweight and when babies were born. When we analysed the data, we took into account other factors that can affect birthweight and maturity, including infant sex, the mother's age, health and smoking status during pregnancy.



Considerations

We calculated exposure based on the mother's address at delivery. This means we may not have captured changes in smoke exposure that resulted from movement within and outside of the Latrobe Valley during the fire.



Where to from here?

These findings will be shared with relevant organisations and the scientific community to ensure they are used to shape services for the future health of the Latrobe Valley. Additionally, findings will help guide responses to severe smoke events in the future. We will also be investigating whether exposure to smoke from the coal mine fire was linked to onset of pregnancy complications, including gestational diabetes mellitus.



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

We are grateful to CCOPMM for providing access to the de-identified data used for this project and for the assistance of the staff at the Consultative Councils Unit, Safer Care Victoria. The views expressed in this paper do not necessarily reflect those of CCOPMM

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

The research was funded by the Department of Health and Human Services.

Research Summary

The ongoing experiences of students following the Hazelwood mine fire

March 2019



Background

Analysis aims

This study assessed the psychological impacts of six weeks of exposure to smoke and ash from the Hazelwood mine fire on school-aged children. The study compared students from schools in the most exposed community (Morwell) with those from schools elsewhere in the Latrobe Valley which were less exposed to the smoke event.

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, with the concentration of smoke contaminants reaching high levels.

The smoke event 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.



Meet the team

Sonia Allen
Matthew Carroll
Emily Berger
Darryl Maybery
Tim Campbell



What we found

The interviews revealed that for most students, their recall of the event was vivid, with students recalling feeling anxious or sick at the time; disruption of routines and relocation of home or school; some relief from sharing the experience with friends or family; and being confined to indoors or trips away from the smoke. While the majority of the participants reported little to no ongoing concerns, some did express current concerns. The need to move on from the event was clearly expressed, however, for some students this was challenging, with thoughts of the event rekindled by anniversaries, media reports, and smoke in the air. In particular, some students reported experiencing key symptoms of distress associated with the event such as dreaming about the event, feeling more restless, or trying to avoid thinking about it by distracting themselves with other activities. Students remarked on a number of things that helped them at the time, highlighting the important role that family, friends, and school personnel played in supporting them. With regards to preparing for and responding to future events, students remarked on the need for clearer communication with them on the nature of the event and potential impacts, and what they can do to look after themselves and their families.

A more detailed report describing the findings from this analysis can be found at <http://hazelwoodhealthstudy.org.au/study-findings/study-reports/>

What we did

This analysis is focused on the second round of face to face interviews completed in 2017 by 46 students in grades 5, 7, and 9. The students were primarily from Morwell schools and had completed a similar interview in 2015. This allowed us to explore the impacts of the event more deeply.

Where to from here

This research comprises one aspect of the HHS Psychological Impacts stream. Future activities for this stream include follow up surveys and interviews with school-aged children and adults.

The Hazelwood Health Study is a collaborative program of research led by the Monash University Schools of Public Health and Preventative Medicine and Rural Health in partnership with Federation University, the Menzies Institute for Medical Research at the University of Tasmania, the University of Adelaide and the CSIRO.

This research was funded by the Victorian Department of Health and Human Services.

Considerations

While all attempts were made to recruit as many students as possible into the Schools Study, the majority of eligible families did not respond to the invitation to participate. Older students were also less likely to participate than their younger counterparts, due in part to there being only one secondary school in Morwell. Finally, the random sample used for the interviews may have restricted the range of possible responses. This raises the possibility that the participant samples for the survey and interviews may not represent the full student population at the time.



Research Summary

The Latrobe ELF Study | Exposure to mine fire smoke and the risk of pregnancy-related health problems

May 2019



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 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 happened. This includes children whose mothers were pregnant with them at the time.

Analysis aims

We aimed to find out whether pregnant mothers exposed to mine fire smoke were more likely to experience complications in pregnancy, including gestational diabetes, high blood pressure, or placental problems, compared to mothers who were not exposed in their pregnancy.



What we found

We found that pregnant women exposed to smoke from the coal mine fire were more likely to be diagnosed with gestational diabetes compared to pregnant women who were not exposed to coal mine fire smoke. Exposure in the second trimester of pregnancy was associated with the greatest risk of gestational diabetes. The number of extra cases of gestational diabetes that were likely to be connected to smoke exposure from the fire was 16. We found no evidence that exposure to smoke was associated with other complications in pregnancy, including high blood pressure conditions or problems with the position or attachment of the placenta.

Meet the team

Fay Johnston
Shannon Melody
Alison Venn
Karen Wills
Jane Ford

To request a copy of the full technical report, please call 1800 985 899 or email contact@hazelwoodhealthstudy.org.au



What we did

- After obtaining ethical approval for this research, we obtained anonymous Victorian Perinatal Data Collection records for pregnant women in the Latrobe Valley who gave birth at 20 or more weeks gestation between 1st March 2012 to 31st December 2015.
- We used the recorded home address at the time the baby was born to estimate how much smoke pregnant women had been exposed to during the fire.
- We looked to see if the amount of smoke exposure during the fire was associated with whether the mother had gestational diabetes, high blood pressure in pregnancy or an abnormally positioned or implanted placenta. When we analysed the data, we took into account other factors that can affect pregnancy complications, including whether the mother smoked in pregnancy, the mother's age and year of conception.



Where to from here?

These findings will be shared with relevant organisations and the scientific community to ensure they are used to shape services for the future health of the Latrobe Valley. Additionally, findings will help guide responses to severe smoke events in the future, by supporting the need for pregnant women to be provided with targeted advice to reduce their exposure during the event.

Considerations

We calculated exposure based on the mother's address at delivery. This means we may not have captured changes in smoke exposure that resulted from movement within and outside of the Latrobe Valley during the fire.

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

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



Community perceptions of the impact of the Hazelwood mine fire on community wellbeing, and of the effectiveness of communication during and after the fire

Research Summary

May 2019



Background

Analysis aims

This analysis presents community perceptions of the impact of the smoke event on community wellbeing, and the elements that are important for effective communication during and after the smoke event.

Meet the Team

Dr Susan Yell
Assoc Prof Michelle Duffy
Dr Sue Whyte
Dr Larissa Walker
Dr Matthew Carroll
Prof Judi Walker

The Community Wellbeing Stream is led by Federation University. The HHS is led by Monash University with collaborators from Federation University, the University of Tasmania, the University of Adelaide and CSIRO.

The research was funded by the Department of Health and Human Services.

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 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 **Community Wellbeing Stream** is the part of the Hazelwood Health Study that looks at the impact of the smoke event on the community wellbeing of those living in Morwell and the Latrobe Valley. This includes looking at the communication during and after the mine fire, and at the community rebuilding efforts that have taken place since the fire.



What we did

We 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. We also collected media articles about the mine fire, along with social media posts by community members on three local Facebook groups. We interviewed a total of 85 people, and analysed 1,096 media reports and 1,709 social media posts.



What we found



Considerations

We found that the event had a substantial impact on community wellbeing, most notably a loss of trust in the authorities dealing with the crisis. The main factors leading to this loss of trust were the problems with communication and information, the lack of an emergency plan and a sense on the part of some in the community that the government, authorities and GDF Suez (the owners of the mine and power station) had not accepted responsibility for what happened and were not held accountable.

This loss of trust also led some community members and groups to take matters into their own hands, finding ways to support one another, meet the needs of those impacted by the fire, and lobby for government to address their concerns. Social media had an important function in enabling community groups to organise and express themselves.

These initiatives were important to addressing the concerns of the community and determining ways forward. However, many questioned the motives of those who took on this work, while others were concerned about the repercussions on the reputation of the community.

Problems with official communication during the smoke event played a prominent part in the community's distress. Local media and social media were important in filling information gaps and representing the concerns of the wider community, while at the same time reflecting some of the divisions and conflicts in this diverse community. In reflecting on what could have been done better in communicating with the community, our interviewees mentioned a number of elements important for effective communication. These were:

- media and social media as a sounding board and a strategic resource;
- fast, accurate and honest communication;
- a broad range of channels;
- face-to-face communication is important;
- a trusted spokesperson, preferably someone local;
- empathic communication;
- continuity of spokespeople;
- a local communications team.

The findings of this study would be useful for policy and planning for future disasters. They show that there is a requirement to listen to the community, address their concerns and communicate with them honestly, accurately and empathically, using appropriate channels and trusted spokespersons. To do so promotes a relationship of trust between community members and agencies involved in disaster, so necessary for effective disaster response and management. In addition, we argue for the development of a comprehensive disaster management plan which recognises the specific needs and risks for this community, and which includes a communications and community engagement strategy. While every attempt was made to speak to a broad array of individuals and organisations, it is possible that the participant sample may not represent the full range of viewpoints.

A copy of the full report describing the findings from the analysis can be found at

<http://hazelwoodhealthstudy.org.au/publications>



Where to from here?

A further report is being prepared which presents our findings on community perceptions of the effectiveness of community rebuilding activities. Additional data collection is planned to track the ongoing wellbeing of the community.



Updated analysis of birth outcomes in the Latrobe ELF cohort Research Summary

May 2019



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 HHS that follows the health and growth of children who were younger than two years old when the fire happened. This includes children who were in the womb and had not been born yet.

Analysis aims

We aimed to repeat our first analysis of birth outcomes using improved estimates of smoke exposure and health data to find out whether babies born to pregnant mothers exposed to mine fire smoke were born earlier or smaller compared to those born to mothers who were not exposed.

Meet the team

Fay Johnston, Shannon Melody, Alison Venn, Karen Wills, Jane Ford, Marita Dalton, Grant Williamson, Tierney O'Sullivan.



What we found

We found that babies born to mothers exposed to the coal mine fire smoke during pregnancy were no different in their birthweight and were not more likely to be born too early. This supports our findings reported previously.

As with our first analysis we found that smoking during pregnancy was associated with lower birthweights in babies.

A detailed paper describing the findings from this analysis can be found at

<http://hazelwoodhealthstudy.org.au/publications>

Website: www.hazelwoodhealthstudy.org.au/study-reports



@hazelwoodhealthstudy



@HazelwoodHS

What we did

- After obtaining ethical approval for this research, we enrolled children born between 1st March 2012 and 31st December 2015 who lived in the Latrobe Valley. We then asked families to complete a detailed survey about the study child, their family, their health and the pregnant mother's whereabouts during the fire.
- We looked to see if the amount of smoke exposure during the fire was associated with whether babies were born early and how much they weighed. When we analysed the data, we took into account other factors that can affect birthweight and maturity, including infant sex, the mother's age, health and smoking status during pregnancy.
- In this updated analysis, we used information collected in the survey about the mother's whereabouts during the fire to calculate a more detailed estimate of smoke exposure. We also did additional analyses using the birth data recorded by midwives or doctors at the time of the birth in addition to the parent-reported birth outcomes used in the first analysis.

Where to from here

These findings will be shared with relevant organisations and the scientific community to ensure they are used to shape services for the future health of the Latrobe Valley. Additionally, findings will help guide responses to severe smoke events in the future.

Considerations

There were some factors that might affect birthweight, such as pregnancy complications and how many pregnancies a mother has had, which we were unable to account for in this analysis. We are investigating some of these separately.

The Latrobe ELF Cohort Study is led by the Menzies Institute for Medical Research at the University of Tasmania with collaborators from Melbourne University and the Telethon Kids Institute. The HHS is led by Monash University with collaborators from Menzies, Federation University, The University of Adelaide, and CSIRO.

The research was funded by the Department of Health and Human Services.



Factors associated with high blood pressure and its management among older Gippslanders Research Summary

October 2019

Analysis aims

This research aimed to measure how common high blood pressure (hypertension) was in Gippsland and the Latrobe Valley and how well it was managed.

The **Cardiovascular Stream** is the part of the Hazelwood Health Study that has measured markers of heart and blood vessel health, including blood pressure, in older adults.

Meet the Team

Dr Sasha Taylor
Dr Juliana Betts
Dr Caroline Gao
Mr David Brown
Dr Jillian Ikin
Ms Andrea Taggart
A/Prof Dion Stub
Prof Michael Abramson
Prof Danny Liew



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.






What we found

We found no evidence that the mine fire smoke led to higher blood pressure in adults from Morwell who were exposed to the smoke, compared to adults from Sale who were unexposed. When we combined the Morwell and Sale participants, we found that approximately 80% of participants were found to have high blood pressure. Among those with high blood pressure, 37% were determined to be 'undermanaged'. That meant they had been diagnosed with hypertension by a doctor, or were taking antihypertensive medications, but their blood pressure was still too high. A further 8% of participants with high blood pressure were determined to be 'unmanaged', meaning that their high blood pressure had not yet been diagnosed or treated by a doctor. Compared to participants without high blood pressure, those with high blood pressure were more likely to have signs of kidney damage and thickening of the heart muscle. After taking into consideration a number of factors that can influence blood pressure, being employed and being single were both independently associated with higher blood pressure.

To request a copy of the full technical report, please call 1800 985 899 or email contact@hazelwoodhealthstudy.org.au

Website: www.hazelwoodhealthstudy.org.au

 @hazelwoodhealthstudy

 @HazelwoodHS



What we did

We tested 498 adults who lived in or near the Gippsland towns of Morwell and Sale. Participants were aged between 55 and 89 years. Participants were considered to have high blood pressure if they had blood pressure readings of $\geq 140/90$ mmHg (millimetres of mercury), or a self-reported doctor-diagnosis of high blood pressure, or if they took medication for high blood pressure. Electrocardiography (ECG) was used to measure any thickening of the main pumping chamber of the heart (left ventricle), which can result from prolonged high blood pressure. Kidney damage can also result from prolonged high blood pressure, and this was investigated by taking a blood sample to measure kidney function. We took into consideration other factors that could influence blood pressure, such as history of heart disease or diabetes, age, sex, body mass index, cigarette smoking, alcohol consumption, physical activity and socioeconomic status.



Where to from here?

Further investigation of heart and blood vessel health in Gippsland will be undertaken with the use of Medicare, medication, ambulance and hospital data sets.



Considerations

Cardiovascular Stream participants were drawn from the HHS Adult Survey which had recruited adults who had lived in the towns of Morwell and Sale during the 2014 Hazelwood mine fire. Therefore, the findings may not accurately represent the broader Gippsland area.

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

The research was funded by the Department of Health and Human Services.



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

October 2019

Background

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

Dr Juliana Betts
Dr Caroline Gao
Ms Elizabeth Dewar
Ms Karen Kilpatrick
Dr Sinjini Biswas
Dr Berihun Zeleke
A/Prof Dion Stub
Dr Jillian Ikin
Ms Andrea Taggert
Mr David Brown
Prof Michael Abramson
Prof Danny Liew

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.



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.

To request a copy of the full technical report, please call 1800 985 899 or email contact@hazelwoodhealthstudy.org.au



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.

The research was funded by the Victorian Department of Health and Human Services

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.



Report: Ambulance call outs increased during mine fire

New findings from the Hazelwood Health Study (HHS) show an overall increase in ambulance attendances during the 2014 Hazelwood mine fire period.

Using data supplied by Ambulance Victoria for Morwell and surrounding towns, the analysis showed a 15% increased likelihood of ambulance attendances for all conditions during the mine fire period when compared to other times before and after the mine fire.

“When we looked into respiratory conditions specifically, we found there was a 41% increase in ambulance attendances during the mine fire period, compared to ambulance attendances before and after the mine fire,” HHS researcher Associate Professor Yuming Guo said.

“This corresponds to an estimated total of 236 attendances for all conditions and 42 attendances for respiratory conditions associated with the mine fire during the mine fire period.”

“We also wanted to know if there was an association between ambulance attendances and daily pollution levels. By mapping changes in air pollution levels onto ambulance use, we found that increases in the levels of mine fire related air pollution increased ambulance attendances for respiratory conditions.”

HHS Principal Investigator, Professor Michael Abramson cautioned that although “the study adjusted for other factors, such as seasonality, day of the week and public holidays, there were unknown factors that could not be controlled for, such as the proportion of population leaving the area.”

Researchers from the Monash University-led Hazelwood Health Study will be conducting further analyses using ambulance attendances, hospital admissions, emergency presentations and cancer datasets.

For more information about the Hazelwood Health Study, visit hazelwoodhealthstudy.org.au

This research was funded by the Victorian Department of Health and Human Services.

NOT FOR PUBLICATION

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EMBARGOED until Wednesday 23 January, 2019

Adult Survey: Respiratory and Psychological Symptoms are lasting effects of the Hazelwood coal mine fire

New findings from the Hazelwood Health Study (HHS) Adult Survey suggest that people exposed to smoke during the 2014 Hazelwood mine fire were still experiencing psychological distress and respiratory symptoms two and a half years later, often regardless of whether their level of exposure had been low, medium, or high.

This research aimed to assess whether adults who were heavily exposed to air pollution from the mine fire experienced poorer respiratory, cardiovascular, or psychological, health than adults who were less exposed.

“What we found is that, irrespective of whether their level of air pollution exposure was low, medium or high, participants who were exposed to the mine fire smoke were more likely to report most respiratory symptoms such as wheeze, night time and resting shortness of breath, chronic cough and phlegm, chest tightness and nasal symptoms, compared to participants who were not exposed. Increases were observed ranging from 15%, up to 110% for some symptoms” Principal Investigator Michael Abramson said.

“Reassuringly, we did not find any increase in the likelihood of having high blood pressure, high cholesterol, cardiovascular conditions, diabetes or cancer related to exposure to the mine fire smoke.”

It was also found that any level of smoke exposure during the mine fire was related to experiencing greater psychological distress. Impacted participants reported symptoms including intrusive thoughts about the fire, avoidance behaviour such as trying not to think or talk about the fire and being more easily startled.

“While there was an increase in distress levels associated with exposure to the smoke, the average level of distress across the community was moderate, with some people reporting little or no impacts and others reporting higher impacts,” Psychological Impacts Stream Lead Dr Matthew Carroll said.

Researchers from the Monash University-led Hazelwood Health Study will distribute the results to healthcare providers in the Latrobe Valley and the wider Gippsland region to help inform public health policy.

For more information about the Hazelwood Health Study, visit hazelwoodhealthstudy.org.au

This research was funded by the Victorian Department of Health and Human Services.

NOT FOR PUBLICATION

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Tuesday 19 March



While most students have ‘moved on’, some are reporting ongoing issues associated with the Hazelwood mine fire

Analysis of the second round of interviews with student participating in the Hazelwood Health Study (HHS) Schools Study has revealed that while the majority of the participants reported little to no ongoing concerns, some students reported ongoing issues.

According to Psychological Impacts stream lead Dr Matthew Carroll, this included dreaming about the event, feeling more restless, and attempting to avoid thinking about the event by distracting themselves with other activities.

The study aimed to assess the psychological impacts of six weeks of exposure to smoke and ash from the Hazelwood mine fire on school aged children. Researchers analysed the results of the face to face interviews held in 2017 with 46 students in grades 5, 7 and 9.

“While these findings are in line with what we found from the first round, a clear theme that emerged in this new analysis was that most students had ‘moved on’ from the Hazelwood event,” said Dr Carroll.

The report includes several suggestions from the students about how to respond to a future event, including the need for clearer communication with students on the potential impacts of the event and what they can do to look after themselves and their families.

According to Dr Carroll, the findings from across the different streams of the Hazelwood Health Study is continuing to shed light on the impacts of exposure to the smoke event and should inform any communications relating to a future event.

Analysis of Schools Study survey data and other educational data is continuing and will help evaluate any ongoing impacts of the Hazelwood event.

For more information about the Hazelwood Health Study, visit hazelwoodhealthstudy.org.au

This research was funded by the Victorian Department of Health and Human Services.

NOT FOR PUBLICATION

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Gestational diabetes increased in women exposed to mine fire smoke

New research from the Hazelwood Health Study Latrobe Early Life Follow-Up (ELF) stream has revealed that pregnant women exposed to smoke from the coal mine fire were more likely to be diagnosed with gestational diabetes, compared to pregnant women who were not exposed to coal mine fire smoke.

The study analysed whether pregnant mothers exposed to mine fire smoke were more likely to experience complications in pregnancy, including gestational diabetes, high blood pressure, or placental problems, compared to mothers who were not exposed in their pregnancy.

The analysis was undertaken through examining anonymous Victorian Perinatal Data Collection (VPDC) records for pregnant women in the Latrobe Valley who gave birth at 20 or more weeks gestation between 1st March 2012 to 31st December 2015.

ELF stream researcher Dr Shannon Melody reassured that “there was no evidence that exposure to smoke was associated with other complications in pregnancy such as high blood pressure conditions, or problems with the position or attachment of the placenta.”

Stream lead Associate Professor Fay Johnston noted that these findings should be considered in the light of other research published by the Latrobe Early Life Follow-Up stream of the health study. “We have evaluated many pregnancy and childbirth outcomes in ELF participants using both parent-reported data and anonymous VPDC records. We have not found smoke exposure to be associated with lower than expected birthweight, or earlier than expected delivery. But when looking at the VPDC records we have found important associations with diabetes in pregnancy,” said Associate Professor Johnson.

These findings will be shared with relevant organisations and the scientific community so that they can inform services for the future health of the Latrobe Valley.

This analysis was conducted by the Menzies Institute for Medical Research at the University of Tasmania as part of the larger, Monash University-led Hazelwood Health Study.

This research was funded by the Victorian Department of Health and Human Services.

For more information about the Hazelwood Health Study, visit hazelwoodhealthstudy.org.au

NOT FOR PUBLICATION

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June 3 2019

Residents invited to talk about the future directions of the Hazelwood Health Study

The Hazelwood Health Study is inviting Latrobe Valley and Sale residents and other interested community members to participate in an upcoming community engagement session.

The engagement evening will be held at the Morwell Bowling Club, 52 Hazelwood Rd Morwell, on Tuesday 11 June commencing at 6.30pm.

The study is considering its research directions for the next five years and is keen to involve the community in a discussion about the findings to date and about the future directions of the study.

The session will be chaired by Professor John Catford, known to the community through his work with the Latrobe Health Assembly and role on the two Hazelwood Mine Fire Inquiries.

“The study team has been very busy over the last five years, with a raft of findings released to date, and more on the way. This is the chance for the community to hear about those findings and to discuss what more is needed from the research team. Your input will make a difference”, said Professor Catford.

Jane Anderson, the Latrobe Health Advocate, will also be there to hear about the study’s findings and to encourage people to have their say. What Jane hears from communities informs the work she does to identify necessary system changes to improve health and wellbeing in Latrobe.

“This is a not to be missed opportunity for community members to talk with the research team and provide their input on the directions of the study. As the Advocate for this community, I will take on board the discussions and ensure they are taken back to the relevant people”, said Ms Anderson.

The session will also give residents a chance to meet with researchers from the different research streams to hear directly from them about the findings and what they mean for the community, and about the plans for the next five years.

The study is funded by the Victorian Department of Health and Human Services.

For more information about the session, visit www.hazelwoodhealthstudy.org.au or www.facebook.com/HazelwoodHealthStudy

NOT FOR PUBLICATION

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Professor John Catford, Chair, Latrobe Health Assembly P: 0407 850 056

Professor Judi Walker, HHS Principal Co-Investigator (Gippsland) P: 0418 508 680

Other enquiries:

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Have your say on future of Hazelwood Health Study

THE Hazelwood Health Study will host a community engagement session for Latrobe Valley and Sale residents as well as interested members of the public next week.

It will be held at the Morwell Bowling Club, 52 Hazelwood Road Morwell, on Tuesday, June 11 from 6.30pm.

The study is considering its research direction for the next five years and is keen to involve the community in a discussion about the findings to date and about the future of the study.

The session will be chaired by Professor John Catford, known to the community through his work with the Latrobe Health Assembly and on the two Hazelwood Mine Fire Inquiries.

"The study team has been very busy over the last five years, with a raft of findings released to date, and more on the way," Professor Catford said.

"This is the chance for the community to hear about those findings and to discuss what more is needed from the research team."

Latrobe Health Advocate Jane Anderson will also be there to hear about the study's findings and to encourage people to have their say.

"This is a not-to-be-missed opportunity for community members to talk with the research team and provide their input on the directions of the study," Ms Anderson said.

"I will take on board the discussions and ensure they are taken back to the relevant people."

The study is funded by the Victorian Department of Health and Human Services.

For more information about the session, visit hazelwoodhealthstudy.org.au or the Hazelwood Health Study's Facebook page.

Study finds pregnancy link

Anne Simmons (/profile/684/anne-simmons)

 @AnneSimm111 (<https://www.twitter.com/@AnneSimm111>)

23 May 2019, midnight

(<https://www.facebook.com/sharer/sharer.php?u=http://www.latrobevalleyexpress.com.au/story/6162389/study-finds-pregnancy-link/>).

(https://twitter.com/share?url=http://www.latrobevalleyexpress.com.au/story/6162389/study-finds-pregnancy-link/&text=Study%20finds%20pregnancy%20link&via=lv_express).

(<mailto:?subject=Study finds pregnancy link&body=Hi,I found this article - Study finds pregnancy link, and thought you might like it http://www.latrobevalleyexpress.com.au/story/6162389/study-finds-pregnancy-link/>).



The fire in the Hazelwood coal mine burnt for six weeks in February and March 2014 and covered the surrounding areas in smoke and ash. file photograph

Pregnant Latrobe Valley women exposed to poor air quality during the 2014 Hazelwood mine fire were more likely to be diagnosed with gestational diabetes than those who were not, researchers have found.

The Hazelwood Health Study released the findings on Tuesday which its researchers say are the first of their kind for examining pregnancy complications during a severe but time-limited smoke event, rather than day-to-day air pollution like traffic smog.

It used the state government's perinatal data collection to examine anonymous records of Latrobe Valley women who gave birth between March 2012 and December 2015.

The data analysis showed no associations between exposure to the smoke from burning coal and complications in pregnancy other than gestational diabetes.

The study, which comes under the Latrobe Early Life Follow-Up stream, found there were 16 extra cases of gestational diabetes likely connected to smoke exposure from the mine fire.

"It's seeming more and more that environmental exposures such as air pollution may play a part in determining whether a person develops gestational diabetes," Menzies Institute for Medical Research public health physician Shannon Melody said.

Dr Melody said the findings for gestational diabetes and exposure to air pollution fell into an area of "emerging" research and more was needed to fully

understand an association between the two.

"We think, underpinning all of it, air pollution causes inflammation in the body and oxidative stress and then that, in turn, can affect the glucose pathway in the body but it's an area that's not fully characterised yet," Dr Melody said.

Gestational diabetes can only be diagnosed in pregnancy and describes a condition where there is more glucose in the blood which can affect the development of the baby.

"If a woman is diagnosed with gestational diabetes in pregnancy they are more likely to be diagnosed later in life with type 2 diabetes as well as other cardio-metabolic conditions such as high blood pressure," Dr Melody said.

The researchers used the mother's home address at the time of the baby's birth alongside CSIRO air quality modelling to determine each woman's level of exposure to fine particle pollution.

They did further analysis looking at whether pregnant women were in trimester one, two or three.

"When we looked at women in the second trimester the association was very strong between exposure to smoke and gestational diabetes," Dr Melody said.

"We know in the second trimester that's when there is the greatest surge in placental hormones responsible for breaking down glucose. We think smoke and particles in the smoke are providing a further insult to that surge or to the normal developmental mechanism of pregnancy."

Researchers are still looking into underlying reasons for these findings but Dr Melody said the poor air quality could have been "a further insult" to someone already at risk of gestational diabetes.

Risk factors for the "very complex condition" included older age at the time of pregnancy, smoking during pregnancy, exposure to second-hand smoke and the mother's country of birth, she said.

Dr Melody said using the mother's address at the time of birth was a main limitation of the research as it did not account for women who may have moved around during their pregnancy.

News Business

But earlier research in the study has found "not that many people moved throughout the fire event", she said.

"Other limitations include that we don't know when women were diagnosed with gestational diabetes in their pregnancy and whether that diagnosis was before the fire or after," Dr Melody said.

This analysis was conducted by the Menzies Institute for Medical Research at the University of Tasmania as part of the broader Monash University-led Hazelwood Health Study.

It was funded by the Victorian Health Department.

For more information, visit hazelwoodhealthstudy.org.au.





Study finds students moved on from fire

THE majority of students participating in a section of the Hazelwood Health Study have recovered from the 2014 mine fire, recent analysis has found.

However, some students reported ongoing issues including dreaming about the event, feeling more restless and attempting to avoid thinking about the fire by distracting themselves with other activities.

The study assessed the psychological impacts of six weeks of exposure to smoke and ash from the Hazelwood mine fire on school-aged children.

Researchers analysed the results of face-to-face interviews held in 2017 with 46 students in grades 5, 7 and 9.

The students were primarily from Morwell schools and had completed a similar interview in 2015.

“While these findings are in line with what we found from the first round, a clear theme that emerged in this new analysis was that most students had



DR MATTHEW CARROLL

‘moved on’ from the Hazelwood event,” psychological impacts stream lead Dr Matthew Carroll said.

The analysis includes several suggestions from the students about how to respond to a future event, including the need for clearer communication with students on the potential impacts of the event and what they can

do to look after themselves and their families.

Dr Carroll said students highlighted the important role their family, friends and school personnel had in supporting them at the time.

The recent analysis was led by Dr Sonia Allen as part of the overall psychological stream of the Hazelwood Health Study.

Dr Carroll said the stream would now look at Naplan data as well as move forward with the adult component of psychological impacts and try to understand the determinates of distress.

“This will help response agencies to target groups within the community in future,” Dr Carroll said.

The Hazelwood Health Study is a collaboration between Monash University, Federation University, the University of Tasmania, the University of Adelaide and the CSIRO.

It is funded by the state government.