



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: Saxby K, Zhang Y. Bulk-billing rates and out-of-pocket costs for general practitioner services in Australia, 2022, by SA3 region: analysis of Medicare claims data. *Med J Aust* 2025; doi: 10.5694/mja2.52562.

Supplementary methods

Table 1. Age group and sex adjustment

	(1)	(2)
	General practitioner services bulk-billed	Out-of-pocket cost per non-bulk-billed general practitioner service
	β (95% CI)	β (95% CI)
Age group (v 0-15 years)	0	0
16-29 years	-0.13 (-0.14 to -0.11)	5.05 (4.06 to 6.04)
30-64 years	-0.15 (-0.16 to -0.13)	7.26 (6.27 to 8.24)
65 years plus	-0.03 (-0.04 to -0.01)	2.10 (1.01 to 3.20)
Sex (female v male)	-0.01 (-0.02 to 0.00)	0.12 (-0.55 to 0.79)
Constant	0.92 (0.90 to 0.93)	38.4 (37.6 to 39.3)

CI = confidence interval.

Regressions weighted by number of services provided by sex, age group per Statistical Area 3 region.

Supplementary results

Table 2. Full results by SA3: Age- and sex-adjusted bulk-billed general practitioner services and out-of-pocket cost per non-bulk-billed general practitioner service

SA3 code (2021)	SA3 Name 2021	General practitioner services bulk-billed: mean proportion	Mean out-of-pocket cost for non-bulk-billed general practitioner service
80106	South Canberra	0.46	59.94
80105	North Canberra	0.47	54.75
80109	Woden Valley	0.51	54.99
80110	Molonglo	0.51	54.67
80108	Weston Creek	0.51	54.67
60105	Hobart Inner	0.53	52.64
80111	Uriarra - Namadgi	0.53	54.59
80103	Canberra East	0.54	56.89
40107	Unley	0.57	43.25
12104	North Sydney - Mosman	0.57	52.12
60102	Hobart - North East	0.57	50.43
20804	Stonnington - East	0.57	57.76
12201	Manly	0.58	48.48
30503	Brisbane Inner - North	0.59	51.21
11801	Eastern Suburbs - North	0.6	60.77
10102	Queanbeyan	0.6	52.08
80104	Gungahlin	0.6	50.79
20801	Bayside	0.6	54.35
50301	Cottesloe - Claremont	0.61	53.49
20606	Stonnington - West	0.61	58.92
30301	Carindale	0.62	44.87
10901	Albury	0.63	46.37
50302	Perth City	0.63	51.96
11103	Newcastle	0.64	46.72
30504	Brisbane Inner - West	0.65	48.84
70101	Darwin City	0.65	47.65
31201	Bowen Basin - North	0.66	45.62
60201	Launceston	0.66	45.86
31605	Noosa	0.66	46.19
40501	Barossa	0.67	38.60
30404	The Gap - Enoggera	0.67	43.00
20701	Boroondara	0.67	52.02
40301	Holdfast Bay	0.67	42.85
30103	Wynnum - Manly	0.67	40.66
60104	Hobart - South and West	0.67	43.61
50704	Melville	0.68	48.54
51101	Esperance	0.68	47.67
51003	West Pilbara	0.68	53.23
30805	Gladstone	0.68	52.20
12202	Pittwater	0.68	50.14
30502	Brisbane Inner - East	0.68	44.90
20602	Darebin - South	0.69	49.67
11101	Lake Macquarie - East	0.69	42.37
20402	Wangaratta - Benalla	0.69	43.83
12002	Leichhardt	0.69	50.97
10602	Maitland	0.69	36.91
31202	Mackay	0.69	50.13
60106	Sorell - Dodges Ferry	0.69	46.65
40201	Gawler - Two Wells	0.7	33.87

SA3 code (2021)	SA3 Name 2021	General practitioner services bulk-billed: mean proportion	Mean out-of-pocket cost for non-bulk-billed general practitioner service
30403	Sherwood - Indooroopilly	0.7	48.78
30202	Chermside	0.7	48.43
30801	Central Highlands (Qld)	0.7	52.09
40102	Adelaide Hills	0.70	38.48
20604	Melbourne City	0.70	56.00
30501	Brisbane Inner	0.70	56.81
30605	Tablelands (East) - Kuranda	0.70	44.59
12103	Ku-ring-gai	0.71	51.61
50607	South Perth	0.71	47.40
50702	Fremantle	0.71	52.66
80107	Tuggeranong	0.71	49.34
20605	Port Phillip	0.71	57.30
51104	Mid West	0.71	45.65
40101	Adelaide City	0.71	51.14
20403	Wodonga - Alpine	0.71	41.87
80101	Belconnen	0.72	51.14
31602	Caloundra	0.73	45.91
30701	Darling Downs (West) - Maranoa	0.73	41.85
60302	Huon - Bruny Island	0.73	34.99
21603	Shepparton	0.73	43.98
30204	Sandgate	0.73	40.70
50501	Joondalup	0.73	50.67
21704	Warrnambool	0.73	44.23
20303	Surf Coast - Bellarine Peninsula	0.73	41.11
31601	Buderim	0.73	45.33
40103	Burnside	0.74	45.99
11102	Lake Macquarie - West	0.74	37.55
51002	East Pilbara	0.74	61.09
10104	South Coast	0.74	41.28
21402	Mornington Peninsula	0.74	47.70
20201	Bendigo	0.74	39.65
40303	Mitcham	0.74	46.84
21502	Mildura	0.75	40.13
30101	Capalaba	0.75	43.73
21103	Maroondah	0.75	37.84
11004	Tamworth - Gunnedah	0.75	47.60
20901	Banyule	0.75	44.25
50502	Stirling	0.76	44.25
40702	Limestone Coast	0.76	45.90
20502	Gippsland - East	0.76	42.88
31203	Whitsunday	0.76	42.25
21602	Moirra	0.76	36.54
30201	Bald Hills - Everton Park	0.76	42.93
10401	Clarence Valley	0.76	37.41
40504	Yorke Peninsula	0.76	39.65
21002	Macedon Ranges	0.77	36.74
20302	Geelong	0.77	44.23
11201	Richmond Valley - Coastal	0.77	48.55
30703	Granite Belt	0.77	36.36
11303	Wagga Wagga	0.77	47.23
40401	Charles Sturt	0.77	35.46
20607	Yarra	0.77	52.94
50901	Albany	0.77	51.15
21601	Campaspe	0.77	32.23

SA3 code (2021)	SA3 Name 2021	General practitioner services bulk-billed: mean proportion	Mean out-of-pocket cost for non-bulk-billed general practitioner service
70201	Alice Springs	0.77	50.48
30803	Rockhampton	0.78	49.64
10201	Gosford	0.78	39.61
40104	Campbelltown (SA)	0.78	37.54
11202	Richmond Valley - Hinterland	0.78	42.55
70102	Darwin Suburbs	0.79	47.96
30203	Nundah	0.79	40.61
11402	Southern Highlands	0.79	44.68
20903	Nillumbik - Kinglake	0.79	46.09
30302	Holland Park - Yeronga	0.79	50.90
30601	Cairns - North	0.79	46.28
12203	Warringah	0.79	44.28
11703	Sydney Inner City	0.79	57.82
50101	Augusta - Margaret River - Busselton	0.79	48.04
30102	Cleveland - Stradbroke	0.80	46.93
30402	Kenmore - Brookfield - Moggill	0.80	39.45
31401	The Hills District	0.80	41.06
60103	Hobart - North West	0.80	42.35
10103	Snowy Mountains	0.80	44.51
20802	Glen Eira	0.80	49.07
40304	Onkaparinga	0.80	32.66
20102	Creswick - Daylesford - Ballan	0.80	39.05
20601	Brunswick - Coburg	0.80	46.89
21503	Murray River - Swan Hill	0.80	36.12
10903	Upper Murray exc. Albury	0.80	37.70
20301	Barwon - West	0.80	40.10
40105	Norwood - Payneham - St Peters	0.80	47.57
11001	Armidale	0.80	49.49
21703	Colac - Corangamite	0.80	34.49
21701	Glenelg - Southern Grampians	0.80	37.13
10704	Wollongong	0.80	42.70
10402	Coffs Harbour	0.80	48.09
30603	Innisfail - Cassowary Coast	0.81	40.83
31603	Maroochy	0.81	53.66
31608	Noosa Hinterland	0.81	40.03
40701	Fleurieu - Kangaroo Island	0.81	32.77
40502	Lower North	0.81	38.30
31802	Townsville	0.81	44.76
30401	Centenary	0.81	40.80
20202	Heathcote - Castlemaine - Kyneton	0.81	34.32
10805	Taree - Gloucester	0.81	44.16
21105	Yarra Ranges	0.81	39.67
30902	Coolangatta	0.81	38.38
11301	Griffith - Murrumbidgee (West)	0.81	36.66
60402	Devonport	0.81	48.80
50102	Bunbury	0.81	49.37
30910	Surfers Paradise	0.82	47.53
70205	Katherine	0.82	46.80
20603	Essendon	0.82	48.04
50402	Mundaring	0.82	49.84
11002	Inverell - Tenterfield	0.82	41.66
40703	Murray and Mallee	0.82	43.13
30604	Port Douglas - Daintree	0.82	56.05
31901	Bundaberg	0.82	40.71

SA3 code (2021)	SA3 Name 2021	General practitioner services bulk-billed: mean proportion	Mean out-of-pocket cost for non-bulk-billed general practitioner service
40106	Prospect - Walkerville	0.83	31.90
31502	Outback - North	0.83	50.38
30602	Cairns - South	0.83	47.48
12801	Cronulla - Miranda - Caringbah	0.83	43.80
31903	Gympie - Cooloola	0.83	48.74
10603	Port Stephens	0.83	39.70
50201	Mandurah	0.83	38.16
30901	Broadbeach - Burleigh	0.83	49.78
11203	Tweed Valley	0.83	37.08
10801	Great Lakes	0.83	43.81
50701	Cockburn	0.83	49.37
10202	Wyong	0.84	36.12
11401	Shoalhaven	0.84	41.32
30905	Mudgeeraba - Tallebudgera	0.84	45.66
11802	Eastern Suburbs - South	0.84	45.58
21302	Hobsons Bay	0.84	40.79
31701	Toowoomba	0.84	49.98
12101	Chatswood - Lane Cove	0.84	50.49
20505	Wellington	0.84	47.57
40403	West Torrens	0.84	39.58
50605	Kalamunda	0.84	41.05
31607	Nambour	0.84	44.39
20101	Ballarat	0.84	46.96
50401	Bayswater - Bassendean	0.84	46.58
10304	Orange	0.84	50.12
31304	Narangba - Burpengary	0.84	32.79
20803	Kingston	0.85	43.41
51103	Goldfields	0.85	51.57
31305	Redcliffe	0.85	42.87
30702	Darling Downs - East	0.85	39.12
60401	Burnie - Ulverstone	0.85	38.04
40302	Marion	0.85	32.62
31303	Caboolture Hinterland	0.85	33.60
60101	Brighton	0.85	42.78
31606	Sunshine Coast Hinterland	0.85	42.04
30304	Nathan	0.85	39.74
40503	Mid North	0.85	37.60
21001	Keilor	0.85	38.41
20703	Whitehorse - West	0.85	39.78
21104	Whitehorse - East	0.85	38.91
10703	Kiama - Shellharbour	0.85	38.66
50602	Belmont - Victoria Park	0.85	36.94
50503	Wanneroo	0.85	39.69
50903	Wheat Belt - South	0.86	48.84
20501	Baw Baw	0.86	43.19
21102	Manningham - East	0.86	40.31
70104	Palmerston	0.86	33.03
40205	Tea Tree Gully	0.86	30.84
10804	Port Macquarie	0.86	45.26
60203	North East	0.86	43.16
12802	Sutherland - Menai - Heathcote	0.86	39.67
10604	Upper Hunter	0.86	39.91
10503	Dubbo	0.86	41.24
11003	Moree - Narrabri	0.87	43.57

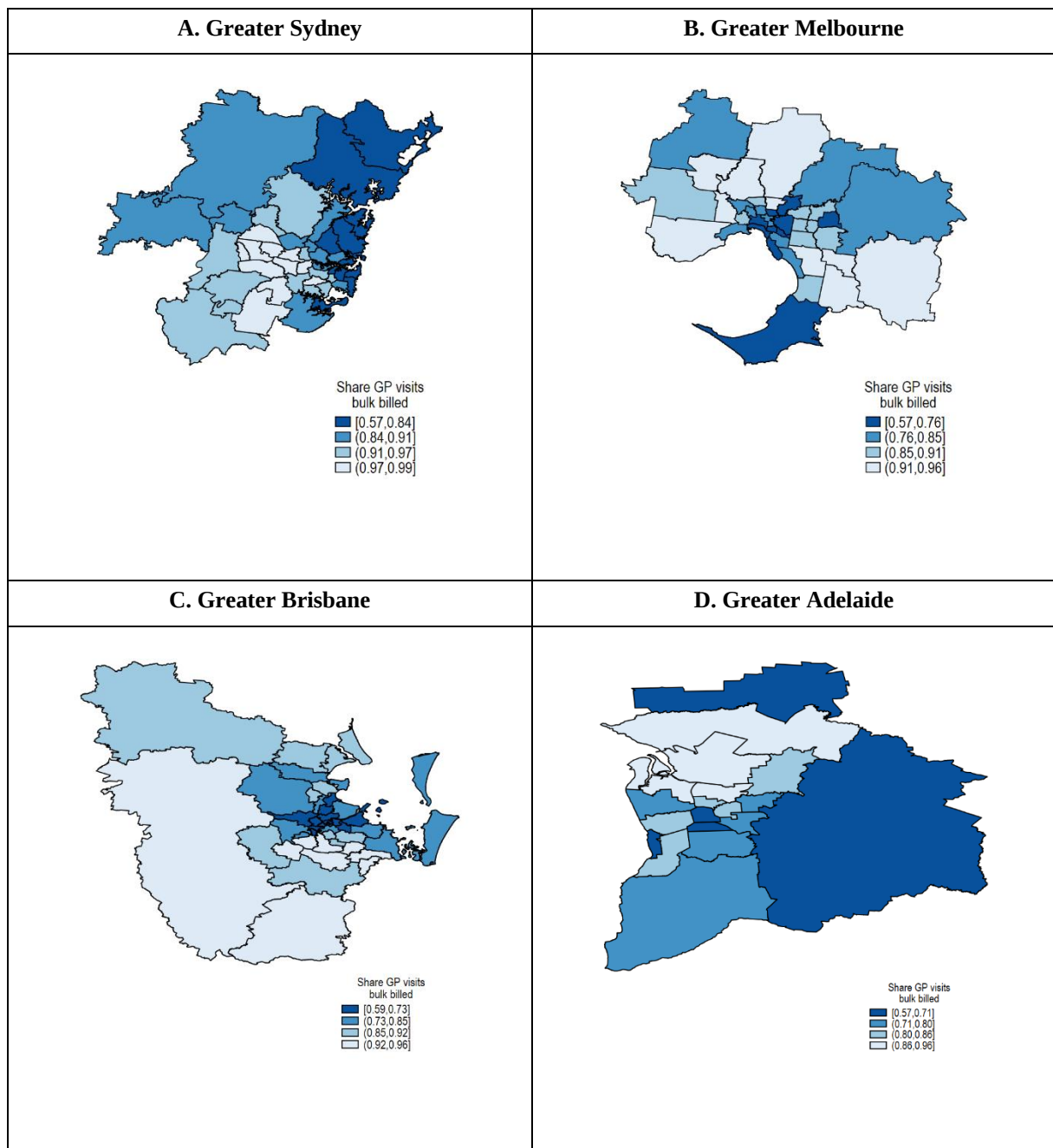
SA3 code (2021)	SA3 Name 2021	General practitioner services bulk-billed: mean proportion	Mean out-of-pocket cost for non-bulk-billed general practitioner service
10301	Bathurst	0.87	33.11
21401	Frankston	0.87	43.57
20401	Upper Goulburn Valley	0.87	44.30
12401	Blue Mountains	0.87	40.73
12602	Ryde - Hunters Hill	0.87	43.89
31403	Strathpine	0.87	34.70
10802	Kempsey - Nambucca	0.87	45.38
70204	East Arnhem	0.87	56.87
21501	Grampians	0.87	49.63
21205	Monash	0.87	42.33
20503	Gippsland - South West	0.87	48.39
50103	Manjimup	0.87	37.40
20702	Manningham - West	0.88	43.28
51001	Kimberley	0.88	53.97
10106	Young - Yass	0.88	41.12
31904	Hervey Bay	0.88	46.32
12001	Canada Bay	0.88	37.03
30909	Southport	0.88	45.27
40203	Port Adelaide - East	0.88	31.35
11501	Baulkham Hills	0.88	45.06
40602	Outback - North and East	0.88	35.35
31301	Bribie - Beachmere	0.88	34.36
21101	Knox	0.88	49.37
21303	Maribyrnong	0.88	43.54
50705	Rockingham	0.88	40.65
10601	Lower Hunter	0.88	36.66
20203	Loddon - Elmore	0.89	36.39
10105	Goulburn - Mulwaree	0.89	45.67
10502	Broken Hill and Far West	0.89	52.51
30906	Nerang	0.89	38.44
12601	Pennant Hills - Epping	0.89	36.18
31302	Caboolture	0.89	36.48
31902	Burnett	0.89	39.93
50902	Wheat Belt - North	0.89	42.08
50603	Canning	0.89	40.35
10303	Lithgow - Mudgee	0.89	50.64
31905	Maryborough	0.90	42.53
40601	Eyre Peninsula and South West	0.90	44.62
51102	Gascoyne	0.90	59.28
50606	Serpentine - Jarrahdale	0.90	32.72
30903	Gold Coast - North	0.90	45.56
11701	Botany	0.90	42.26
10701	Dapto - Port Kembla	0.90	33.82
60301	Central Highlands (Tas.)	0.90	45.38
50601	Armada	0.90	38.24
30904	Gold Coast Hinterland	0.90	40.95
50403	Swan	0.90	48.32
21304	Melton - Bacchus Marsh	0.90	34.73
30804	Biloela	0.90	43.48
30908	Robina	0.90	65.63
60202	Meander Valley - West Tamar	0.90	42.91
11503	Hawkesbury	0.90	41.16
31402	North Lakes	0.90	38.20
12102	Hornsby	0.90	36.81

SA3 code (2021)	SA3 Name 2021	General practitioner services bulk-billed: mean proportion	Mean out-of-pocket cost for non-bulk-billed general practitioner service
31003	Ipswich Inner	0.91	35.18
21003	Moreland - North	0.91	41.78
12404	Richmond - Windsor	0.91	42.01
30303	Mt Gravatt	0.91	39.75
21202	Casey - North	0.91	51.11
31801	Charters Towers - Ayr - Ingham	0.91	41.01
11903	Hurstville	0.91	38.24
21201	Cardinia	0.91	41.50
20504	Latrobe Valley	0.91	39.42
21004	Sunbury	0.91	35.34
11502	Dural - Wisemans Ferry	0.91	33.25
40402	Port Adelaide - West	0.92	30.87
70103	Litchfield	0.92	32.22
30306	Sunnybank	0.92	42.96
31501	Far North	0.92	41.38
10302	Lachlan Valley	0.92	38.44
11904	Kogarah - Rockdale	0.92	34.71
30907	Ormeau - Oxenford	0.92	39.60
31104	Jimboomba	0.92	39.75
12502	Carlingford	0.92	42.47
31106	Springwood - Kingston	0.93	36.80
31101	Beaunesert	0.93	37.71
60403	West Coast	0.93	42.43
31105	Loganlea - Carbrook	0.93	26.65
40204	Salisbury	0.94	21.38
31004	Springfield - Redbank	0.94	40.47
20902	Darebin - North	0.94	39.68
60303	South East Coast	0.94	25.59
10902	Lower Murray	0.94	29.98
20103	Maryborough - Pyrenees	0.94	33.87
21305	Wyndham	0.94	35.21
30305	Rocklea - Acacia Ridge	0.94	31.77
50604	Gosnells	0.94	36.88
12301	Camden	0.94	38.71
20904	Whittlesea - Wallan	0.95	34.05
11702	Marrickville - Sydenham - Petersham	0.95	39.55
21203	Casey - South	0.95	37.01
31001	Forest Lake - Oxley	0.95	38.14
11504	Rouse Hill - McGraths Hill	0.95	31.44
12003	Strathfield - Burwood - Ashfield	0.95	47.93
21301	Brimbank	0.95	43.85
31102	Beenleigh	0.95	35.36
31103	Browns Plains	0.96	35.22
21005	Tullamarine - Broadmeadows	0.96	34.53
31002	Ipswich Hinterland	0.96	40.09
12303	Wollondilly	0.96	36.57
90103	Jervis Bay	0.96	39.33
40202	Playford	0.96	21.47
21204	Dandenong	0.96	38.55
31503	Outback - South	0.96	28.75
11901	Bankstown	0.96	33.12
12403	Penrith	0.97	42.08
50703	Kwinana	0.97	29.04
12701	Bringelly - Green Valley	0.97	39.52

SA3 code (2021)	SA3 Name 2021	General practitioner services bulk-billed: mean proportion	Mean out-of-pocket cost for non-bulk-billed general practitioner service
12703	Liverpool	0.97	35.11
12702	Fairfield	0.97	32.93
11602	Blacktown - North	0.97	22.64
12504	Parramatta	0.98	45.32
12501	Auburn	0.98	35.30
70202	Barkly	0.98	51.94
12302	Campbelltown (NSW)	0.98	34.47
11302	Tumut - Tumbarumba	0.98	43.85
11902	Canterbury	0.98	39.11
12503	Merrylands - Guildford	0.98	30.23
10501	Bourke - Cobar - Coonamble	0.99	98.66
11601	Blacktown	0.99	39.87
11603	Mount Druitt	0.99	16.18
70203	Daly - Tiwi - West Arnhem	0.99	83.87
12405	St Marys	0.99	32.65

Adjusted by age group (0–15, 16–40, 40–65, 65 years or older) and sex (male, female).

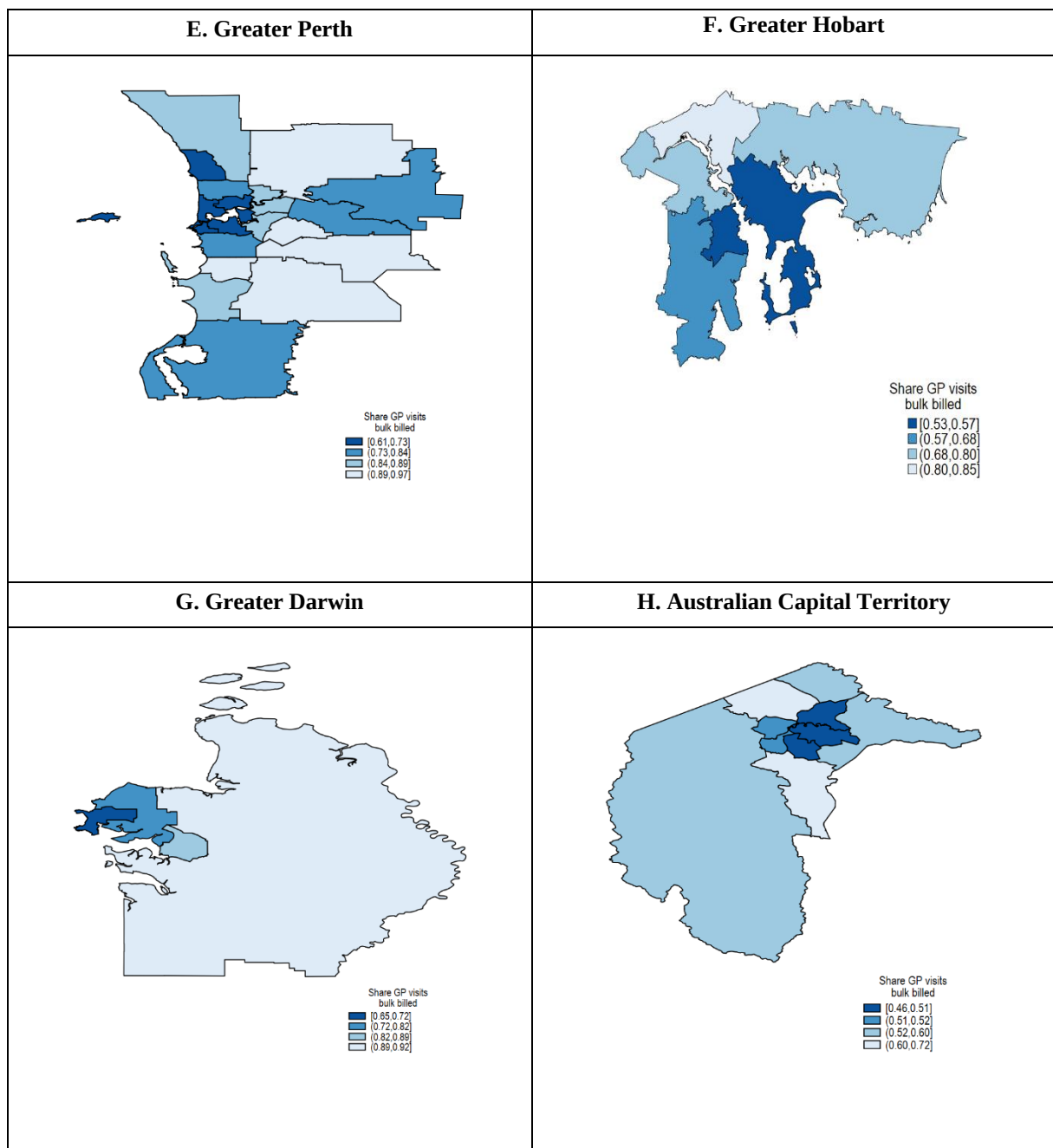
Figure 1. General practice services bulk-billing rate, Australia, 2022, mean values by Statistical Area level 3 (SA3): capital cities*



GP = general practitioner.

* By quartile, adjusted by age group (0–15, 16–40, 40–65, 65 years or older) and sex (male, female). “[“ quintile inclusive of value. “(“ quintile exclusive of value.

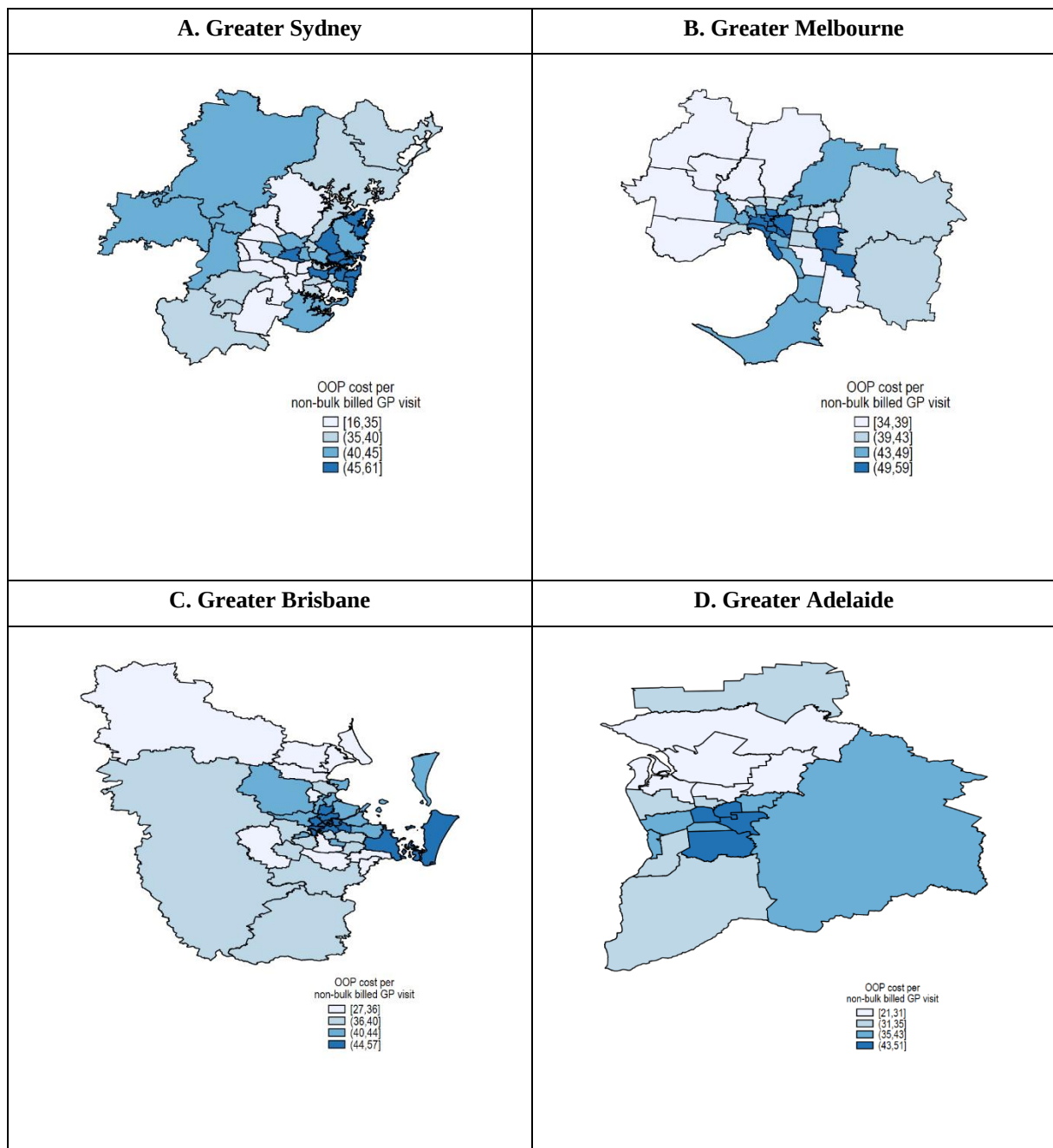
Figure 1 (continued)*



GP = general practitioner.

* By quartile, adjusted by age group (0–15, 16–40, 40–65, 65 years or older) and sex (male, female). “[“ quintile inclusive of value. “(“ quintile exclusive of value.

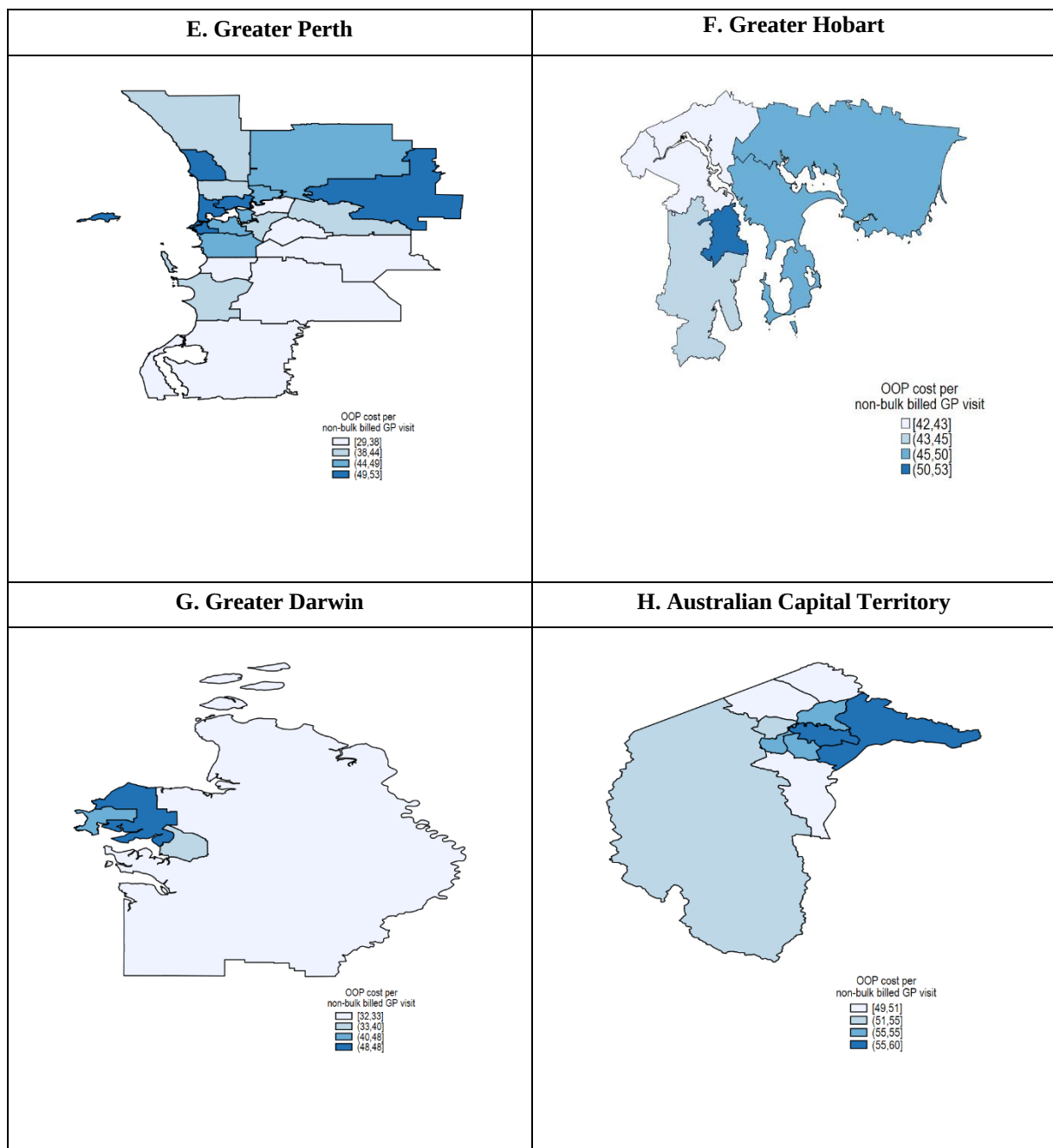
Figure 2. Out-of-pocket costs for non-bulk-billed general practitioner services, Australia, 2022, mean values by Statistical Area level 3 (SA3): capital cities*



OOP = out-of-pocket.

* By quartile, adjusted by age group (0–15, 16–40, 40–65, 65 years or older) and sex (male, female). Costs are reported as 2024 dollars. “[” quintile inclusive of value. “(“ quintile exclusive of value.

Figure 2 (continued) *



OOP = out-of-pocket.

* By quartile, adjusted by age group (0–15, 16–40, 40–65, 65 years or older) and sex (male, female). Costs are reported as 2024 dollars. “[“ quintile inclusive of value. “(“ quintile exclusive of value.

Table 3. Differences in outcomes, by Index of Relative Socioeconomic Disadvantage (IRSD) quintile

	General practitioner services bulk-billed: proportion	Out-of-pocket cost per non-bulk-billed general practitioner service
IRSD quartile	Difference, percentage points (95% CI)*	Difference (95% CI)*
1 (least disadvantaged)	Reference	Reference
2	-0.03 (-0.06 to 0.01)	-\$1.59 (-\$4.27 to \$1.08)
3	-0.01 (-0.05 to 0.02)	-\$1.17 (-\$3.86 to \$1.51)
4	-0.05 (-0.09 to -0.02)	\$0.90 (-\$1.78 to \$3.57)
5 (most disadvantaged)	-0.13 (-0.16 to -0.10)	4.82 (\$2.15 to \$7.50)

CI = confidence interval. * Outcomes adjusted for age group and sex.

Table 4. Differences in outcomes, by remoteness category

	General practitioner services bulkbilled: proportion	Out-of-pocket cost per non-bulkbilled general practitioner service
Remoteness category	Difference, percentage points (95% CI)*	Difference (95% CI)*
Metropolitan (MMM1 or 2)	Reference	Reference
Rural (MMM3-5)	0.02 (-0.01 to 0.04)	-\$0.56 (-2.39 to 1.26)
Remote (MMM6 or 7)	0.05 (-0.01 to 0.11)	\$13.33 (\$9.14 to \$17.51)

CI = confidence interval. MMM = Monash Modified Model. * Outcomes adjusted for age group and sex.