Stormy weather: a retrospective analysis of demand for emergency medical services during epidemic thunderstorm asthma

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Table S1: Characteristics of out-of-hospital cardiac arrest patients attended by an emergency ambulance between 6pm and midnight on Mondays

|	Thunderstorm asthma period (n=17)	Comparator period (n=15)	p-value	RR (95% CI)
Age (years), mean (SD)	48.2 (20.6)	61.3 (23.4)	0.1	-
Age (years), n (%)				
0-14	0	0	-	-
15-30	4 (23.5)	1 (7.1)	0.3	3.29 (0.41-26.2)
31-50	6 (35.3)	5 (35.7)	0.98	0.99 (0.38-2.56)
51-70	5 (29.4)	3 (21.4)	0.7	1.37 (0.40-4.76)
≥71	2 (11.8)	5 (35.7)	0.2	0.33 (0.08-1.44)
Male gender, n (%)	13 (76.5)	9 (60.0)	0.5	1.27 (0.78-2.08)
Pre-existing medical conditions, n (%)				
Asthma	8 (57.1)	3 (23.1)	0.1	2.48 (0.83-7.37)
Other respiratory	0	1 (7.7)	0.5	-
Current asthma medications, n (%)				
Anti-inflammatory	0	0	-	-
Bronchodilator	6 (54.6)	0	0.003	-
Both	0	1 (7.7)	0.5	-
Aetiology, n (%)				
Cardiac	6 (35.3)	9 (60.0)	0.2	0.59 (0.27-1.26)
Respiratory	9 (52.9)	0	0.001	-
Witnessed to arrest				
By EMS	3 (17.7)	3 (20.0)	1.0	0.88 (0.21-3.73)
By bystander	11 (64.7)	8 (53.3)	0.7	1.21 (0.67-2.19)
Bystander CPR, n (%)	9 (52.9)	5 (33.3)	0.3	1.59 (0.68-3.70)
Initial arrest rhythm				
VF/VT	4 (23.5)	6 (40.0)	0.5	0.59 (0.20-1.69)
PEA	5 (29.4)	3 (20.0)	0.7	1.47 (0.42-5.14)
Asystole	7 (41.2)	6 (40.0)	1.0	1.03 (0.44-2.39)
EMS attempted resuscitation, n (%)	13 (76.5)	10 (66.7)	0.7	1.15 (0.74-1.80)
Transported to hospital, n (%)	10 (58.8)	6 (40.0)	0.3	1.47 (0.70-3.07)
Discharged alive, n (%)	4 (25.0)	1 (7.7)	0.3	3.25 (0.41-25.6)

Thunderstorm asthma period included 6pm-11:59pm on 21/11/2016; comparator period included 6pm-11:59pm on the three previous Mondays. Proportions exclude missing data. Abbreviations: RR, risk ratio; CI, confidence interval; SD, standard deviation; EMS, emergency medical services; CPR, cardiopulmonary resuscitation; VF/VT, ventricular fibrillation/ventricular tachycardia; PEA, pulseless electrical activity.

Table S2: Characteristics of patients with paramedic-assessed acute respiratory distress attended by an emergency ambulance between 6pm and midnight on Mondays

	Thunderstorm asthma period (n=291)	Comparator period (n=43)	p-value	RR (95% CI)
Age (years), mean (SD)	42.1 (20.2)	59.7 (30.0)	<0.001	-
Age (years), n (%)				
0-14	27 (9.3)	5 (11.6)	0.6	0.80 (0.33-1.97)
15-30	50 (17.2)	5 (11.6)	0.4	1.48 (0.63-3.51)
31-50	130 (44.8)	4 (9.3)	<0.001	4.82 (1.88-12.4)
51-70	58 (20.0)	10 (23.3)	0.6	0.86 (0.48-1.55)
≥71	25 (8.6)	19 (44.2)	<0.001	0.20 (0.12-0.32)
Male gender, n (%)	149 (51.4)	21 (48.8)	0.8	1.05 (0.76-1.46)
Pre-existing medical conditions, n (%)				
Asthma	191 (65.6)	16 (37.2)	<0.001	1.76 (1.19-2.62)
Other respiratory	18 (6.2)	7 (16.3)	0.019	0.38 (0.17-0.86)
Current asthma medications, n (%)				
Anti-inflammatory	6 (2.1)	1 (2.3)	1.0	0.91 (0.11-7.34)
Bronchodilator	125 (43.9)	8 (18.6)	0.002	2.36 (1.24-4.47)
Both	54 (18.9)	11 (25.6)	0.3	0.74 (0.42-1.30)
Dispatch priority, n (%)				
Time critical	282 (96.9)	25 (58.1)	<0.001	1.67 (1.29-2.15)
Acute but not time critical	9 (3.1)	16 (37.2)	<0.001	0.08 (0.04-0.18)
Non-acute	0	2 (4.7)	0.016	-
Breathing problems identified in emergency call, n (%)	249 (85.6)	34 (79.1)	0.3	1.08 (0.92-1.27)
Transported to hospital, n (%)	236 (81.1)	38 (88.4)	0.2	0.92 (0.81-1.04)

Thunderstorm asthma period includes 6pm-11:59pm on 21/11/2016; comparator period includes 6pm-11:59pm on the three previous Mondays. Proportions exclude missing data. Abbreviations: RR, risk ratio; CI, confidence interval; SD, standard deviation; OHCA, out-of-hospital cardiac arrest.
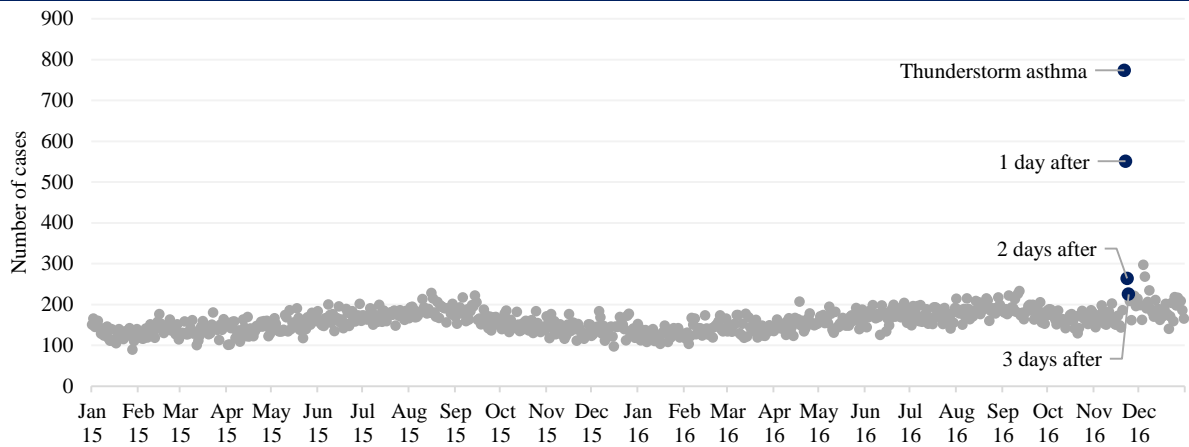
Figure S1: Immediate and cumulative effect of the thunderstorm asthma event on EMS caseload
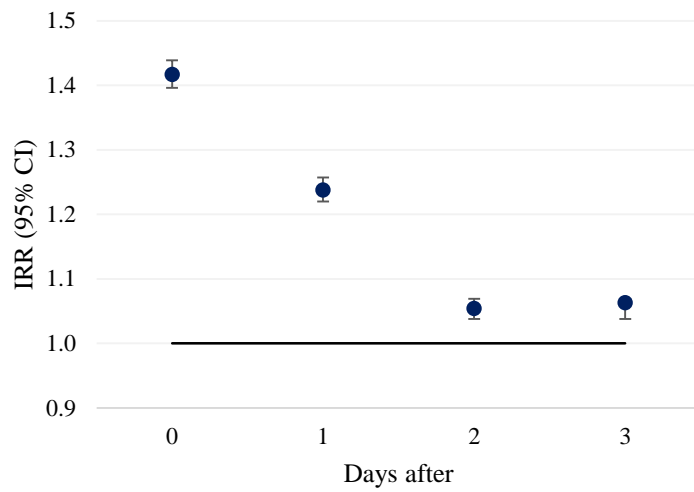
Abbreviations: IRR, incident rate ratio; CI, confidence interval.

Figure S2: Daily volume of breathing problem presentations

A: Breathing problems identified in the emergency phone call

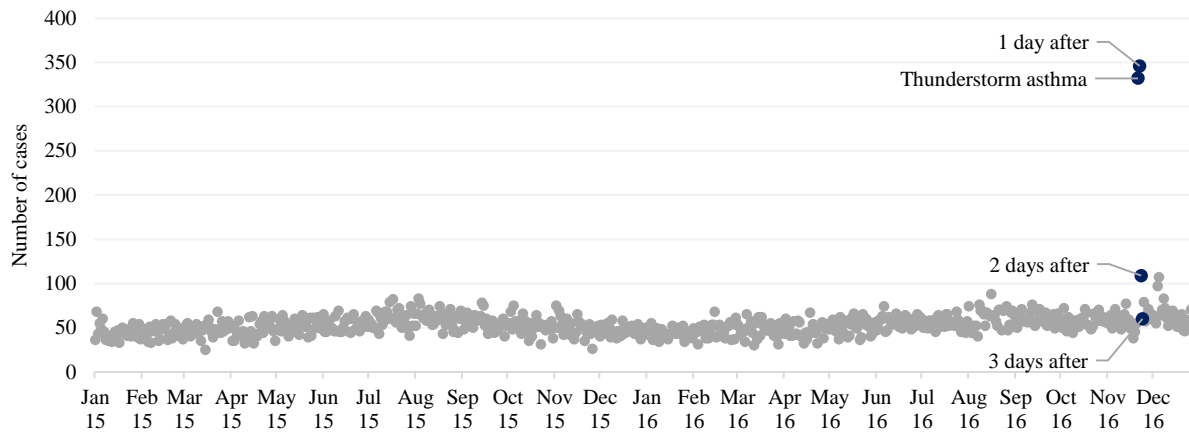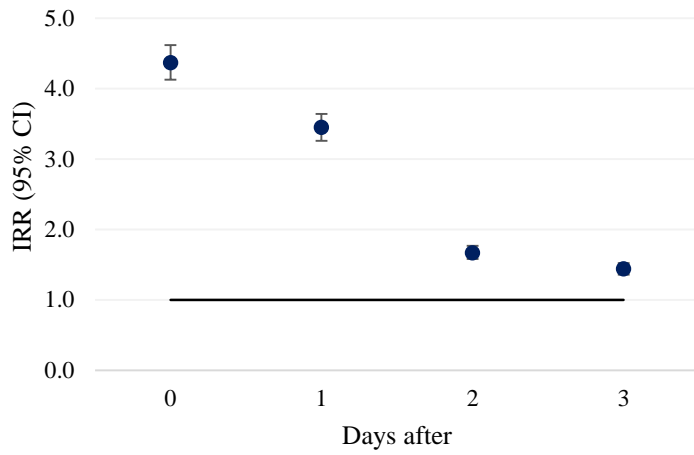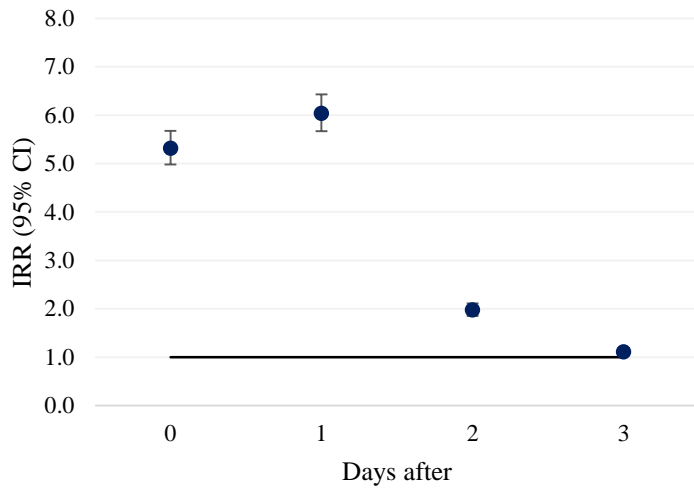B: Paramedic assessment of acute respiratory distress

Figure S3: Immediate and cumulative effect of the thunderstorm asthma event on breathing problem presentations

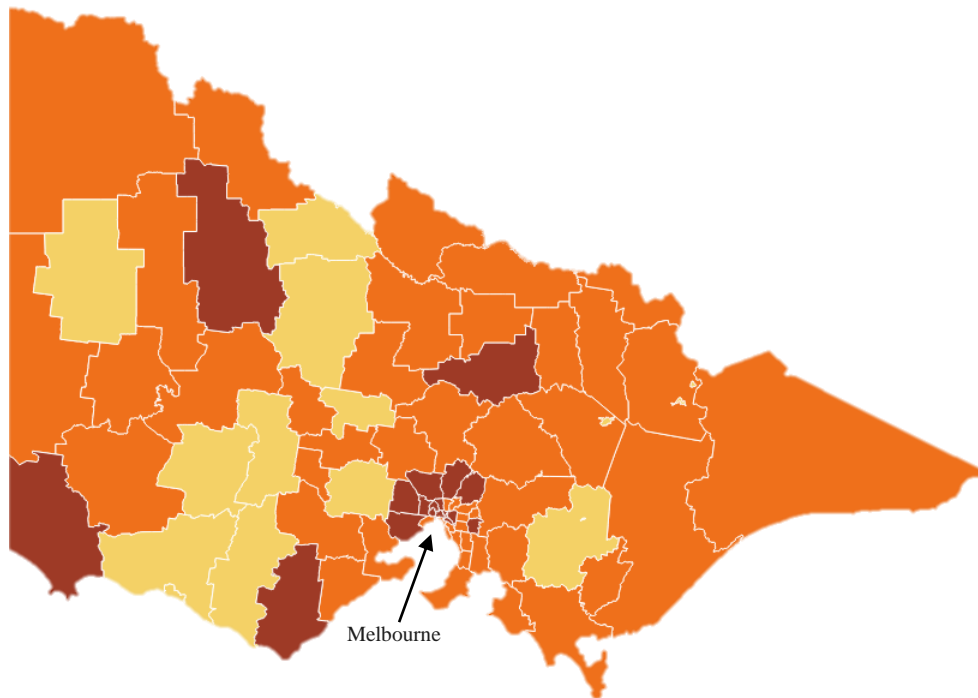**A: Breathing problems identified in the emergency phone call**

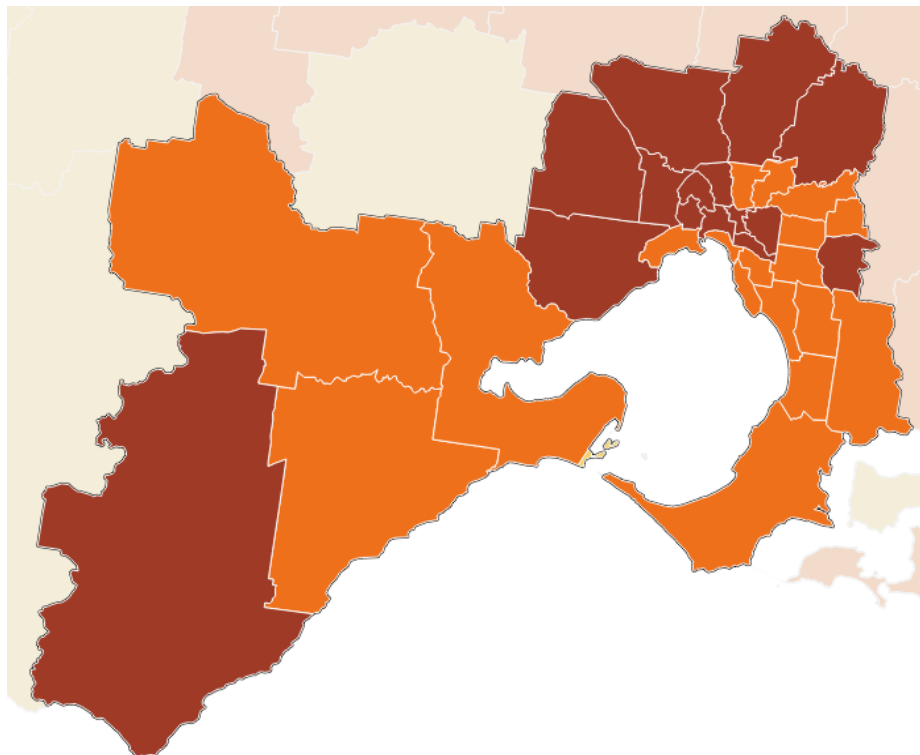**B: Paramedic assessment of acute respiratory distress**

Abbreviations: IRR, incident rate ratio; CI, confidence interval.

Figure S4: Immediate effect of thunderstorm asthma across Local Government Areas in Victoria

A: State of Victoria

B: Capital city of Melbourne (zoomed in from above)

Legend: Yellow, IRR≤0.99; Orange, IRR=1.00-1.69; Red, IRR≥1.70. Abbreviations: IRR, incident rate ratio. IRR categories are based on the average IRR+2 standard deviations across the state, excluding Thunderstorm Asthma (average IRR=0.99, 2 standard deviations=0.67). Areas outside Melbourne with IRR≥1.70 include small samples and should be interpreted with caution.