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Supporting Information

Supplementary methods and results

**This appendix was part of the submitted manuscript and has been peer reviewed.
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Appendix to: Shawon MSR, Yu J, Sedrakyan A, et al. Non-index hospital re-admissions after hospitalisation with acute myocardial infarction and geographic remoteness, New South Wales, 2005–2020: a retrospective cohort study. *Med J Aust* 2024; doi: 10.5694/mja2.52420.

Supplementary methods

Table 1. Medical condition and procedure codes for index hospital admissions with acute myocardial infarction

Variable	Description
Procedures	***Australian Classification of Health Interventions (ACHI) codes***[1]
Percutaneous coronary interventions (PCI)	38300-00, 38303-00, 38306-00, 38306-01, 38306-02, 38309-00, 38312-00, 38312-01, 38315-00, 38318-00, 38318-01, 90218-00, 90218-01, 90218-02, 90218-03
Coronary artery bypass grafting (CABG)	38497-00, 38497-01, 38497-02, 38497-03, 38497-04, 38497-05, 38497-06, 38497-07, 38500-00, 38500-01, 38500-02, 38500-03, 38500-04, 38500-05, 38503-00, 38503-01, 38503-02, 38503-03, 38503-04, 38503-05, 90201-00, 90201-01, 90201-02, 90201-03
Medical conditions	***International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) codes and definitions***[1,2]
Myocardial infarction	I21 as a principal diagnosis at index admission Classification of acute myocardial infarction type: • ST-elevated myocardial infarction – STEMI: I21.0–I21.3[1] • Non–ST-elevated myocardial infarction – NSTEMI I21.4[1] • Unspecified myocardial infarction: I21.9[1]
Diabetes	E10, E11, E12, E13, E14
Hypertension	I10, U82.3, I11, I12, I13, I15
Chronic obstructive pulmonary disease	J43, J44, U83.2
Congestive heart failure	I43, I50, I09.9, I11.0, I13.0, I13.2, I42.0, I42.5, I42.6, I42.7, I42.8, I42.9, P29.0, U82.2
Chronic kidney disease	N18, U87.1
Cardiomyopathy	I42
Coronary artery disease	I20, I21, I22, I24, I25, U82.1
Sleep apnoea	G47.3
Obesity	E66, U78.1
Stroke	G45, G46, H34.0, I60, I61, I62, I63, I64, I65, I66, I67, I68, I69
Peripheral vascular disease	I70, I71, I73.1, I73.8, I73.9, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8, Z95.9, U82.2
Atrial fibrillation	I48

Table 2. Hospital peer groups

Peer group	Description
Principal referral	Greater than 35,000 acute weighted separations AND offering highly specialised services (such as bone marrow and other specialised transplants, severe burn injury, major trauma)
Major hospitals	35,000 or less but greater than 10,000-17,000 acute weighted separations Also considers the availability of one or more specialist services requiring specific infrastructure (such as cardiac catheterisation, comprehensive cancer centre, in-centre dialysis and medical radiation imaging) OR average acute National Weighted Activity Unit per separation
District group	4,000-10,000 or less but greater than 2,000 acute separations
Community hospitals	2,000 or less acute separations. Also considers total separations and percentual surgery
Other peer groups	Paediatric specialist, Ungrouped acute, Psychiatric, Nursing home, Multi-purpose service, Sub-acute, Palliative care, Rehabilitation, Mothercraft, Other ungrouped, Dialysis services

Source: Adapted from reference 3.

References

1. Australian Institute of Health and Welfare. Better Cardiac Care measures for Aboriginal and Torres Strait Islander people: sixth national report 2021. 30 Nov 2021. https://www.aihw.gov.au/reports/indigenous-australians/better-cardiac-care-measures-2021/summary (viewed Aug 2024).

2. Independent Health and Aged Care Pricing AuthoritySupplementary codes for chronic conditions (ACS 0003). https://www.ihacpa.gov.au/sites/default/files/2022-01/ACS%200003%20Supplementary%20Codes%20for%20Chronic%20Conditions.pdf (viewed Sep 2023).

3. NSW Health. NSW Hospital Peer Groups 2016. https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/IB2016_013.pdf (viewed Aug 2024).

Supplementary results

Table 3. Selected characteristics of people with myocardial infarction (2005-2020), overall and by remoteness category

Characteristic	All areas	Major cities	Regional or remote areas
Acute myocardial infarction admissions	182330	123859 (67.9%)	58471 (32.1%)
Type of acute myocardial infarction			
ST-elevation myocardial infarction	54525 (29.9%)	37716 (30.5%)	16809 (28.7%)
Non-ST-elevation myocardial infarction	117578 (64.5%)	80732 (65.2%)	36846 (63.0%)
Non-specific myocardial infarction	10227 (5.6%)	5411 (4.4%)	4816 (8.2%)
Coronary revascularisation			
Percutaneous Coronary Intervention	48463 (26.6%)	37755 (30.5%)	10708 (18.3%)
Coronary Artery Bypass Graft	14029 (7.7%)	10026 (8.1%)	4003 (6.8%)
Emergency admission	128765 (70.6%)	87565 (70.7%)	41200 (70.5%)
Had inter-hospital transfer	68891 (37.8%)	42056 (34.0%)	26835 (45.9%)
Length of stay (days), median (IQR)	5 (3–9)	5 (3–9)	5 (2–9)
Patient age, years mean (SD)	70.3 (14.2)	70.0 (14.4)	71.1 (13.9)
Sex (women)	64600 (35.4%)	43132 (34.8%)	21468 (36.7%)
Index of Relative Socio-economic Disadvantage			
Q1 - most disadvantaged	48429 (26.6%)	27524 (22.2%)	20905 (35.8%)
Q2	38520 (21.1%)	19087 (15.4%)	19433 (33.2%)
Q3	36245 (19.9%)	23997 (19.4%)	12248 (20.9%)
Q4	28834 (15.8%)	23320 (18.8%)	5514 (9.4%)
Q5 - least disadvantaged	30273 (16.6%)	29905 (24.1%)	368 (0.6%)
Private insurance	54959 (30.1%)	40191 (32.4%)	14768 (25.3%)
Comorbidity profile			
Diabetes	52434 (28.8%)	36670 (29.6%)	15764 (27.0%)
Congestive heart failure	44348 (24.3%)	30208 (24.4%)	14140 (24.2%)
Cardiac arrhythmias	62656 (34.4%)	43271 (34.9%)	19385 (33.2%)
Pulmonary circulation disorders	6799 (3.7%)	4651 (3.8%)	2148 (3.7%)
Peripheral vascular disease	12117 (6.6%)	7711 (6.2%)	4406 (7.5%)
Renal failure	27360 (15.0%)	18994 (15.3%)	8366 (14.3%)
Liver disease	3474 (1.9%)	2469 (2.0%)	1005 (1.7%)
Metastatic cancer	2615 (1.4%)	1748 (1.4%)	867 (1.5%)
Solid tumour, no metastasis	7455 (4.1%)	4936 (4.0%)	2519 (4.3%)
Cardiogenic shock	5671 (3.1%)	4205 (3.4%)	1466 (2.5%)
Index hospital funding type			
Public	155160 (85.1%)	103034 (83.2%)	52126 (89.1%)
Private	27170 (14.9%)	20825 (16.8%)	6345 (10.9%)
Index hospital category			
Principal referral	88668 (48.6%)	76604 (61.8%)	12064 (20.6%)
Large public	41691 (22.9%)	18532 (15.0%)	23159 (39.6%)
Other public	24045 (13.2%)	7190 (5.8%)	16855 (28.8%)
Private	27170 (14.9%)	20825 (16.8%)	6345 (10.9%)
In-hospital mortality	14233 (7.8%)	9432 (7.6%)	4801 (8.2%)
30-day readmission	28309 (16.8%)	18673 (16.3%)	9636 (18.0%)

CI = confidence interval; SD = standard deviation.

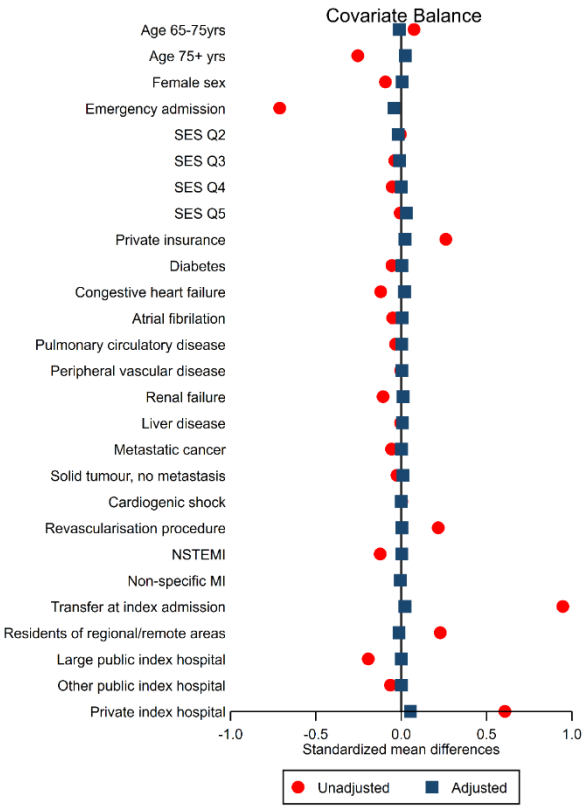
Table 4. Selected characteristics of people re-admitted within 30 days of index hospitalisation with acute myocardial infarction (2005-2020), overall and by remoteness category

	Major cities		Regional/remote areas	
Characteristic	**Index re-admission**	**Non-index re-admission**	**Index re-admission**	**Non-index re-admission**
30-day re-admissions	11519 (61.7%)	7154 (38.3%)	4804 (49.9%)	4832 (50.1%)
Characteristics of index acute myocardial infarction stay				
Type of **acute myocardial infarction**				
ST-elevation-myocardial infarction	2766 (24.0%)	1999 (27.9%)	999 (20.8%)	1454 (30.1%)
Non-ST-elevation myocardial infarction	8490 (73.7%)	4930 (68.9%)	3384 (70.4%)	3110 (64.4%)
Non-specific myocardial infarction	263 (2.3%)	225 (3.1%)	421 (8.8%)	268 (5.5%)
Coronary revascularisation				
Percutaneous Coronary Intervention	2806 (24.4%)	1872 (26.2%)	453 (9.4%)	972 (20.1%)
Coronary Artery Bypass Graft	608 (5.3%)	790 (11.0%)	121 (2.5%)	480 (9.9%)
Emergency admission	10147 (88.1%)	3735 (52.2%)	4013 (83.5%)	3048 (63.1%)
Had inter-hospital transfer	1840 (16.0%)	4032 (56.4%)	1100 (22.9%)	3109 (64.3%)
Length of stay (days), median (IQR)	5 (3–9)	6 (3–14)	5 (3–9)	5 (3–12)
Age (years), mean (SD)	73.5 (14.1)	71.1 (14.1)	75.7 (13.0)	68.9 (13.6)
Sex (women)	4586 (39.8%)	2638 (36.9%)	2047 (42.6%)	1694 (35.1%)
Index of Relative Socio-economic Disadvantage				
Q1 - most disadvantaged	2663 (23.1%)	1914 (26.8%)	1833 (38.2%)	1852 (38.3%)
Q2	1938 (16.8%)	1031 (14.4%)	1630 (33.9%)	1567 (32.4%)
Q3	2504 (21.7%)	1327 (18.5%)	920 (19.2%)	1010 (20.9%)
Q4	2134 (18.5%)	1272 (17.8%)	408 (8.5%)	372 (7.7%)
Q5 - least disadvantaged	2275 (19.7%)	1609 (22.5%)	13 (0.3%)	31 (0.6%)
Private insurance	2309 (20.0%)	2514 (35.1%)	877 (18.3%)	1161 (24.0%)
Other medical conditions				
Diabetes	4183 (36.3%)	2464 (34.4%)	1557 (32.4%)	1452 (30.0%)
Congestive heart failure	4059 (35.2%)	2273 (31.8%)	1643 (34.2%)	1235 (25.6%)
Cardiac arrhythmias	4845 (42.1%)	2888 (40.4%)	1818 (37.8%)	1711 (35.4%)
Pulmonary circulation disorders	649 (5.6%)	364 (5.1%)	271 (5.6%)	216 (4.5%)
Peripheral vascular disease	944 (8.2%)	621 (8.7%)	484 (10.1%)	417 (8.6%)
Renal failure	2795 (24.3%)	1484 (20.7%)	997 (20.8%)	774 (16.0%)
Liver disease	290 (2.5%)	173 (2.4%)	95 (2.0%)	103 (2.1%)
Metastatic cancer	276 (2.4%)	118 (1.6%)	116 (2.4%)	76 (1.6%)
Solid tumour, no metastasis	617 (5.4%)	356 (5.0%)	287 (6.0%)	241 (5.0%)
Cardiogenic shock	315 (2.7%)	201 (2.8%)	71 (1.5%)	88 (1.8%)
Discharging hospital funding type				
Public	11083 (96.2%)	5234 (73.2%)	4758 (99.0%)	4092 (84.7%)
Private	436 (3.8%)	1920 (26.8%)	46 (1.0%)	740 (15.3%)
Discharging hospital category				
Principal referral	8001 (69.5%)	3543 (49.5%)	200 (4.2%)	1452 (30.0%)
Large public	2399 (20.8%)	927 (13.0%)	2364 (49.2%)	1577 (32.6%)
Other public	611 (5.3%)	728 (10.2%)	2192 (45.6%)	1056 (21.9%)
Private	436 (3.8%)	1920 (26.8%)	46 (1.0%)	740 (15.3%)
30-day re-admission parameters				
Length of stay (days), median (IQR)	4 (1–8)	4 (1–8)	4 (1–8)	3 (1–7)
30-day mortality	1304 (11.3%)	659 (9.2%)	670 (13.9%)	368 (7.6%)
1-year mortality	3457 (30.0%)	1670 (23.3%)	1601 (33.3%)	974 (20.2%)

IQR = interquartile range; SD = standard deviation.

The discharging hospital during index hospitalisation was considered as the index hospital.

Figure 1. Love plot of standardised differences in covariates between patients with and without care fragmentation before and after propensity score matching in all people with myocardial infarction

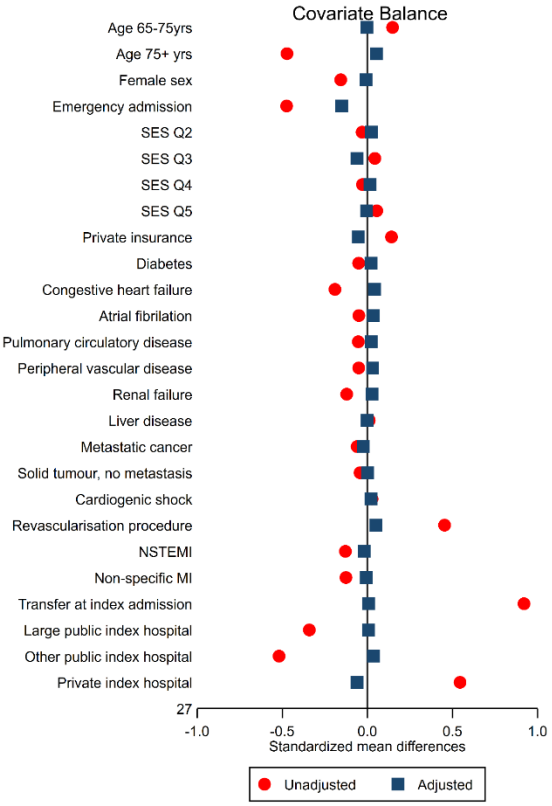


MI = myocardial infarction; NSTEMI = non-ST-elevated myocardial infarction; SES = socio-economic status (Index of Relative Socio-economic Disadvantage)

Figure 2. Love plot of standardised differences in covariates between patients with and without care fragmentation before and after propensity score matching in people with myocardial infarction in major cities

MI = myocardial infarction; NSTEMI = non-ST-elevated myocardial infarction; SES = socio-economic status (Index of Relative Socio-economic Disadvantage)

Figure 3. Love plot of standardised differences in covariates between patients with and without care fragmentation before and after propensity score matching in people with myocardial infarction in regional/remote areas



MI = myocardial infarction; NSTEMI = non-ST-elevated myocardial infarction; SES = socio-economic status (Index of Relative Socio-economic Disadvantage)

Table 5. Non-index hospital re-admissions within 30 days of hospitalisation with acute myocardial infarction, overall: multivariate analyses*

Variables	Adjusted odds ratio (95% CI)
Age at myocardial infarction admission	
<65 years	1
65-74 years	0.86 (0.81-0.92)
75+ years	0.59 (0.55-0.62)
Sex (women)	0.92 (0.87-0.96)
Socio-economic status (IRSD)	
Q1 - most disadvantaged	1.16 (1.07-1.25)
Q2	1.00 (0.92-1.09)
Q3	0.94 (0.86-1.02)
Q4	0.90 (0.82-0.98)
Q5 - least disadvantaged	1
Residence	
Major cities	1
Regional/remote areas	1.61 (1.53-1.70)
Private insurance	1.84 (1.74-1.95)
Other conditions	
Diabetes	0.92 (0.88-0.97)
Congestive heart failure	0.90 (0.85-0.96)
Cardiac arrhythmias	1.03 (0.98-1.09)
Pulmonary circulation disorders	0.98 (0.88-1.09)
Peripheral vascular disease	1.12 (1.03-1.22)
Renal failure	0.90 (0.84-0.96)
Liver disease	0.89 (0.76-1.04)
Metastatic cancer	0.63 (0.51-0.77)
Solid tumour, no metastasis	1.12 (0.98-1.27)
Cardiogenic shock	1.04 (0.88-1.21)
Myocardial infarction type	
STEMI	1
NSTEMI	0.84 (0.79-0.89)
Non-specific MI	0.89 (0.78-1.01)
Emergency admission	2.29 (2.21-2.37)
Revascularisation procedure	1.40 (1.33-1.48)
Had transfer	6.83 (6.46-7.21)
Hospital type	
Public	1
Private	10.2 (9.21-11.3)

* Adjusted for age, sex, and other medical conditions.