Title: A national analysis of the Modified Monash Model, population distribution, and a socio-economic index to inform rural health workforce planning

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Supplementary paragraph

The genesis of this Commentary is the transition to the Modified Monash Model (MMM) across a number of Department of Health programs – this move spans workforce (most notably the Rural Health Multidisciplinary Training Program), research and translation, and service delivery. Previously the Australian Statistical Geography Standard - Remoteness Areas (ASGS-RA) had been applied, and population summaries of this classification are freely available. The same cannot be said for the MMM, beyond the headline statistic that 70% of the Australian population reside in these areas – a statistic that can be directly taken from the Remoteness Area 1 – Major Cities of Australia which has direct concordance with Modified Monash 1 – Metropolitan Areas. This Commentary provides a summary of the Australian population, stratified by MMM, but moves beyond this – it is also overlaid by measure of socio-economic status, and further stratify by jurisdiction (every State and Territory). In summary, it provides a nuanced perspective that is not yet available in the peer-reviewed literature.

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Abstract

Aims Describe the population distribution and socio-economic position of residents across all states and territories of Australia, stratified using the seven Modified Monash Model (MM Model) classifications. The numerical summary, and the methods described, can be applied by a variety of end-users including workforce planners, researchers, policy makers, and funding bodies for guiding future investment under different scenarios, and aid in evaluating geographically focused programs.

Context The Commonwealth Department of Health is transitioning to the MM Model to objectively describe geographical access. This change applies to the Rural Health Multidisciplinary Training (RHMT) program, one of the Australian Government's key policies to address the maldistribution of the rural health workforce. Unlike the previously applied Australian Statistical Geography Standard - Remoteness Areas (ASGS-RA), a summary of the population in each MM Model classification is not available, nor is a socio-economic overview of the communities within these areas.

Approach Spatial analysis of Australian Bureau of Statistics (ABS) data (MM Model, population data, and the Index of Relative Socio-economic Advantage and Disadvantage collected or derived from the 2016 census) at the Statistical Area 1 – the smallest unit for the release of census data.

Conclusion Linking the MM model, a socio-economic index, and granular population data at the national level highlights the disadvantage of many residents in small rural towns (MM5). The MM model does not exhibit a continuum of the largest population residing in the most accessible classification and the smallest population in the least accessible that is seen in the ASGS-RA. Coupled with policy relevance, the advantage of using the MM Model as the basis for analysis is that it

highlights areas that have both a critical mass of residents, as well as differing levels of socio-economic advantage and disadvantage. This will help end users to target funding to those regions where there is potential to improve access to services for the greatest number of rural residents.

Keywords social determinants; spatial analysis; geographical information systems; GIS; regional health; remote health; rural health; Modified Monash Model; Remoteness Areas

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Background

Life expectancy in Australia is high by global standards – it is ranked seventh of the 37 countries in the Organisation for Economic Co-operation and Development (OECD). [1] Yet despite having a universal healthcare system, Australia also experiences highly variable mortality rates and the burden of many diseases persist which are influenced by where people live. [2] Simply put, Australians living rural and remote areas typically have poorer health status than their metropolitan counterparts.

Much of this discrepancy can be explained by access to services, which can be classified as aspatial dimensions (affordability, acceptability, and communication) and spatial dimensions (availability and accessibility). [3,4] To ensure access, the spatial dimensions of availability and accessibility first need to be addressed. A service may well be affordable, acceptable, and effectively communicated, but in the absence of availability and accessibility, it will not, or simply cannot, be utilised. Dynamics of spatial accessibility (e.g., a lack of services or where physical access is challenging) are exacerbated in rural and remote areas by factors such as higher rates of poverty, lower levels of formal education, and other socioeconomic indicators.[5]

The population distribution of Australia further complicates issues associated with spatial access – it ranges from densely inhabited metropolitan settings through to sparsely populated landscapes in remote areas with vast distances between communities and services. [6] The relative differences between areas can be described by objective measures of spatial dimensions of access, with the same measures used to guide investment across a range of policies. The Accessibility/Remoteness Index of Australia (ARIA), and the subsequent ARIA+, is a nationally consistent model that quantifies access as highly accessible through to very remote. [7] This has become the standard access index in Australia and can be classified into the five categories of the Australian Statistical Geography Standard - Remoteness Area (ASGS-RA): RA1 – Major Cities of Australia; RA2 – Inner Regional Australia; RA3 – Outer Regional Australia; RA4 – Remote Australia; and RA5 – Very Remote Australia. [8] When defining access in the early iterations of ARIA, the New South Wales Central Coast, Maitland (NSW), Wollongong (NSW), and Geelong (VIC) were included in the most accessible category, [9] and explains why non-capital cities can be classed as Major Cities of Australia.

The Rural Health Multidisciplinary Training (RHMT) program is one of the Australian Government's key policies to address the maldistribution of the rural health workforce. [10] Currently, the RHMT

program applies the ASGS-RA to dichotomise between metropolitan (RA1) and rural areas (RA2-RA5) – the explicit purpose of this higher level categorisation is to achieve one of the program goals of maximising rural expenditure through the program.

By accounting for road distance and the population of cities, towns, and communities, the ASGS-RA can be further classified into the seven categories of the MM Model (MM1 Metropolitan Areas, MM2 Regional centres; MM3 Large rural towns, MM4 Medium rural towns, MM5 Small rural towns, MM6 Remote communities, MM7 Very Remote communities) (Table 1). [11] The MM Model has burgeoning national policy relevance. The Australian Government's Department of Health is moving to adopt this geographic classification for all workforce programs, including the RHMT in 2022. [11]

Beyond the headline statistic that 70% of Australia's population reside in MM1 (all areas categorised as ASGS-RA1), [12] there does not appear to be a public summary of Australia's population stratified by MM Model categories, although this can be found for the ASGS-RA. [13] Understanding the population distribution across the MM Model categories is important, but this is not the only metric that should be accounted for when allocating resource based upon need – an appreciation of the socio-economic conditions of communities within these categories is also warranted.

As the RHMT adopts the MM Model in 2022, this contribution provides jurisdictional detail (all States and Territories) of the population distribution and an objective area-level measure of socio-economic status, stratified using the classifications of the MM Model. It is intended this detailed summary will provide a framework for guiding investment across a variety of programs, beyond the RHMT, that use the MM Model.

Methods

The main summary (Table 2) was generated by mapping Australia's Usual Residential Population at Statistical Areas Level 1 (SA1, the finest resolution of area-level data released by the ABS, the same resolution as the MM Model), and using a spatial join in ArcGIS to extract the deciles of the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD). [14,15,16] IRSAD is one of four Socio-Economic Indexes for Areas (SEIFA) released by the Australian Bureau of Statistics and is recommended for analyses where a general measure of advantage and disadvantage is required. [16] The deciles of IRSAD have been stratified into three groups: (1) deciles 1-3 (lowest advantage and highest disadvantage); (2) deciles 4-7; and (3) deciles 8-10 (highest advantage and lowest disadvantage). The deciles published by the ABS were selected to enable comparisons across Australia.

Findings and implications

The summary (Table 2) permits pooling of results to dichotomise between metropolitan (MM1) and rural areas (MM2-MM7) – the focus of the findings below. The granular approach to presenting MM Model was deliberate, and allows future users to combine categories if required (e.g., where a more nuanced understanding may be needed, such as MM3-MM7 or MM4-MM7 areas, referred to throughout the recent RHMT Independent Evaluation).[17]

Metropolitan Areas (MM1)

The Australian Capital Territory (ACT) had the highest proportion of its population residing in MM1 (99.83% – just 644 residents in ACT are classified as living in rural areas), with Western Australia having the most centralised population of the States (78.23% residing in MM1). With the exception of South Australia (SA), all other MM1 areas in each jurisdiction had more residents in the highest deciles of IRSAD (8-10) compared to the lowest deciles (1-3) – cities tend to be areas of greater advantage. This reinforces the importance of targeted investment outside metropolitan areas as specified by programs such as the RHMT (e.g., the RHMT places a 5% cap on central fees and charges that can be spent at the main university campus).[18]

Rural Areas (MM2-MM7)

Almost exclusively across Australia, socioeconomic status is lower in rural and remote areas relative to metropolitan areas. When the highest deciles (8-10) and lowest deciles (1-3) are compared directly, the majority of residents in MM2-MM7 live in areas categorised as the lowest IRSAD deciles (the only exceptions to this national picture are MM2 in NSW, NT, and SA, and MM6 in WA).

In Tasmania (TAS) and the Northern Territory (NT), the most accessible category is MM2 (the areas surrounding Hobart and Launceston, and Darwin, respectively). MM2 areas in TAS followed the same pattern described in metropolitan SA (i.e. more residents in areas with higher disadvantage), noting over half of Tasmanian residents (50.24%) compared to 38.4% in SA reside in deciles 1-3. In the NT, most of the population were concentrated in deciles 4-10 – 54% of the almost 59% residing in MM2 (0.55% of the Australian population). This is in contrast with the most remote areas of the NT where most of the MM7 population reside in areas of the lowest 3 deciles (38,407 residents, 17.55% of the NT population, and 0.17% of the Australian population).

The significance of Small rural towns (MM5)

Outside MM1 (with 71.33% of the Australian population, 16,562,074 residents) and MM2 (with 8.99%, 2,088,256), MM5 is the category with the highest percentage of the Australian population (7.27%, 1,687,796) (Table 1). In declining numerical order after MM5 are MM3 (6.50%, 1,509,139), MM4 (3.97%, 922,965), MM6 (1.17%, 270,545), and MM7 (0.77%, 179,638). Tasmania has the highest percentage of MM5 residents (18.2%, 92,220) (Table 2). Of the mainland states, SA (9.67%, 161,152), NSW (7.56%, 562,056), QLD (7.51%, 350,207), VIC (6.64%, 391,735), and WA (5.21%, 127,179) have a substantial percentage of their population residing in MM5 (Table 2). Common to MM5 areas in all states is a higher percentage of residents in IRSAD deciles 1-3 compared with IRSAD deciles 8-10. These findings quantify both the numerical importance, and area-level socio-economic conditions, of MM5 communities across the country.

The move towards MM Model is useful for health planning and targeting RHMT investment at the locality level. Under the previously applied ASGS-RA, MM5 localities would have been classified as either Inner Regional Australia or Outer Regional Australia (Table 1). This likely oversimplifies the access to services experienced by residents in these areas. For example, the Inner Regional Australia classification includes localities classified as MM2, MM3, MM4, and MM5 (Table 1). At the area-level, MM5 is a category that resembles the spatial distribution of MM6 and MM7; that is, it covers a large area without the distinct 'patches' that characterise MM3 and MM4, which are more likely to have services by virtue of their status as Large and Medium rural towns (Figure 1). When MM1-MM4 are considered together, they represent continuous built up areas, noting they will have varying density. MM5, is by definition, areas that are more than a 10km drive from a town with between 5,000-15,000 residents – this suggests a highly variable experience for residents in need of healthcare, and different challenges for workforce planning.

Conclusions

The shift from ASGS-RA to MM Model to define rural areas in the RHMT program is a progressive step towards better informed allocation of resources. Coupled with policy relevance, the advantage of using the MM Model as the basis for analysis is that it highlights areas that have both a critical mass of residents, as well as differing levels of socio-economic advantage and disadvantage. This will help end users to target funding to those regions where there is potential to improve access to services for the greatest number of rural residents. The use of nationally consistent measures also assists in drawing meaningful comparisons between localities and communities in different regions or jurisdictions.[20]

There is direct and contemporary policy relevance in adopting the MM Model for this analysis that goes beyond the RHMT program. The MM Model is also being used to guide funding allocations for recent Medical Research Future Fund opportunities. The 2020 Rapid Applied Research Translation Grant Opportunity had two streams: (1) organisations based in metropolitan areas (any MM1 area), and (2) organisations based in rural areas (MM2-MM7). [21] Profession specific applications include Medicare rebates on telehealth psychology consults (i.e. patients must reside in MM4-MM7 and be further than 15km by road), [22] while the Rural Pharmacy Maintenance Allowance (RPMA) transitioned in early 2021 from Pharmacy Accessibility/Remoteness Index of Australia (PhARIA) to the MM Model.[23] The use of these measures of rurality have important implications for the reach and impact of these programs.

Unlike the ASGS-RA, the MM Model does not exhibit a continuum of the largest population residing in the most accessible classification to the smallest population in the most remote category. This is a key finding from this analysis. The exception is MM5 - Small rural towns. A focus on areas classified as MM5 may be a worthwhile strategy within the RHMT network. In addition to the many residents of these areas that may have direct benefit, activities such as research and evaluation of models of care conducted in these settings may be generalisable to other communities with similar levels of access and socio-economic status. These findings can be used to guide policy at the national scale, but equally contribute to smaller scale resource allocation (such as health service provision or training facilities with the same methods applied in a localised setting). Both endeavours, at either end of this spatial continuum, will benefit further from mapping population at the SA1 level with a socio-economic lens to more accurately estimate of the population that will be influenced by under different scenarios of investment.

References

1. Australian Institute of Health and Welfare 2020. Deaths in Australia. https://www.aihw.gov.au/reports/life-expectancy-death/deaths-in-australia/contents/life-expectancy Accessed April 2021.
2. Australian Institute of Health and Welfare 2019. Rural & remote health. https://www.aihw.gov.au/reports/rural-remote-australians/rural-remote-health/contents/summary Accessed April 2021.
3. Penchansky R, Thomas JW. The Concept of Access: Definition and Relationship to Consumer Satisfaction. *Med Care* 1981; 19:127–140.
4. Khan AA. An Integrated Approach to Measuring Potential Spatial Access to Health Care Services. *Socioecon Plan Sci* 1992; 26:275–287.
5. Beard JR, Tomaska N, Earnest A, Summerhayes R, Morgan G. Influence of socioeconomic and cultural factors on rural health. *Aust J Rural Health* 2009; 17(1):10-5.
6. Versace VL, Coffee NT, Franzon J, et al. Comparison of general and cardiac care-specific indices of spatial access in Australia. *PLoS ONE* 2019; 14(7):e0219959.
7. Department of Health. Accessibility Remoteness Index of Australia (ARIA) Remoteness Area (RA). https://www1.health.gov.au/internet/publications/publishing.nsf/Content/ARIA-Review-Report-2011~ARIA-Review-Report-2011-2~ARIA-Review-Report-2011-2-2-3 Accessed June 2021.
8. The Australian Statistical Geography Standard (ASGS) Remoteness Structure. https://www.abs.gov.au/websitedbs/D3310114.nsf/home/remoteness+structure Accessed June 2021.
9. ABS Views on Remoteness 2001. https://www.ausstats.abs.gov.au/ausstats/free.nsf/0/FCC8158C85424727CA256C0F00003575/$File/12440_2001.pdf Accessed June 2021.
10. Walsh S, Lyle DM, Thompson SC, et al. The role of national policies to address rural allied health, nursing and dentistry workforce maldistribution. *Med J Aust* 2020 Dec; 213(Supplement 11):S18-+.
11. Australian Government Department of Health 2020. Modified Monash Model. https://www.health.gov.au/health-topics/health-workforce/health-workforce-classifications/modified-monash-model#what-is-the-mmm-used-for Accessed April 2021.

12. Australian Government Department of Health 2020. Modified Monash Model - fact sheet. https://www.health.gov.au/resources/publications/modified-monash-model-fact-sheet Accessed April 2021.
13. Australian Bureau of Statistics 2018. Estimates of Aboriginal and Torres Strait Islander Australians. https://www.abs.gov.au/statistics/people/aboriginal-and-torres-strait-islander-peoples/estimates-aboriginal-and-torres-strait-islander-australians/latest-release Accessed April 2021.
14. Australian Bureau of Statistics. Australian Statistical Geography Standard (ASGS). https://www.abs.gov.au/websitedbs/D3310114.nsf/home/Australian+Statistical+Geography+Standard+(ASGS) Accessed April 2021.
15. Environmental Systems Research Institute (ESRI) 2020. ArcGIS Release 10.8. Redlands, CA.
16. Australian Bureau of Statistics 2018. Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2016. https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Main%20Features~IRSAD~20 Accessed April 2021.
17. Independent Evaluation of the Rural Health Multidisciplinary Training Program - Final Report to the Commonwealth Department of Health 2020. https://kbconsult.com.au/wp-content/uploads/2020/08/20200626_Independent-evaluation-RHMT-Report-FINAL-FINAL.pdf Accessed June 2021.
18. Australian Government Department of Health Rural Health Multidisciplinary Training (RHMT) Framework 2019-2020 (2019). https://www1.health.gov.au/internet/main/publishing.nsf/Content/75C46070F19CFF15CA257F7A000EC248/$File/5.%20Rural%20Health%20Multidisciplinary%20Training%20(RHMT)%20Program%20Framework%202019-2020%20-%20PDF%20version.pdf Accessed April 2021.
19. Health Workforce Locator. https://www.health.gov.au/resources/apps-and-tools/health-workforce-locator/health-workforce-locator Accessed June 2021.
20. Gillam MH, Leach MJ, Gonzalez-Chica DA, et al. Availability and characteristics of publicly available health workforce data sources in Australia. *Med J Aust* 2020; 213(11 Suppl):S23–S26.
21. Australian Department of Health 2020. Turning research findings into health benefits that help patients, by connecting expert groups in health and medical research. https://business.gov.au/grants-and-programs/mrff-2020-rapid-applied-research-translation-grant-opportunity Accessed April 2021.

22. Australia Department of Health 2021. Modified Monash Model Lookup. https://www.modifiedmonashmodel.com/ Accessed April 2021.
23. Pharmacy Programs Administrator 2021. Rural Pharmacy Maintenance Allowance (RPMA) – Changes to Eligibility and Payment Arrangements. https://www.ppaonline.com.au/changes-to-rpma-eligibility Accessed June 2021.

Table 1. Summary of the relationship between and the Modified Monash Model and Australian Statistical Geography Standard - Remoteness Area classifications, [11,12] and the population distribution of Australia (summarised from Table 2).

Modified Monash category	**ASGS-RA Inclusions**	**Australian population (%)**
MM1 (Metropolitan areas)	All areas categorised ASGS-RA1.	16,562,074 (71.33)
MM2 (Regional centres)	Areas categorised ASGS-RA 2 and ASGS-RA 3 that are in, or within 20km road distance, of a town with a population greater than 50,000.	2,088,256 (8.99)
MM3 (Large rural towns)	Areas categorised ASGS-RA 2 and ASGS-RA 3 that are not in MM2 and are in, or within 15km road distance, of a town with a population between 15,000 and 50,000.	1,509,139 (6.50)
MM4 (Medium rural towns)	Areas categorised ASGS-RA 2 and ASGS-RA 3 that are not in MM2 or MM3 and are in, or within 10km road distance, of a town with a population between 5,000 and 15,000.	922,965 (3.97)
MM5 (Small rural towns)	All other areas in ASGS-RA 2 and 3.	1,687,796 (7.27)
MM6 (Remote communities)	All areas categorised ASGS-RA 4 that are not on a populated island that is separated from the mainland in the ABS geography and is more than 5km offshore. Islands that have an MM5 classification with a population of less than 1,000 (2019 Modified Monash Model classification only).	270,545 (1.17)

MM7 (Very remote communities)	All other areas; that being ASGS-RA 5 and areas on a populated island that is separated from the mainland in the ABS geography and is more than 5km offshore.	179,638 (0.77)
Total		23,220,413* (100)

*The total population excludes residents classified as living in 'Other Territories' (n=4,269) and residents living in an SA1 without an IRSAD score (n=6,862).

Population residing in IRSAD decile 1-3				Population residing in IRSAD decile 4-7				Population residing in IRSAD decile 8-10				Population residing in IRSAD decile 1-10				
	Population	State	Australia		Population	State	Australia		Population	State	Australia		Population		Percent of Australia	
ACT	(n)	(%)	(%)	ACT	(n)	(%)	(%)	ACT	(n)	(%)	(%)	ACT	(n)	State (%)	MM category (%)*	Australia (%)
MM 1	8767	2.26	0.04	MM 1	104067	26.78	0.45	MM 1	275053	70.79	1.18	MM 1	387887	99.83	2.34	1.67
				MM 2	81	0.02	0.00	MM 2	521	0.13	0.00	MM 2	602	0.15	0.03	0.00
				MM 5				MM 5	42	0.01	0.00	MM 5	42	0.01	0.00	0.00
ACT				ACT				ACT				ACT				
TOTAL	8767	2.26	0.04	TOTAL	104148	26.81	0.45	TOTAL	275616	70.94	1.19	TOTAL	388531	100.00		1.67
NSW				NSW				NSW				NSW				
MM 1	1249034	16.80	5.38	MM 1	1821048	24.50	7.84	MM 1	2482649	33.40	10.69	MM 1	5552731	74.70	33.53	23.91
MM 2	34867	0.47	0.15	MM 2	78915	1.06	0.34	MM 2	66712	0.90	0.29	MM 2	180494	2.43	8.64	0.78
MM 3	334156	4.50	1.44	MM 3	303781	4.09	1.31	MM 3	88087	1.19	0.38	MM 3	726024	9.77	48.11	3.13
MM 4	218379	2.94	0.94	MM 4	144158	1.94	0.62	MM 4	14134	0.19	0.06	MM 4	376671	5.07	40.81	1.62
MM 5	274517	3.69	1.18	MM 5	245270	3.30	1.06	MM 5	42269	0.57	0.18	MM 5	562056	7.56	33.30	2.42
MM 6	17853	0.24	0.08	MM 6	9514	0.13	0.04	MM 6	2121	0.03	0.01	MM 6	29488	0.40	10.90	0.13
MM 7	3290	0.04	0.01	MM 7	2332	0.03	0.01	MM 7		0.00	0.00	MM 7	5622	0.08	3.13	0.02
NSW				NSW				NSW				NSW				
TOTAL	2132096	28.68	9.18	TOTAL	2605018	35.05	11.22	TOTAL	2695972	36.27	11.61	TOTAL	7433086	100.00		32.01
NT				NT				NT				NT				
MM 2	10421	4.76	0.04	MM 2	53150	24.29	0.23	MM 2	65169	29.79	0.28	MM 2	128740	58.84	6.16	0.55
MM 5	444	0.20	0.00	MM 5	2761	1.26	0.01	MM 5		0.00	0.00	MM 5	3205	1.46	0.19	0.01
MM 6	10471	4.79	0.05	MM 6	22447	10.26	0.10	MM 6	8870	4.05	0.04	MM 6	41788	19.10	15.45	0.18
MM 7	38407	17.55	0.17	MM 7	4417	2.02	0.02	MM 7	2224	1.02	0.01	MM 7	45048	20.59	25.08	0.19
								NT								
NT TOTAL	59743	27.31	0.26	NT TOTAL	82775	37.83	0.36	TOTAL	76263	34.86	0.33	NT TOTAL	218781	100.00		0.94
QLD				QLD				QLD				QLD				
MM 1	665182	14.26	2.86	MM 1	1295377	27.77	5.58	MM 1	983672	21.09	4.24	MM 1	2944231	63.12	17.78	12.68
MM 2	398833	8.55	1.72	MM 2	396918	8.51	1.71	MM 2	118598	2.54	0.51	MM 2	914349	19.60	43.79	3.94
MM 3	68676	1.47	0.30	MM 3	60951	1.31	0.26	MM 3	4383	0.09	0.02	MM 3	134010	2.87	8.88	0.58

MM 4	113621	2.44	0.49	MM 4	76167	1.63	0.33	MM 4	9034	0.19	0.04	MM 4	198822	4.26	21.54	0.86
MM 5	211713	4.54	0.91	MM 5	134562	2.88	0.58	MM 5	3932	0.08	0.02	MM 5	350207	7.51	20.75	1.51
MM 6	27027	0.58	0.12	MM 6	37016	0.79	0.16	MM 6	3724	0.08	0.02	MM 6	67767	1.45	25.05	0.29
MM 7	35902	0.77	0.15	MM 7	16569	0.36	0.07	MM 7	2471	0.05	0.01	MM 7	54942	1.18	30.58	0.24
QLD				QLD				QLD				QLD				
TOTAL	1520954	32.61	6.55	TOTAL	2017560	43.26	8.69	TOTAL	1125814	24.14	4.85	TOTAL	4664328	100		20.09
SA				SA				SA				SA				
MM 1	414396	24.85	1.78	MM 1	546568	32.78	2.35	MM 1	264606	15.87	1.14	MM 1	1225570	73.51	7.40	5.28
MM 2	3163	0.19	0.01	MM 2	20000	1.20	0.09	MM 2	11009	0.66	0.05	MM 2	34172	2.05	1.64	0.15
MM 3	70013	4.20	0.30	MM 3	55424	3.32	0.24	MM 3	7603	0.46	0.03	MM 3	133040	7.98	8.82	0.57
MM 4	35559	2.13	0.15	MM 4	21003	1.26	0.09	MM 4	753	0.05	0.00	MM 4	57315	3.44	6.21	0.25
MM 5	91666	5.50	0.39	MM 5	66517	3.99	0.29	MM 5	2969	0.18	0.01	MM 5	161152	9.67	9.55	0.69
MM 6	14989	0.90	0.06	MM 6	20905	1.25	0.09	MM 6	2360	0.14	0.01	MM 6	38254	2.29	14.14	0.16
MM 7	10527	0.63	0.05	MM 7	7259	0.44	0.03	MM 7		0.00	0.00	MM 7	17786	1.07	9.90	0.08
								SA								
SA TOTAL	640313	38.40	2.76	SA TOTAL	737676	44.24	3.18	TOTAL	289300	17.35	1.25	SA TOTAL	1667289	100.00		7.18
TAS				TAS				TAS				TAS				
MM 2	127307	25.12	0.55	MM 2	141581	27.94	0.61	MM 2	51940	10.25	0.22	MM 2	320828	63.31	15.36	1.38
MM 3	55421	10.94	0.24	MM 3	23269	4.59	0.10	MM 3	567	0.11	0.00	MM 3	79257	15.64	5.25	0.34
MM 4	1421	0.28	0.01	MM 4	2109	0.42	0.01	MM 4		0.00	0.00	MM 4	3530	0.70	0.38	0.02
MM 5	64101	12.65	0.28	MM 5	27965	5.52	0.12	MM 5	154	0.03	0.00	MM 5	92220	18.20	5.46	0.40
MM 6	6003	1.18	0.03	MM 7	2423	0.48	0.01	MM 6		0.00	0.00	MM 6	8426	1.66	3.11	0.04
MM 7	320	0.06	0.00	MM 6	2155	0.43	0.01	MM 7		0.00	0.00	MM 7	2475	0.49	1.38	0.01
TAS				TAS				TAS								
TOTAL	254573	50.24	1.10	TOTAL	199502	39.37	0.86	TOTAL	52661	10.39	0.23	TAS TOTAL	506736			2.18
VIC				VIC				VIC				VIC				
MM 1	921488	15.62	3.97	MM 1	1814535	30.76	7.81	MM 1	1805131	30.60	7.77	MM 1	4541154	76.98	27.42	19.56

MM 2	123381	2.09	0.53	MM 2	203861	3.46	0.88	MM 2	74435	1.26	0.32	MM 2	401677	6.81	19.24	1.73
MM 3	139703	2.37	0.60	MM 3	135832	2.30	0.58	MM 3	24139	0.41	0.10	MM 3	299674	5.08	19.86	1.29
MM 4	132349	2.24	0.57	MM 4	119121	2.02	0.51	MM 4	10535	0.18	0.05	MM 4	262005	4.44	28.39	1.13
MM 5	153071	2.59	0.66	MM 5	220324	3.73	0.95	MM 5	18340	0.31	0.08	MM 5	391735	6.64	23.21	1.69
MM 6	2161	0.04	0.01	MM 6	967	0.02	0.00	MM 6	45	0.00	0.00	MM 6	3173	0.05	1.17	0.01
VIC TOTAL	1472153	24.95	6.34	VIC TOTAL	2494640	42.29	10.74	VIC TOTAL	1932625	32.76	8.32	VIC TOTAL	5899418	100.00		25.41
WA				WA				WA				WA				
MM 1	336970	13.80	1.45	MM 1	812813	33.28	3.50	MM 1	760718	31.15	3.28	MM 1	1910501	78.23	11.54	8.23
MM 2	31143	1.28	0.13	MM 2	62405	2.56	0.27	MM 2	13846	0.57	0.06	MM 2	107394	4.40	5.14	0.46
MM 3	44482	1.82	0.19	MM 3	77893	3.19	0.34	MM 3	14759	0.60	0.06	MM 3	137134	5.62	9.09	0.59
MM 4	11966	0.49	0.05	MM 4	10131	0.41	0.04	MM 4	2525	0.10	0.01	MM 4	24622	1.01	2.67	0.11
MM 5	54587	2.24	0.24	MM 5	63782	2.61	0.27	MM 5	8810	0.36	0.04	MM 5	127179	5.21	7.54	0.55
MM 6	19501	0.80	0.08	MM 6	38559	1.58	0.17	MM 6	23589	0.97	0.10	MM 6	81649	3.34	30.18	0.35
MM 7	26776	1.10	0.12	MM 7	24873	1.02	0.11	MM 7	2116	0.09	0.01	MM 7	53765	2.20	29.93	0.23
WA TOTAL	525425	21.51	2.26	WA TOTAL	1090456	44.65	4.70	WA TOTAL	826363	33.84	3.56	WA TOTAL	2442244	100.00		10.52
AUST TOTAL	6614024		28.48	AUST TOTAL	9331775		40.19	AUST TOTAL	7274614		31.33	AUST TOTAL	23220413			100.00

Table 2. Australian jurisdictions (all states and territories), stratified by Modified Monash Model and the Index of Relative Socio-economic Advantage and Disadvantage. *Totals by jurisdiction will not sum to 100% due to uneven populations in states and territories.

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