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Supporting Information

Supplementary methods and results

This appendix was part of the submitted manuscript and has been peer reviewed. It is posted as supplied by the authors.

Appendix to: Spinks J, Mihala G, Jennings W, et al. Potentially preventable medication-related hospitalisations with cardiovascular disease of Aboriginal and Torres Strait Islander people, Queensland, 2013–2017: a data linkage cohort study. *Med J Aust* 2025; doi: 10.5694/mja2.52600.

Supplementary methods

Table 1. Assumptions applied to measure the clinical indicators

Indicator	PBS	MBS	Other notes
1	PBS supply of agents known to exacerbate congestive heart failure within 1–50 days before hospitalisation		
2	No PBS supply of angiotensin-converting enzyme inhibitors, angiotensin receptor blockers or angiotensin receptor-neprilysin inhibitors within 1–50 days before hospitalisation		
3	No PBS supply of anti-platelet(s) or beta-blocker (reduced left-ventricular systolic function only) or HMG-CoA reductase inhibitor within 1–90 days before hospitalisation		
4	No PBS supply of a P2Y12 inhibitor at least once within 1–60 days before hospitalisation		Aspirin is often purchased non-PBS. It is (conservatively) assumed that all individuals have been using aspirin
5	No PBS supply of anticoagulant at least once within 1–90 days before hospitalisation		Likely underestimated as CHA_2DS_2-VASc score was calculated using only previous admission history (not full history) and limited demographics
6	No PBS supply of lipid lowering therapy or antihypertensive therapy for 1–50 days before hospitalisation		
7	No PBS supply of any of antiplatelet, antihypertensive, anticoagulant, lipid lowering therapy for 1–90 days before hospitalisation	Assumes no MBS service with general practitioner for previous 24 months, including 715 health check for Aboriginal and Torres Strait Islander people, none of items 701/703/707 (brief-prolonged health assessments) or 3/4/23/36/44 (level A–D consults)	Likely overestimated due to truncated data (MBS data from 1 July 2012 to 31 Dec 2017; admissions from 1 Jan 2013 to 31 Dec 2017). Also likely overestimated as aspirin is often purchased non-PBS and may not be recorded
8	No PBS supply of beta-blocker, calcium channel blocker or nitrates for 1–90 days before hospitalisation		Ischaemic coronary event restricted to primary diagnosis definition
9	No PBS supply of antiplatelet or lipid lowering therapy for 1–100 days before hospitalisation		

HMG-CoA = 3-hydroxy-3-methylglutaryl-coenzyme A reductase; CHA_2DS_2-VASc = a set of clinical prediction rules for estimating the risk of stroke in people with atrial fibrillation; PBS = Pharmaceutical Benefits Scheme; MBS = Medicare Benefits Schedule.

Supplementary results

Table 2. Descriptive statistics of cardiovascular potentially preventable medication-related hospitalisations (total 11,469), by indicator

Indicator	1	2	3	4	5	6	7	8	9
Events	4,350	4,350	1,089	371	400	815	2,192	2,586	5,417
Year									
2013†	511 (12%)	511 (12%)	138 (13%)	42 (11%)	21 (5%)	109 (13%)	412 (19%)	387 (15%)	711 (13%)
2014	795 (18%)	795 (18%)	214 (20%)	72 (19%)	65 (16%)	174 (21%)	461 (21%)	515 (20%)	1,011 (19%)
2015	928 (21%)	928 (21%)	220 (20%)	75 (20%)	78 (19%)	188 (23%)	382 (17%)	540 (21%)	1,117 (21%)
2016	1,020 (23%)	1,020 (23%)	235 (22%)	67 (18%)	134 (34%)	160 (20%)	470 (21%)	516 (20%)	1,247 (23%)
2017	1,096 (25%)	1,096 (25%)	282 (26%)	115 (31%)	102 (26%)	184 (23%)	467 (21%)	628 (24%)	1,331 (25%)
Age category (years)									
18 to 29	106 (2%)	106 (2%)	8 (1%)	*	*	*	50 (2%)	14 (1%)	43 (1%)
30 to 39	245 (6%)	245 (6%)	45 (4%)	24 (6%)	12 (3%)	*	136 (6%)	113 (5%)	226 (5%)
40 to 49	799 (18%)	799 (18%)	257 (24%)	111 (30%)	20 (5%)	*	328 (15%)	611 (26%)	1,050 (21%)
50 to 59	1,063 (24%)	1,063 (24%)	318 (29%)	112 (30%)	68 (17%)	*	515 (23%)	727 (31%)	1,411 (29%)
60 to 69	991 (23%)	991 (23%)	260 (24%)	81 (22%)	68 (17%)	307 (38%)	499 (23%)	709 (30%)	1,516 (31%)
70 or older	1,146 (26%)	1,146 (26%)	201 (18%)	38 (10%)	231 (58%)	508 (62%)	664 (30%)	170 (7%)	664 (14%)
Sex									
Male/other	2,030 (47%)	2,030 (47%)	639 (59%)	222 (60%)	180 (45%)	370 (45%)	1,071 (49%)	1,532 (59%)	3,159 (58%)
Female	2,320 (53%)	2,320 (53%)	450 (41%)	149 (40%)	220 (55%)	445 (55%)	1,121 (51%)	1,054 (41%)	2,258 (42%)
ARIA+ accessibility classification									
Highly	995 (23%)	995 (23%)	201 (19%)	68 (18%)	120 (31%)	212 (28%)	625 (30%)	663 (26%)	1,503 (28%)
Accessible	565 (13%)	565 (13%)	183 (17%)	66 (18%)	64 (16%)	184 (24%)	415 (20%)	389 (15%)	827 (15%)
Moderately	1,685 (39%)	1,685 (39%)	399 (37%)	144 (39%)	105 (27%)	193 (25%)	575 (27%)	836 (33%)	1,775 (33%)
Remote	498 (12%)	498 (12%)	135 (12%)	42 (11%)	48 (12%)	69 (9%)	219 (10%)	318 (13%)	630 (12%)
Very remote	555 (13%)	555 (13%)	167 (15%)	51 (14%)	56 (14%)	102 (13%)	282 (13%)	331 (13%)	621 (12%)

ARIA+ = Accessibility/Remoteness Index of Australia Plus (https://able.adelaide.edu.au/hugo-centre/services/aria).

* Consistent with Australian Institute of Health and Welfare requirements, cells with counts of six or less were suppressed for reasons of privacy.

† The number of events was lower in 2013 for all indicators except number 7 because of the effect of applying diagnosis history (for example, “prior hospitalisation for congestive heart failure”); first hospitalisations were conservatively omitted, resulting in lower counts for 2013.

Table 3. Age group- and sex-adjusted cardiovascular potentially preventable medication-related hospitalisation rates standardised for Queensland Aboriginal and Torres Strait Islander population, 2013–2017

	Per hospitalisation				
	2013	**2014**	**2015**	**2016**	**2017**
Indicator 1	7.6%	8.4%	7.0%	7.3%	12.7%
Indicator 2	21.4%	43.6%	29.1%	32.3%	28.9%
Indicator 3	33.4%	42.2%	75.4%	41.5%	61.3%
Indicator 4	50.5%	23.0%	43.4%	24.9%	32.6%
Indicator 5	12.0%	21.4%	10.2%	16.5%	18.3%
Indicator 6	10.7%	10.9%	10.9%	9.1%	9.5%
Indicator 7	58.8%	63.7%	55.7%	62.6%	62.5%
Indicator 8	41.9%	43.4%	47.1%	31.1%	50.1%
Indicator 9	39.8%	64.5%	79.6%	49.1%	64.8%

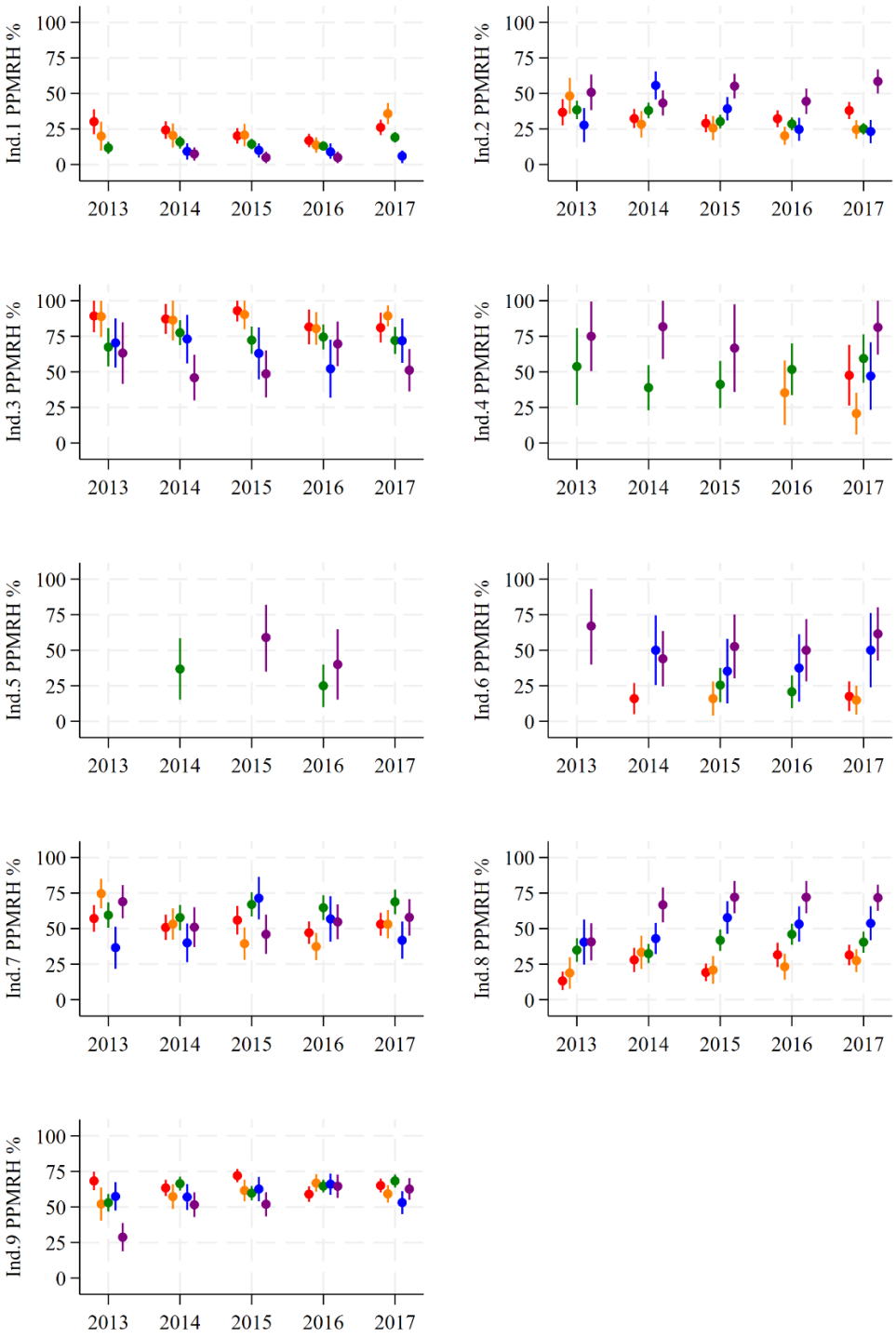
For example, for Indicator 3 in 2016, 41.5% of eligible hospitalisations were potentially preventable medication-related hospitalisations (denominator: all eligible hospitalisations); all percentages standardised for age group and sex.

Table 4. Median costs (with interquartile range) of potentially preventable medication-related hospitalisations, by indicator*

Year	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 5	Indicator 6	Indicator 7	Indicator 8	Indicator 9
2013	$6,052 (9,170)	$4,730 (6,909)	$6,152 (13,501)	$9,997 (8,629)	$1,872 (0)	$5,235 (20,173)	$3,673 (10,864)	$4,013 (7,650)	$3,129 (7,783)
2014	$4,482 (10,333)	$4,470 (9,162)	$5,295 (9,840)	$3,707 (6,617)	$1,337 (1,096)	$2,281 (6,200)	$2,599 (6,549)	$3,069 (5,424)	$3,174 (6,560)
2015	$6,705 (8,855)	$4,940 (7,640)	$6,807 (7,083)	$13,894 (7,763)	$1,488 (530)	$2,717 (14,383)	$3,700 (8,977)	$3,125 (7,874)	$3,742 (8,387)
2016	$7,361 (9,783)	$5,072 (8,812)	$7,556 (10,771)	$12,099 (20,026)	$1,458 (818)	$6,028 (9,609)	$4,798 (11,278)	$3,012 (8,175)	$3,767 (8,624)
2017	$6,083 (10,302)	$6,884 (10,302)	$7,299 (10,302)	$11,434 (12,720)	$1,410 (1,448)	$4,336 (7,392)	$4,676 (12,599)	$4,336 (9,363)	$3,889 (9,401)

* Base year of 2017 was chosen for costs, which were adjusted for inflation relative to the base year (www.rba.gov.au/calculator).

Figure 1. Proportions (with 95% confidence intervals) of potentially preventable medication-related cardiovascular hospitalisations (PPMRHs), by indicator, year, and remoteness category



Red: highly accessible; orange: accessible; green: moderately accessible; blue: remote; purple: very remote. Denominator: meeting admission criteria. Results suppressed when fewer than 6 cases were reported (no markers and confidence intervals shown).