Hazelinks

HAZELINKS

Identified data linkage (Adult Survey participants)

Data extract for all ages for Hume, Gippsland, Eastern Metropolitan regions and a small part of the Southern Metropolitan region (Cardinia) from 1 Jan 2009 to most recent data available

- Victorian Cancer Registry
- Medicare and PBS data
- Hospital Data (VEMD/VAED)
- Ambulance data (VACIS/VACAR)
- Death data (NDI/NMD)

- Hospital Data (VEMD/VAED)
- Ambulance data (VACIS/VACAR)
- Victorian Cancer Registry
- Australian Cancer Database
- National Death Index

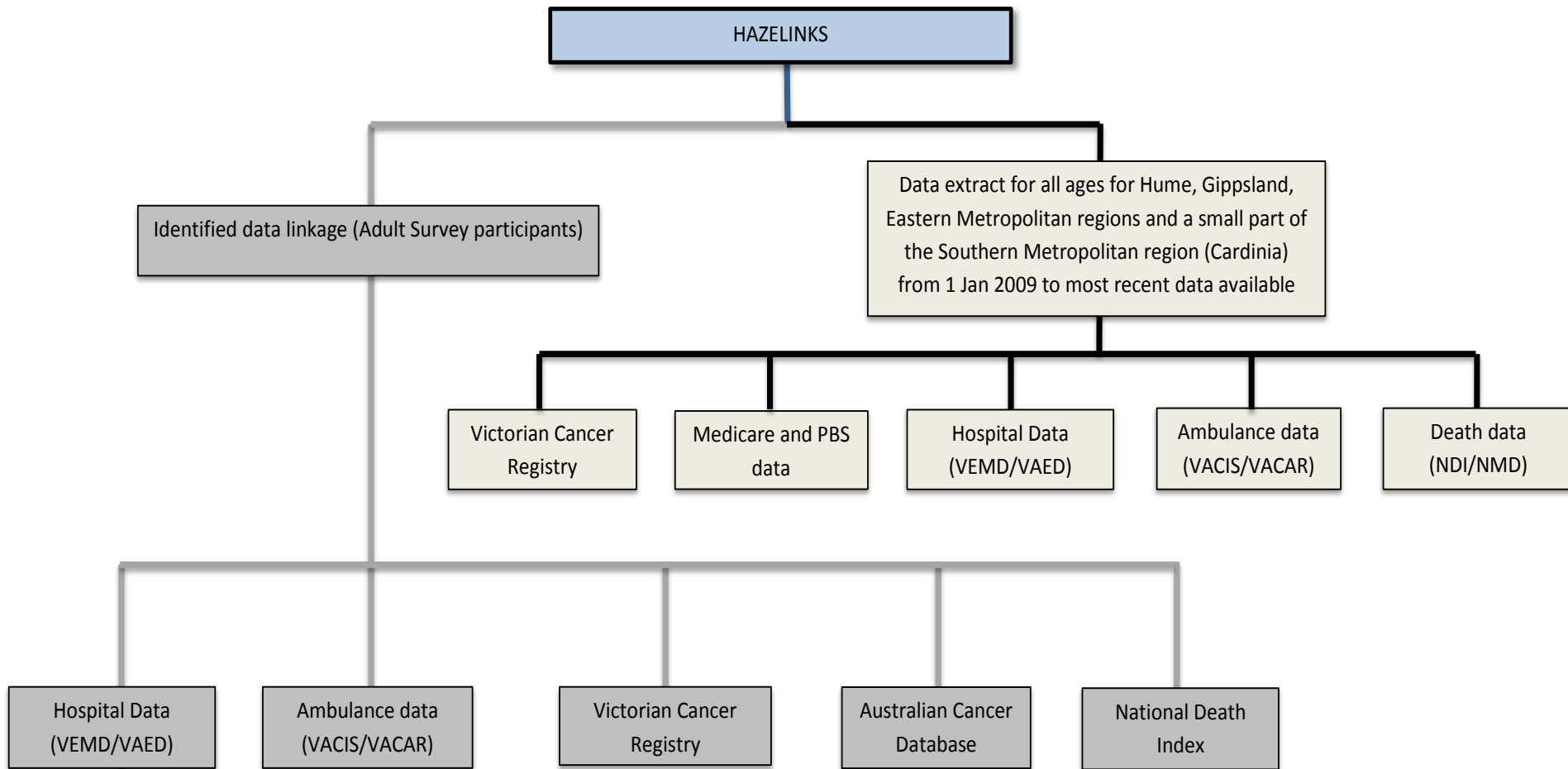**Medicine, Nursing and Health Sciences**

Coal mine fire smoke exposure associated with increased ambulance attendances for cardiac and respiratory conditions in the Latrobe Valley, Australia

Lahn Straney, Project Biostatistician

Study aim

To examine the impact of the coal mine fire smoke exposure on condition-specific ambulance attendance rates

Data

- **Ambulance data**

    - Data for all ambulance attendances in the Latrobe Valley (1/1/2013 to 31/12/2014) extracted from the Victorian Ambulance Clinical Information System (VACIS).
    - Restricted our analysis to those conditions with a plausible link to elevated levels of smoke.

- **Pollution data**

    - We used CSIRO modelled estimates of the spatial smoke density to determine the relative exposure across the region during the fire episode. Constructed as a 3km grid, each grid was assigned with a value between 0 and 1 indicating the relative exposure level of the exposure period. A value of 1 indicated the highest level of exposure, while a value of 0 indicated no smoke exposure.
    - We defined the exposure period as February 9th to March 25th

Figure 1. Model estimated relative smoke concentration from coal mine fire in February and March 2014
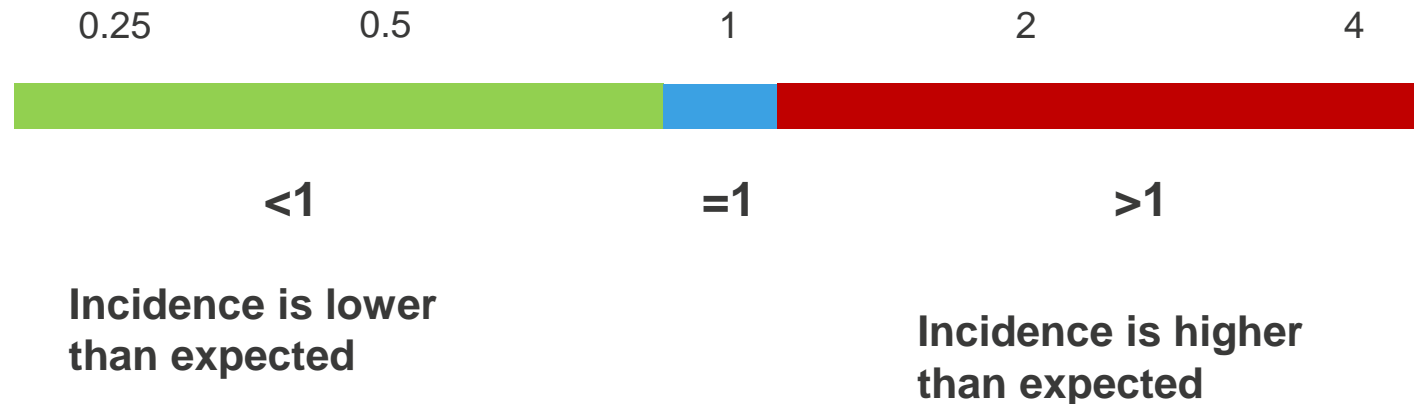
February 2014
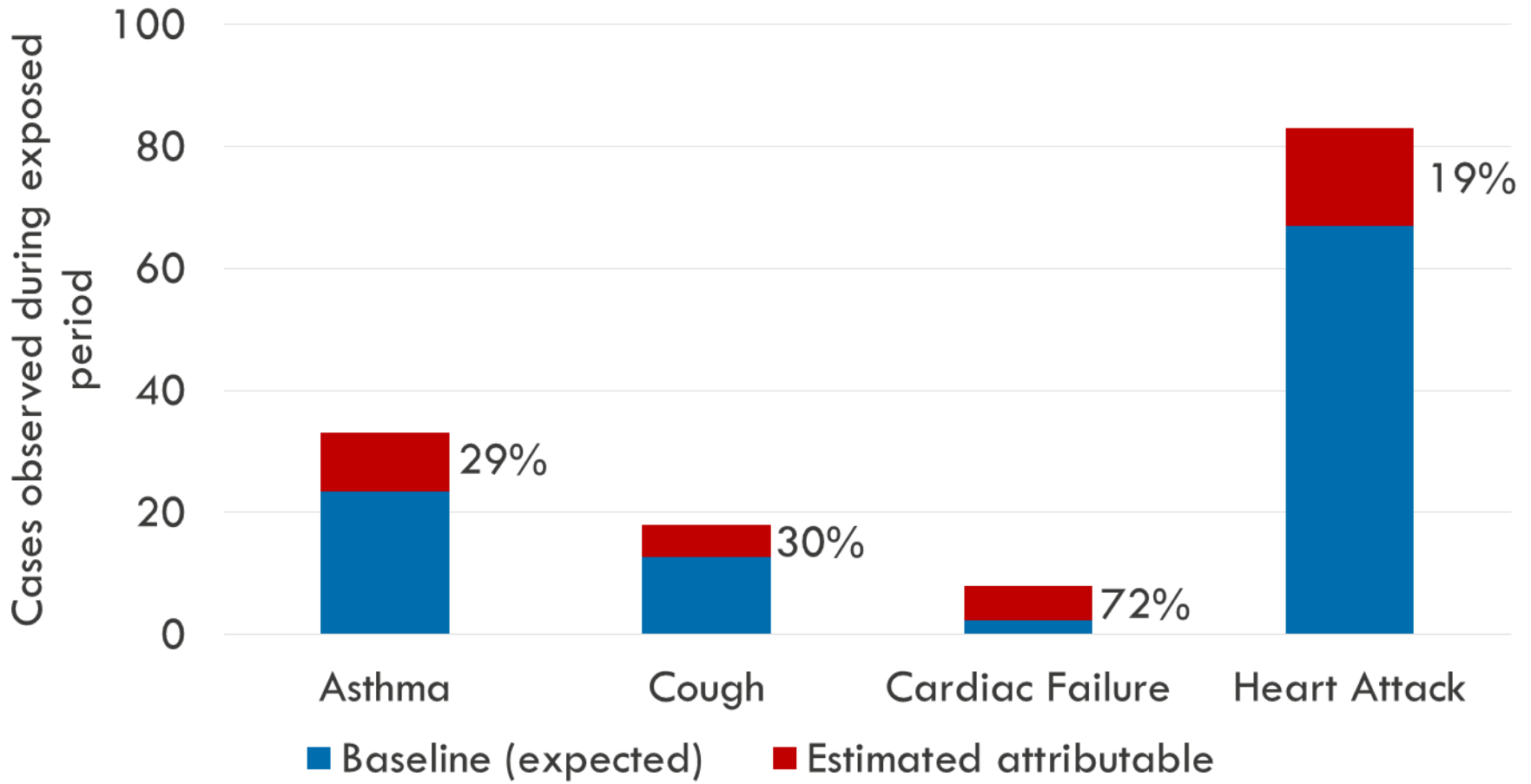
March 2014.

MONASH University
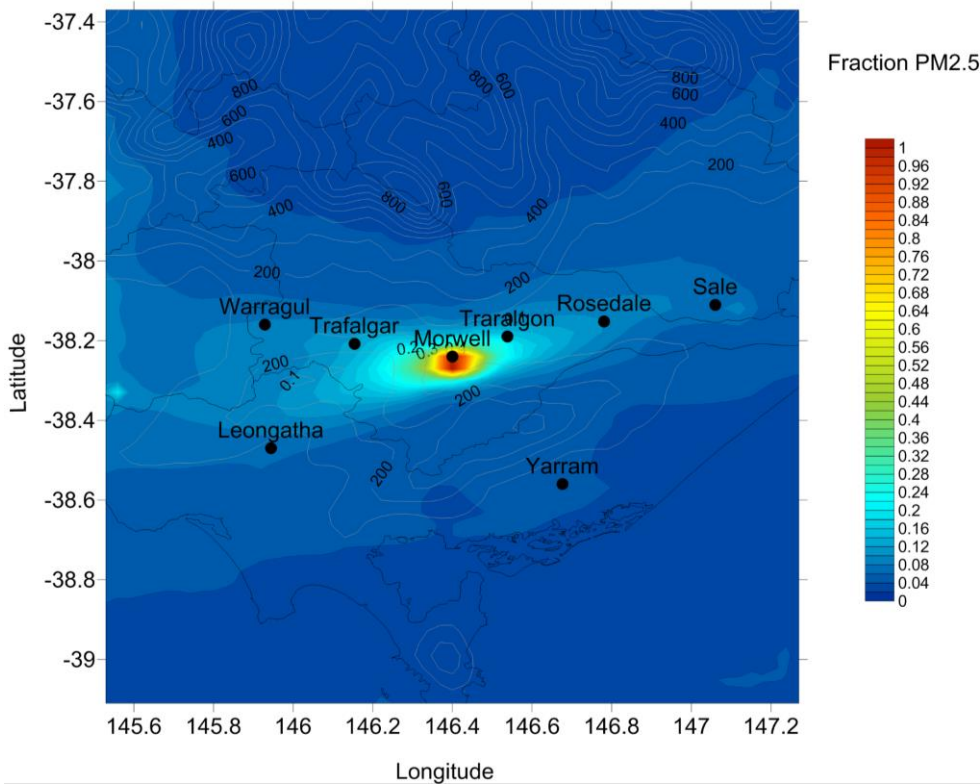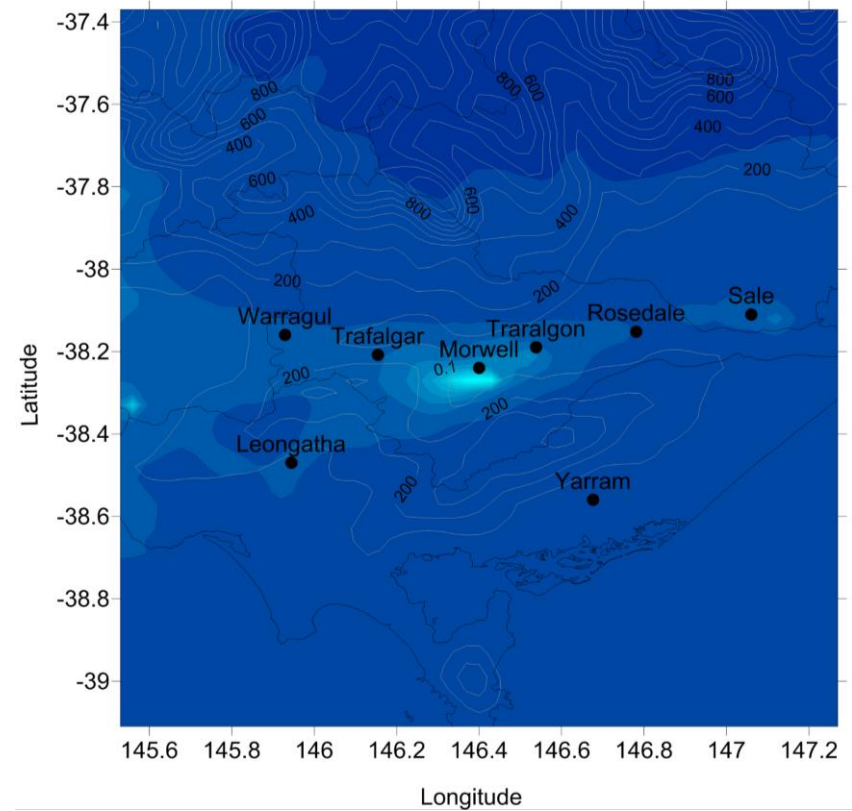
Calculating a Incidence Rate Ratio

$$\frac{\text{Incidence Rate Ratio during the Fire}}{\text{Normal Incidence Rate}} = \text{Incidence Rate Ratio}$$

0.25   0.5   1   2   4

<1   **=1**   **>1**

**Incidence is lower
than expected**

**Incidence is higher
than expected**

Figure 3. Estimated number of attendances attributable to coal mine smoke exposure

Interpretation

1. Findings show that ambulance call outs for cough, asthma, heart attack and heart failure, during February and March 2014, were elevated in the areas of the Latrobe Valley with higher levels of smoke exposure.

2. Ambulance attendance data from January 2011 to December 2014 was considered to ensure that seasonal and temperature changes were not an alternative explanation for the increase in ambulance attendance during the mine fire period

3. Difficult to disaggregate increases in incidence versus increases in ambulance use. Heightened health concerns during the mine fire period fire may mean that some people were more likely to call an ambulance when they might not have otherwise; however this is unlikely to explain all of the increase in ambulance attendance

Next Steps

1. Undertake the analysis using more refined estimates of exposure

2. Estimate the excess impact as it relates to level of PM2.5 exposure.

Data for a given SA2

	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
2013												
Days	31	31	28	31	30	31	30	31	31	30	31	30
Period		1			2			3			4	
Days at risk		90			92			92			91	
Population		P_1			P_2			P_3			P_4	
Exposure		0			0			0			0	
Cases		n_1			n_2			n_3			n_4	

	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
2014												
Days	0	31	28	31	30	31	30	31	31	25	0	0
Period	5		6	7	8			9			10	
Days at risk	31		20	25	67			92			25	
Population	P_5		P_6	P_7	P_8			P_9			P_{10}	
Exposure	0		$\bar{X}_j$	$\delta\bar{X}_j$	0			0			0	
Cases	n_5		n_6	n_7	n_8			n_9			n_{10}	