

Supplementary Material

Application of the Australian Bureau of Statistics Socio-Economic Indexes for Areas in cardiovascular disease research: a scoping review identifying implications for research

Hannah Beks^A (PhD, Research Fellow), *Sandra M. Walsh^B* (MEd, Research Assistant), *Sarah Wood^A* (MAppRes, Associate Research Fellow), *Suzanne Clayden^{A,C}* (MNg(NPrac), Associate Research Fellow), *Laura Alston^{A,D}* (PhD, Research Unit Director), *Neil T. Coffee^A* (PhD, Professor) and *Vincent L. Versace^{A,*}* (PhD, Director)

^ADeakin Rural Health, Deakin University, PO Box 423, Warrnambool, Vic. 3280, Australia

^BDepartment of Rural Health, University of South Australia, Whyalla, SA, Australia

^CSpecialist Physicians Clinic, Southwest Healthcare, Warrnambool, Vic., Australia

^DColac Area Health, Colac, Vic., Australia

*Correspondence to: Email: vincent.versace@deakin.edu.au

Supplementary Materials

Supplementary file 1. SEIFA

Derived from data collected from the national Census of Population and Housing, SEIFA categorises areas from lowest to highest relative socio-economic advantage and disadvantage.¹² The IRSD is one of four indexes developed by the Australian Bureau of Statistics (ABS) as part of the Socio-Economic Indexes for Areas (SEIFA). Other indexes included in the most recent version, SEIFA 2021, are the: Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD; measuring relative advantage and disadvantage), Index of Education and Occupation (IEO, includes educational and occupational variables, but not income variables), and Index of Economic Resources (IER, includes income and housing variables).¹³ These indexes are calculated for pre-defined ABS Australian Statistical Geography Standard (ASGS) aggregated spatial units (e.g., Statistical Area Level 1 (SA1), Statistical Area Level 2 (SA2)) and non-ABS structures (e.g., local government areas (LGA), postal areas (POAs), suburbs and localities), and are updated following each national census to reflect the changes in population distribution and socio-economic indicators at an area-level.¹⁴ Area-level approaches to analysis using SEIFA apply the indexes at a specified spatial unit and within a defined geographical area (e.g., state, territory). A limitation of applying area-based measures is that the approach is subject to spatial biases, including the Modifiable Areal Unit Problem (MAUP) as the results of analysis will be dependent on the spatial unit and approach applied.¹¹

Supplementary file 2. PRISMA -ScR checklist

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3-4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3-
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	7
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	8
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	9
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8-9
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	9
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	9
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done	10

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	10
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	10
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	10
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	10-11
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	11
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	11-16
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	15-16
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	11-16
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	16-19
Limitations	20	Discuss the limitations of the scoping review process.	19
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	19-20
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	20

JBİ = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible

in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA ScR): Checklist and Explanation. *Ann Intern Med.* 2018;169:467–473. [doi: 10.7326/M18-0850](https://doi.org/10.7326/M18-0850).

Supplementary file 3. Electronic searches

Database	Citations retrieved
Ovid MEDLINE	599
CINAHL (EBSCOhost)	373
APA PsycInfo (EBSCOhost)	69
Embase (Elsevier)	2546
Total	3587
Duplicate papers	800
Total left to screen	2787

Database searches were conducted on the 7 February 2023

Database: Ovid MEDLINE® Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily, Ovid MEDLINE and Versions(R)

Query	Search terms
1	exp Cardiovascular Diseases/
2	((coronary or heart or cardiac* or cardiovascular* or pulmonary) adj2 (syndrome* or disease* or event* or occlusion* or stenosis* or thrombo* or attack* or failure or embolism)).mp.
3	(CHD or CVD or angina or stroke or hypertension).mp.
4	((cerebrovascular or peripheral arterial or rheumatic heart or congenital heart) adj2 disease*).mp.
5	or/1-4
6	(Australian Bureau of Statistics or ABS).mp.
7	(Socio-economic Indexes for Areas or SEIFA or Index of Relative Socio-Economic Disadvantage or IRSD or (Index of Relative Socio-Economic Advantage and Disadvantage) or IRSAD or (Index of Education and Occupation) or IEO or Index of Economic Resources or IER).mp.
8	exp Socioeconomic Factors/
9	(socio-economic or socio economic or socioeconomic or socio-demographic or sociodemographic or socio demographic).mp.
10	(SES or SEP).mp.
11	or/6-10
12	exp Australia/
13	(Australia* or Australa* or Tasmania* or Victoria* or New South Wales or NSW or Queensland or Northern Territory* or Western Australia* or South Australia* Australian Capital Territory*).mp.
14	(Melbourne or Sydney or Brisbane or Hobart or Adelaide or Perth or Darwin or Canberra).mp.
15	or/12-14

16	5 and 11 and 15
17	Limit 16 to yr"2013-Current"

Database: CINAHL Complete (EBSCOhost)

Query	Search terms
S1	(MH "Cardiovascular Diseases+")
S2	TI (((coronary OR heart OR cardiac* OR cardiovascular* OR pulmonary) N2 (syndrome* OR disease* OR event* OR occlusion* OR stenosis* OR thrombo* OR attack* OR failure OR embolism))) OR AB (((coronary OR heart OR cardiac* OR cardiovascular* OR pulmonary) N2 (syndrome* OR disease* OR event* OR occlusion* OR stenosis* OR thrombo* OR attack* OR failure OR embolism)))
S3	TI ((CHD OR CVD OR angina OR stroke OR hypertension)) OR AB ((CHD OR CVD OR angina OR stroke OR hypertension))
S4	TI (((cerebrovascular OR "peripheral arterial" OR "rheumatic heart" OR "congenital heart") N2 disease*)) OR AB (((cerebrovascular OR "peripheral arterial" OR "rheumatic heart" OR "congenital heart") N2 disease*))
S5	S1 OR S2 OR S3 OR S4
S6	TI (("Australian Bureau of Statistics" OR ABS)) OR AB (("Australian Bureau of Statistics" OR ABS))
S7	TI (("Socio-economic Indexes for Areas" OR SEIFA OR "Index of Relative Socio-Economic Disadvantage" OR IRSD OR ("Index of Relative Socio-Economic Advantage" AND Disadvantage) OR IRSAD OR ("Index of Education" AND Occupation) OR IEO OR "Index of Economic Resources" OR IER)) OR AB (("Socio-economic Indexes for Areas" OR SEIFA OR "Index of Relative Socio-Economic Disadvantage" OR IRSD OR ("Index of Relative Socio-Economic Advantage" AND Disadvantage) OR IRSAD OR ("Index of Education" AND Occupation) OR IEO OR "Index of Economic Resources" OR IER))
S8	(MH "Socioeconomic Factors+")
S9	TI ((socio-economic OR "socio economic" OR socioeconomic OR socio-demographic OR sociodemographic OR "socio demographic")) OR AB ((socio-economic OR "socio economic" OR socioeconomic OR socio-demographic OR sociodemographic OR "socio demographic"))
S10	TI ((SES OR SEP)) OR AB ((SES OR SEP))
S11	S6 OR S7 OR S8 OR S9 OR S10
S12	(MH Australia+)
S13	TI ((Australia* OR Australa* OR Tasmania* OR Victoria* OR "New South Wales" OR NSW OR Queensland OR "Northern Territor*" OR "Western Australia*" OR "South Australia*" OR "Australian Capital Territor*")) OR AB ((Australia* OR Australa* OR Tasmania* OR Victoria* OR "New South Wales" OR NSW OR Queensland OR "Northern Territor*" OR "Western Australia*" OR "South Australia*" OR "Australian Capital Territor*"))
S14	TI ((Melbourne or Sydney or Brisbane or Hobart or Adelaide or Perth or Darwin or Canberra)) OR AB ((Melbourne or Sydney or Brisbane or Hobart or Adelaide or Perth or Darwin or Canberra))
S15	S12 OR S13 OR OR S14
S16	S5 AND S11 AND S15
S17	"Limit 16 to yr"2013-Current"

Database: APA PsycInfo (EBSCOhost)

Query	Search terms
S1	(DE "Cardiovascular Disorders" OR DE "Aneurysms" OR DE "Arteriosclerosis" OR DE "Blood Pressure Disorders" OR DE "Cerebrovascular Disorders" OR DE "Embolisms" OR DE "Heart Disorders" OR DE "Hemorrhage" OR DE "Hypertension" OR DE "Ischemia" OR DE "Thromboses" OR DE "Cardiovascular Health")
S2	TI (((coronary OR heart OR cardiac* OR cardiovascular* OR pulmonary) N2 (syndrome* OR disease* OR event* OR occlusion* OR stenosis* OR thrombo* OR attack* OR failure OR embolism))) OR AB (((coronary OR heart OR cardiac* OR cardiovascular* OR pulmonary) N2 (syndrome* OR disease* OR event* OR occlusion* OR stenosis* OR thrombo* OR attack* OR failure OR embolism)))
S3	TI ((CHD OR CVD OR angina OR stroke OR hypertension)) OR AB ((CHD OR CVD OR angina OR stroke OR hypertension))
S4	TI (((cerebrovascular OR "peripheral arterial" OR "rheumatic heart" OR "congenital heart") N2 disease*)) OR AB (((cerebrovascular OR "peripheral arterial" OR "rheumatic heart" OR "congenital heart") N2 disease*))
S5	S1 OR S2 OR S3 OR S4
S6	TI (("Australian Bureau of Statistics" OR ABS)) OR AB (("Australian Bureau of Statistics" OR ABS))
S7	TI (("Socio-economic Indexes for Areas" OR SEIFA OR "Index of Relative Socio-Economic Disadvantage" OR IRSD OR ("Index of Relative Socio-Economic Advantage" AND Disadvantage) OR IRSAD OR ("Index of Education" AND Occupation) OR IEO OR "Index of Economic Resources" OR IER)) OR AB (("Socio-economic Indexes for Areas" OR SEIFA OR "Index of Relative Socio-Economic Disadvantage" OR IRSD OR ("Index of Relative Socio-Economic Advantage" AND Disadvantage) OR IRSAD OR ("Index of Education" AND Occupation) OR IEO OR "Index of Economic Resources" OR IER))
S8	DE "Socioeconomic Factors" OR DE "Economic Disadvantage" OR DE "Economic Resources" OR DE "Employment Status" OR DE "Income Level" OR DE "Social Class" OR DE "Social Disadvantage" OR DE "Socioeconomic Status" OR DE "Socioeconomic Status" OR DE "Family Socioeconomic Status" OR DE "Income Level" OR DE "Social Class"
S9	TI ((socio-economic OR "socio economic" OR socioeconomic OR socio-demographic OR sociodemographic OR "socio demographic")) OR AB ((socio-economic OR "socio economic" OR socioeconomic OR socio-demographic OR sociodemographic OR "socio demographic"))
S10	TI ((SES OR SEP)) OR AB ((SES OR SEP))
S11	S6 OR S7 OR S8 OR S9 OR S10
S12	TI ((Australia* OR Australa* OR Tasmania* OR Victoria* OR "New South Wales" OR NSW OR Queensland OR "Northern Territory*" OR "Western Australia*" OR "South Australia*" OR "Australian Capital Territory*")) OR AB ((Australia* OR Australa* OR Tasmania* OR Victoria* OR "New South Wales" OR NSW OR Queensland OR "Northern Territory*" OR "Western Australia*" OR "South Australia*" OR "Australian Capital Territory*"))
S13	TI ((Melbourne or Sydney or Brisbane or Hobart or Adelaide or Perth or Darwin or Canberra)) OR AB ((Melbourne or Sydney or Brisbane or Hobart or Adelaide or Perth or Darwin or Canberra))
S14	S12 OR S13
S15	S5 AND S11 AND S14
S16	"Limit 15 to yr"2013-Current"

Database: Embase (Elsevier)

Query	Search terms
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1	'Cardiovascular Diseases'/exp
2	((coronary OR heart OR cardiac* OR cardiovascular* OR pulmonary) NEAR/2 (syndrome* OR disease* OR event* OR occlusion* OR stenosis* OR thrombo* OR attack* OR failure OR embolism)):ti,ab,kw
3	(CHD OR CVD OR angina OR stroke OR hypertension):ti,ab,kw
4	((cerebrovascular OR 'peripheral arterial' OR 'rheumatic heart' OR 'congenital heart') NEAR/2 disease*) :ti,ab,kw
5	#1 OR #2 OR #3 OR #4
6	('Australian Bureau of Statistics' OR ABS) :ti,ab,kw
7	('Socio-economic Indexes for Areas' OR SEIFA OR 'Index of Relative Socio-Economic Disadvantage' OR IRSD OR ('Index of Relative Socio-Economic Advantage' AND Disadvantage) OR IRSAD OR ('Index of Education' AND Occupation) OR IEO OR 'Index of Economic Resources' OR IER) :ti,ab,kw
8	'Socioeconomic Factors'/exp
9	(socio-economic OR 'socio economic' OR socioeconomic OR socio-demographic OR sociodemographic OR 'socio demographic') :ti,ab,kw
10	(SES OR SEP) :ti,ab,kw
11	#6 OR #7 OR #8 OR #9 OR #10
12	Australia/exp
13	(Australia* OR Australa* OR Tasmania* OR Victoria* OR 'New South Wales' OR NSW OR Queensland OR 'Northern Territory' OR 'Western Australia*' OR 'South Australia*' OR 'Australian Capital Territory*') :ti,ab,kw
14	(Melbourne or Sydney or Brisbane or Hobart or Adelaide or Perth or Darwin or Canberra) :ti.ab.kw
15	#12 OR #13 OR #14
16	#5 AND #11 AND #15
17	'Limit 16 to yr"2013-Current"'

Supplementary file 4. Excluded studies

	Citation	Reason for exclusion
1	Paige, E., Welsh, J., Agostino, J. et al. Socioeconomic variation in absolute cardiovascular disease risk and treatment in the Australian population. <i>Preventative Medicine</i> . 2018;114:217-222.	Did not apply SEIFA
2	Lannin, AN., Anderson, CA., Donnan, GA. et al. Does patient age influence the quality of care received by patients with acute stroke? <i>Neuroepidemiology</i> . 2015;45(4):321.	Did not apply SEIFA
3	Biswas, S., Duffy, S., Lefkovits, J. et al. Impact of socioeconomic status on risk factors, treatment and clinical outcomes in patients undergoing percutaneous coronary intervention (PCI) for ST-elevation myocardial infarction (STEMI). <i>Heart Lung and Circulation</i> . 2017;36:S339-340.	Insufficient methods information available
4	O'Brien, J., Andrianopoulos, N., Brennan, A. et al. Impact of socioeconomic status on 30-day and 12-month outcomes following percutaneous coronary intervention. <i>Global Heart</i> . 2014;9(1):e99.	Insufficient methods information available
5	Kilkenny, M., Dalli, L., Kim, J. et al. Optimal combination medication treatment improves survival at one-year following ischaemic stroke/TIA: Linked registry and pharmaceutical claims study. <i>International Journal of Stroke</i> . 2020;15(1 Suppl):16.	Insufficient methods information available
6	Huynh, Q., Venn, AJ., Sanderson, K., Marwick, TH. Socioeconomic disadvantage and days at home after hospital discharge in patients with heart failure. <i>European Heart Journal</i> . 2018;39:793.	Insufficient methods information available
7	Matricciani, LA., Paquet, C., Howard, NJ., et al. Investigating individual- and area-level socioeconomic gradients of pulse pressure among normotensive and	Did not apply SEIFA

	hypertensive participants. <i>International Journal of Environmental Research and Public Health</i> . 2013;10(2):571-589.	
8	Huynh, Q., Negishi, K., De Pasquale, C. et al. Service resourcing and geographical variations in short-term readmissions or death after heart failure hospitalisation in Australia. <i>Heart Lung and Circulation</i> . 2017;26:S147-S148.	Insufficient methods information available
9	Sun, Y., Phan, H., Buscot, M. et al. Area-level and Individual-level Socio-economic Differences in Health-related Quality of Life Trajectories: Results from a 10-year Longitudinal Study. <i>International Journal of Stroke</i> . 2022;17(2):25.	Insufficient methods information available
10	Toms, R., Mayne, DJ., Feng, X., Bonney, A. Geographic variation in cardiometabolic risk factor prevalence explained by area-level disadvantage in the Illawarra-Shoalhaven region of the NSW, Australia. <i>Scientific Reports</i> . 2020;10(1):12770.	Focus on CVD risk factors or not CVD
11	Murphy, BM., Grande, MR. Navaratnam, HS. et al. Are poor health behaviours in anxious and depressed cardiac patients explained by sociodemographic factors. <i>European Journal of Preventative Cardiology</i> . 2013;20(6):995-1003.	Did not apply SEIFA
12	Appleton, S., Biermann, S., Hamilton-Bruce, MA. et al. Health literacy (HL) mediates the relationship of socioeconomic status (SES) and stroke in a population sample. <i>International Journal of Stroke</i> . 2013;8:43.	Insufficient methods information available
13	Bray, J., Beauchamp, R., Clark, R. et al. A comparison of Victorian regions at different risk levels of acute myocardial infarction – How are they different? <i>Heart Lung and Circulation</i> . 2019;28:S357-S358.	Did not apply SEIFA

14	De Jager, E., Gunnarsson, R., Ho, YH. Disparities in Advanced Peripheral Arterial Disease Presentation by Socioeconomic Status. <i>World Journal of Surgery</i> . 2022;46(6):1500-1507.	Insufficient methods information available
15	Hastings, K., Marquina, C., Talic, S. et al. P8 New Onset Cardiovascular Disease in Australia by Socioeconomic Groups: A Modelling Study. <i>Value in Health</i> . 2022;25(1):S2.	Insufficient methods information available
16	MacDonald, B., Patel, J., Tarca, A., Yim, D. Factors influencing oral health admissions in dental patients with acute rheumatic fever and rheumatic heart disease in a paediatric tertiary hospital. <i>Heart Lung and Circulation</i> . 2021;30:S108-S109.	Insufficient methods information available
17	Heart health linked to postcode. <i>Lancet</i> . 2017;74(10):28.	Insufficient methods information available
18	Kilkenny, MF., Casburn, K., Reyneke, M. et al. Influence of area-level socioeconomic status and risk factors for stroke: Impact of the New South Wales (NSW) Know your numbers program. <i>International Journal of Stroke</i> . 2014;9:11.	Focus on CVD risk factors or not CVD
19	Justo, E., Reeves, B., Ware, R. et al. Impact of social disadvantage on long term outcomes in children undergoing cardiac surgery. <i>Cardiology in the Young</i> . 2017;27(4):S487.	Insufficient methods information available
20	Munot, S., Rugel, E., Von, HA. et al. Area Level Socioeconomic Status (SES) and Bystander Response to Out-of-Hospital Cardiac Arrest (OHCA) in New South Wales (NSW). <i>Heart Lung and Circulation</i> . 2021;30:S275.	Insufficient methods information available
21	Fonseca, R., Otahal, P., Wiggins, N., Marwick, TH. Growth and geographical variation in the use of cardiac imaging in Australia may reflect ineffective utilisation. <i>European Heart Journal</i> . 2015;36:1113.	Insufficient methods information available

22	Ramkumar, S., Ochi, A., Yang, H. et al. The role of clinical, social and echocardiographic risk assessment prior to screening for incident atrial fibrillation. <i>Circulation</i> . 2018;138.	Insufficient methods information available
23	Astley, CM., Chew, DP., Keech, W. et al. Impact of cardiac rehabilitation programs on 12-month outcomes: A clinical network initiative. <i>Circulation</i> . 2018;138.	Insufficient methods information available
24	Dale, S., D'Este, C., McInnes, E. et al. Association between socioeconomic factors and arrival time to emergency departments after stroke. <i>International Journal of Stroke</i> . 2018;13(2):73.	Insufficient methods information available
25	Hyun, K., Brieger, D., Briffa, T. et a. The impact of socioeconomic status on secondary prevention of the acute coronary syndrome. <i>European Heart Journal</i> . 2020;41(Suppl 2):2970.	Insufficient methods information available
26	Nicholson, C., Hanly, M., Celermajer, D. Developing an Interactive Geographic Information Systems for Adult Congenital Heart Disease Service Planning in Rural New South Wales. <i>Heart Lung and Circulation</i> . 2021;30:S108.	Insufficient methods information available
27	Muthalaly, R., Baradi, A., Mehta, O. et al. 740 Neighbourhood socioeconomic disparities are associated with cardiovascular outcomes. <i>Heart Lung and Circulation</i> . 2020;29:S369.	Did not apply SEIFA
28	Chondur, R., Li, SQ., Guthridge, S., Lawton, P. Does relative remoteness affect chronic disease outcomes? Geographic variation in chronic disease mortality in Australia, 2002-2006. <i>Australian and New Zealand Journal of Public Health</i> . 2014;38(2):117-121.	Focus on CVD risk factors or not CVD
29	Fennell, K., Berry, N., Meng, R. et al. Self-reported physical health, mental health and participation in health-promoting behaviours of rural and urban	Insufficient methods information available

	South Australian adults with a history of cardiovascular disease (CVD). <i>Heart Lung and Circulation</i> . 2016;25:S321-S322.	
30	Wilkinson, L. Inequities in rheumatic heart disease. <i>Australian and New Zealand Journal of Obstetrics and Gynaecology</i> . 2017;57:8-9.	Insufficient methods information available
31	Barnes, M., Challa, P., Dahiya, A. et al. Epidemiology of heart failure in a multicultural and low socio-economic population – an audit of Logan Hospital heart failure service. <i>Global Heart</i> . 2014;9(1):e274.	Insufficient methods information available
32	Paige, E., Banks, E., Agostino, J. The relationship of socioeconomic factors to the use of preventative cardiovascular disease medications: A prospective Australian cohort study. <i>Preventative Medicine</i> . 2022;154.	Did not apply SEIFA
33	Middeldorp, ME., Gupta, A., Pathak, R. et al. Do socioeconomic factors influence the outcomes of risk factor management and freedom of patients with atrial fibrillation? <i>Heart Rhythm</i> . 2018;15(5):S497.	Insufficient methods information available
34	Ngo, AD., Paquet, C., Howard, NJ. et al. Area-level socioeconomic characteristics, prevalence and trajectories of cardiometabolic risk. <i>International Journal of Environmental Research and Public Health</i> . 2014;11(1):830-848.	Focus on CVD risk factors or not CVD
35	Muthalaly, R., Baradi, A., Mehta, O. et al. 741 Neighbourhood Socioeconomic factors are strongly associated with traditional risk factors and cardiovascular death. <i>Heart Lung and Circulation</i> . 2020;29:S369-S370.	Did not apply SEIFA
36	Fonseca, R., Wiggins, N., Otahal, P., Marwick, TH. Growth and geographical variation in the use of echocardiography in Australia. <i>Journal of American Society of Echocardiography</i> . 2015;28(6):B62-B63.	Did not apply SEIFA

37	Maduka, C., Gunaratne, AW., Dale, S. et al. The association between socioeconomic factors and arrival time to emergency departments after stroke-the t-trial. <i>Stroke</i> . 2018;49.	Insufficient methods information available
38	Thakkar, HV., Hollingsworth, L., Enright, JA. et al. Factors associated with successful return to work in young heart failure and ischaemic heart disease patients following index hospital admission. <i>European Journal of Preventative Cardiology</i> . 2021;28(Suppl 1):i299.	Insufficient methods information available
39	Jackson, CA., Mishra, GD. Educational and homeownership inequalities in stroke incidence: A prospective longitudinal study of mid-aged women in Australia. <i>Cerebrovascular Diseases</i> . 2013;35:52.	Insufficient methods information available
40	Middeldorp, ME., Elliot, AD., Pathak, RK. et al. Does socioeconomic factors influence the outcomes of risk factor management and freedom of patients with atrial fibrillation. <i>Europace</i> . 2018;20:i236-i237.	Insufficient methods information available
41	Nichols, L., Stirling, C., Stankovich, J., Gall, S. Time to treatment and inter-hospital transfer of aneurysmal subarachnoid haemorrhage cases in a retrospective population-based cohort in Tasmania. <i>International Journal of Stroke</i> . 2018;13:15.	Insufficient methods information available
42	Morton, JI., Ilomaki, J., Wood, SJ. et al. Trends in rehospitalisation rates for myocardial infarction, heart failure, and stroke in people with and without diabetes in Australia from 2012-2018. <i>Diabetes</i> . 2021;70 (Suppl 1).	Insufficient methods information available
43	Chuang, M., MacIssac, A., Lefkovits, J. Variation in coronary angiography across Australia: Exploring the correlations with sociodemographic health service and disease burden indices. <i>Heart Lung and Circulation</i> . 2016;25:S72.	Insufficient methods information available

44	Ramkumar, S, Yang, H, Wang, Y et al. Abstract 14994: Association Between Low Socio-Economic Status and Risk of Incident Atrial Fibrillation. Circulation. 2017;136:A14994.	Insufficient methods information available
45	Burgner, DP, Cooper, MN, Moore, HC, et al. Childhood Hospitalisation with Infection and Cardiovascular Disease in Early-Mid Adulthood: A Longitudinal Population-Based Study. PLoS ONE 2015;10(5): e0125342.	Socioeconomic status identified as a confounder
46	Truong, T, Koh, Y, Yosufi, R, et al. Understanding valvular heart disease in the dental setting. Australian Dental Journal. 2021;66(3):254-261.	Study population is not persons with cardiovascular disease

Supplementary file 5. Narrative synthesis of included studies and implications

Socioeconomic findings and implications

Study findings and implications were synthesised within five concepts: (1) inequalities for populations in areas with high levels of socioeconomic disadvantage, (2) socioeconomic disadvantage for Aboriginal and Torres Strait Islander populations, (3) variation of findings depending on how socioeconomic status was measured, (4) population representativeness in CVD research, and (5) strategies required to target socioeconomic disadvantage.

Inequalities for populations in areas with high levels of socioeconomic disadvantage

Of studies examining the relationship between area-based SES using SEIFA and CVD outcomes, including mortality^{24, 25}, morbidity (e.g., Aneurysmal subarachnoid haemorrhage, atrial fibrillation, and other CVD)^{26 27 28-34 35}, and risk factors for CVD^{31, 36}, inequalities were generally identified to be greater for groups that experienced higher levels of socioeconomic disadvantage at an area-level.^{22 37 38} A longitudinal study examining deaths over a ten year period identified widening inequalities in premature mortality rates attributed to non-communicable diseases, including CVD, for populations in areas characterised by higher levels of socioeconomic disadvantage.³⁹ Other studies identified higher rates of CVD-related hospital presentations (e.g., chest pain)³⁴, admissions (e.g., myocardial infarction, heart failure, stroke, and hypertensive disease)^{23 21, 40, 41}, out of hospital cardiac arrests⁴²⁻⁴⁴, and adverse outcomes attributed to CVD (e.g., re-admissions and mortality following myocardial infarction)^{45 46, 47} in areas characterised by higher levels of socio-economic disadvantage. Further, some studies identified that persons residing in areas characterised by socioeconomic disadvantage also had a greater time to hospital admission⁴⁸, longer reperfusion times (for myocardial infarction management)⁴⁹, and were less likely to achieve treatment targets for secondary prevention interventions.⁵⁰

Socioeconomic disadvantage for Aboriginal and Torres Strait Islander populations

Four studies had a specific focus on Aboriginal and Torres Strait Islander populations and SEIFA. A cohort study of children undergoing cardiac surgery identified that a higher proportion of Aboriginal and/or Torres Strait Islander children resided in the lowest third of areas classed as socioeconomic disadvantaged when compared with non-Indigenous children, and had a higher six-year mortality rate following surgery.⁵¹ Studies examining the prevalence of rheumatic heart disease identified that a higher burden was experienced by Aboriginal and/or Torres Strait Islander populations residing in areas - characterised by high levels of socioeconomic disadvantage when compared with non-Indigenous populations⁵², with regional differences identified.⁵³ Socioeconomic disadvantage was also identified to contribute to lower survival rates for Aboriginal and/or Torres Strait Islander children with congenital heart defects, when compared with non-Indigenous children.⁵⁴

Variation of findings depending on how socioeconomic status was measured

Some studies did not identify associations between area-level socioeconomic disadvantage and specific study outcome measures (e.g., risk of CVD, blood pressure control, and mortality, adverse outcomes following percutaneous coronary intervention, heart failure management).^{47, 49, 55-57 58} How researchers measured SES mediated with this association. For example, a study that compared the association between individual measures of SES (e.g., education levels) and area-level measures using SEIFA with the incidence of primary and secondary CVD events, identified the association to be stronger for individual measures.⁵⁹ Other studies also identified that socioeconomic inequality for disease incidence and prevalence varied depending on how it was measured, and that area-level measures can underestimate or overestimate inequality which has implications for policy.^{60 29} A study examining the relationship between CVD intervention outcomes (e.g., coronary artery surgery) and area-based socioeconomic status did not identify any association between socioeconomic disadvantage and treatment outcomes, including survival.³⁶

Population representativeness in CVD research

Studies included consideration of area-level socioeconomic population representativeness in research. One study analysed participants involved in stroke clinical research and identified that participants residing in areas characterised by higher levels of SES had lower odds of participating in research.⁶¹ Another study identified that more than one-third of persons admitted to rural hospitals for atherothrombotic diseases resided in the most disadvantaged SEIFA quintile, compared with one-fifth of persons admitted to metropolitan hospitals.⁶² This was identified as important as CVD studies may not be representative of populations from a socioeconomic area-level perspective which has implications for the generalisability of research findings.⁶²

Strategies required to target socioeconomic disadvantage

Due to these inequalities, studies supported the need for targeted strategies for CVD prevention for populations residing in areas characterised by higher levels of socio-economic disadvantage^{40 45} and consideration of individual factors (e.g., socioeconomic factors and other factors including physical activity) that need to be addressed.^{59 60 29, 30} For example, an assessment of cardiac rehabilitation attendance identified that non-attending patients were more likely to be older, female, and to experience higher socioeconomic disadvantage when compared with those who attended, which is important in informing interventions to promote the uptake of secondary prevention in at risk patients.⁶³

Two studies supported the need for addressing economic costs attributed to socioeconomic disadvantage and CVD. The first study applied an economic approach to model the costs of future CVD related health outcomes by SEIFA quintiles.⁶⁴ The study identified that 8.4% of persons residing in areas in the most disadvantaged quintile were at a high risk of CVD compared with 3.7% of persons in the least disadvantaged quintile, with an estimated additional cost of \$183 million (AUD) for acute health care costs between the groups.⁶⁴ The second study applied a human capital approach to model the economic impacts of cardiovascular-related premature deaths and identified that deaths occurring in areas with higher levels of socioeconomic disadvantage, had a disproportionately large impact on the total present value of lifetime income loss.⁶⁵

