



## **Appendix**

**This appendix was part of the submitted manuscript and has been peer reviewed.  
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Appendix to: Randall DA, Lujic S, Havard A, et al. Multimorbidity among Aboriginal people in New South Wales contributes significantly to their higher mortality. *Med J Aust* 2018; 209: 19-23. doi: 10.5694/mja17.00878.

**Table 1. Morbidities and ICD-10-AM codes used in our study**

No.	Name	ICD-10-AM Codes	Type	Scale
1	AIDS/HIV	B20.x-B22.x, B24.x	Physical	Elixhauser
2	Alcohol abuse	F10, E52, G62.1, I42.6, K29.2, K70.0, K70.3, K70.9, T51.x, Z50.2, Z71.4, Z72.1	Mental	Elixhauser
3	Asthma	J45.x, J46.x	Physical	New
4	Bronchiectasis	J47.x	Physical	New
5	Cancer	C00.x -C26.x, C30.x -C34.x, C37.x -C41.x, C43.x, C45.x -C58.x, C60.x -C76.x, C77.x -C80.x, C81.x-C85.x, C88.x, C96.x, C90.0, C90.2, C97.x	Physical	Elixhauser (combined three categories: 'Lymphoma', 'Metastatic cancer', 'Solid tumor without metastasis')
6	Cardiac arrhythmias	I44.1-I44.3, I45.6, I45.9, I47.x-I49.x, R00.0, R00.1, R00.8, T82.1, Z45.0, Z95.0	Physical	Elixhauser
7	Cerebrovascular disease	G45.x, G46.x, H34.0, I60.x-I69.x	Physical	Charlson
8	Chronic ischaemic heart disease	I25.x	Physical	New
9	Chronic pulmonary disease	I27.8, I27.9, J40.x -J44.x, J60.x -J67.x, J68.4, J70.1, J70.3	Physical	Elixhauser (excluding J45-J47, now in two new categories: 'Asthma' and 'Bronchiectasis')
10	Coagulopathy	D65.x-D68.x, D69.1, D69.3-D69.6	Physical	Elixhauser
11	Congestive heart failure	I09.9, I11.0, I13.0, I13.2, I42.0, I42.5-I42.9, I43.x, I50.x, P29.0	Physical	Elixhauser (excluding I25.5, now in new category: 'Chronic ischaemic heart disease')
12	Dementia	F00.x-F03.x, F05.1, G30.X, G31.1	Mental	Charlson
13	Depression	F20.4, F31.3-F31.5, F32.x, F33.x, F34.1, F41.2, F43.2	Mental	Elixhauser
14	Diabetes	E10.x- E14.x	Physical	Elixhauser (combined two categories: 'Diabetes, uncomplicated', 'Diabetes, complicated')
15	Drug abuse	F11.x -F16.x, F18.x, F19.x, Z71.5, Z72.2	Mental	Elixhauser
16	Epilepsy and convulsions	G40.x, G41.x, R56.x	Physical	New
17	Hypertension	I10.x -I13.x, I15.x	Physical	Elixhauser (combined two categories: 'Hypertension, uncomplicated', 'Hypertension, complicated')
18	Hypothyroidism	E00.x -E03.x, E89.0	Physical	Elixhauser
19	Liver disease	B18.x, I85.x, I86.4, I98.2, K70.x, K71.1, K71.3-K71.5, K71.7, K72.x -K74.x, K76.0, K76.2-K76.9, Z94.4	Physical	Elixhauser
20	Multiple sclerosis	G35.x	Physical	New
21	Myocardial infarction	I21.x, I22.x	Physical	Charlson (excluding I25.2, now in new category: 'Chronic ischaemic heart disease')
22	Other neurological disorders	G10.x -G13.x, G20.x -G22.x, G25.4, G25.5, G31.2, G31.8, G31.9, G32.x, G36.x-G37.x, G93.1, G93.4, R47.0	Physical	Elixhauser (excluding G35, G40, G41, R56, now in new categories: 'Multiple sclerosis' and 'Epilepsy and convulsions')
23	Paralysis	G04.1, G11.4, G80.01, G80.02, G81.x, G82.x, G83.0-G83.4, G83.9	Physical	Elixhauser
24	Peptic ulcer disease excluding bleeding	K25.7, K25.9, K26.7, K26.9, K27.7, K27.9, K28.7, K28.9	Physical	Elixhauser
25	Peripheral vascular disorders	I70.x, I71.x, I73.1, I73.8, I73.9, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8, Z95.9	Physical	Elixhauser
26	Psychoses	F20.x, F22.x -F25.x, F28.x, F29.x, F30.2, F31.2, F31.5	Mental	Elixhauser
27	Pulmonary circulation disorders	I26.x, I27.x, I28.0, I28.8, I28.9	Physical	Elixhauser
28	Renal failure	I12.0, I13.1, N18.x, N19.x, N25.0, Z49.0-Z49.2, Z94.0, Z99.2	Physical	Elixhauser
29	Rheumatoid arthritis / collagen vascular diseases	L94.0, L94.1, L94.3, M05.x, M06.x, M08.x, M12.0, M12.3, M30.x, M31.0-M31.3, M32.x -M35.x, M45.x, M46.1, M46.8, M46.9	Physical	Elixhauser
30	Valvular disease	A52.0, I05.x -I08.x, I09.1, I09.8, I34.x -I39.x, Q23.0-Q23.3, Z95.2-Z95.4	Physical	Elixhauser

**Table 2. Characteristics of the population by Aboriginal status**

	Aboriginal		Non-Aboriginal	
	n	%	n	%
Total	117 999	100%	5 319 019	100%
Sex				
Male	55 574	47.1%	2 457 090	46.2%
Female	62 425	52.9%	2 861 929	53.8%
Age group (years)				
0–4	19 653	16.7%	462 686	8.7%
5–9	16 117	13.7%	455 137	8.6%
10–14	8532	7.2%	199 166	3.7%
15–19	8741	7.4%	181 721	3.4%
20–24	10 117	8.6%	249 383	4.7%
25–29	9033	7.7%	310 902	5.8%
30–34	7756	6.6%	356 688	6.7%
35–39	6912	5.9%	373 784	7.0%
40–44	7262	6.2%	382 650	7.2%
45–49	5886	5.0%	332 239	6.2%
50–54	5121	4.3%	342 024	6.4%
55–59	4050	3.4%	326 756	6.1%
60–64	3129	2.7%	318 674	6.0%
65–69	2283	1.9%	298 162	5.6%
70–74	1558	1.3%	227 435	4.3%
75–79	983	0.8%	185 569	3.5%
80–84	536	0.5%	151 120	2.8%
85 or older	330	0.3%	164 923	3.1%
Socio-economic status (IRSAD)				
Quintile 1 (most disadvantaged)	64 468	54.6%	948 939	17.8%
Quintile 2	25 298	21.4%	981 432	18.5%
Quintile 3	15 911	13.5%	1 016 429	19.1%
Quintile 4	9020	7.6%	1 167 422	21.9%
Quintile 5 (most advantaged)	3302	2.8%	1 204 797	22.7%

IRSAD = Index of Relative Socio-economic Advantage and Disadvantage.

**Table 3. Prevalence of specific morbidities by Aboriginal status and broad age groups, and age-adjusted prevalence rate ratios.**

	Total		0-24 years		25-54 years		55+ years		ARR*
	Aboriginal n=117 999	Non-Aboriginal n=5 319 019	Aboriginal n=63 160	Non-Aboriginal n=1 548 093	Aboriginal n=41 970	Non-Aboriginal n=2 098 287	Aboriginal n=12 869	Non-Aboriginal n=1 672 639	
AIDS/HIV	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	1.84 (1.45–2.35)
Alcohol abuse	9.4%	2.4%	2.6%	0.8%	19.0%	3.5%	11.7%	2.4%	4.71 (4.62–4.80)
Asthma	5.8%	2.6%	5.7%	3.8%	5.5%	2.0%	7.0%	2.3%	1.93 (1.88–1.97)
Bronchiectasis	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.6%	0.4%	1.96 (1.66–2.32)
Cancer (solid tumour without metastasis, metastatic cancer, and lymphoma)	1.4%	3.8%	0.1%	0.1%	1.3%	1.7%	8.2%	9.8%	0.90 (0.85–0.94)
Cardiac arrhythmias	3.5%	4.7%	1.0%	0.6%	3.6%	1.8%	15.3%	12.0%	1.82 (1.77–1.88)
Cerebrovascular disease	1.3%	1.8%	0.1%	0.1%	1.2%	0.5%	8.0%	5.1%	2.16 (2.06–2.27)
Chronic ischaemic heart disease	3.0%	3.8%	0.0%	0.0%	2.6%	0.8%	18.9%	11.0%	2.43 (2.35–2.50)
Chronic pulmonary disease (not including asthma or bronchiectasis)	2.3%	1.3%	0.2%	0.1%	2.2%	0.3%	13.6%	3.8%	5.18 (4.99–5.37)
Coagulopathy	0.9%	0.9%	0.3%	0.2%	1.1%	0.6%	2.6%	1.8%	1.83 (1.72–1.95)
Congestive heart failure (not including ischaemic cardiomyopathy)	1.3%	1.4%	0.1%	0.1%	1.1%	0.3%	7.9%	4.1%	3.29 (3.13–3.46)
Dementia	0.2%	0.7%	0.0%	0.0%	0.1%	0.0%	1.9%	2.2%	2.02 (1.80–2.27)
Depression	6.0%	2.9%	2.1%	1.0%	11.3%	4.1%	7.3%	3.3%	2.57 (2.51–2.63)
Diabetes (with and without complications)	5.3%	4.5%	0.4%	0.4%	5.8%	1.8%	27.3%	11.8%	2.79 (2.72–2.85)
Drug abuse	7.5%	1.4%	2.2%	0.5%	16.8%	2.8%	3.2%	0.5%	5.45 (5.34–5.57)
Epilepsy and convulsions	3.3%	1.3%	3.1%	1.8%	3.8%	1.1%	3.0%	1.1%	2.29 (2.21–2.36)
Hypertension (complicated and uncomplicated)	6.6%	8.6%	0.2%	0.1%	6.4%	2.4%	38.6%	24.2%	2.24 (2.20–2.28)
Hypothyroidism	0.4%	0.4%	0.1%	0.1%	0.5%	0.3%	1.8%	1.0%	2.11 (1.93–2.31)
Liver disease	1.4%	0.7%	0.1%	0.1%	2.9%	0.7%	3.2%	1.2%	3.39 (3.23–3.56)
Multiple sclerosis	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.67 (0.51–0.90)
Myocardial infarction	1.6%	1.5%	0.0%	0.0%	1.7%	0.5%	9.0%	4.2%	3.01 (2.88–3.15)
Other neurological disorders	0.6%	0.7%	0.1%	0.1%	0.7%	0.3%	2.6%	1.9%	2.08 (1.93–2.24)
Paralysis	0.8%	0.8%	0.1%	0.1%	0.9%	0.4%	4.1%	2.1%	2.41 (2.26–2.56)
Peptic ulcer disease (excluding bleeding)	0.5%	0.7%	0.0%	0.0%	0.7%	0.4%	1.8%	1.5%	1.55 (1.42–1.68)
Peripheral vascular disorder	0.8%	1.1%	0.1%	0.1%	0.5%	0.2%	4.9%	3.1%	2.24 (2.10–2.39)
Psychoses	2.4%	0.8%	0.6%	0.2%	5.2%	1.4%	2.0%	0.8%	3.46 (3.33–3.59)
Pulmonary circulation disorders	0.7%	0.8%	0.1%	0.0%	0.9%	0.4%	3.0%	1.9%	2.17 (2.03–2.33)
Renal failure	1.1%	1.1%	0.1%	0.0%	0.9%	0.3%	7.4%	3.1%	3.37 (3.20–3.56)
Rheumatoid arthritis / collagen vascular diseases	0.4%	0.6%	0.1%	0.1%	0.5%	0.3%	1.8%	1.3%	1.47 (1.35–1.60)
Valvular disease	0.7%	1.0%	0.2%	0.1%	0.7%	0.3%	3.0%	2.6%	1.96 (1.83–2.09)

\*ARR = adjusted rate ratio from Poisson regression model, adjusted for 5-year age group.

**Table 4. Adjusted prevalence rate ratios of multimorbidity, and adjusted hazard ratios for mortality in one year with sequential adjustment for morbidity count**

	Prevalence of multimorbidity: adjusted rate ratio* (95% CI)	Hazard of mortality within one year: adjusted hazard ratio (95% CI)	
		Model 1*	Model 2†
<b>Aboriginal status</b>			
Non-Aboriginal	1	1	1
Aboriginal	2.59 (2.55–2.62)	2.43 (2.24–2.62)	1.51 (1.39–1.63)
<b>Age group (years)</b>			
0–4	1	1	1
5–9	2.24 (2.10–2.40)	0.41 (0.28–0.59)	0.36 (0.25–0.53)
10–14	4.12 (3.84–4.41)	0.75 (0.50–1.12)	0.59 (0.39–0.88)
15–19	8.46 (7.95–9.01)	2.28 (1.70–3.05)	1.80 (1.35–2.41)
20–24	15.8 (14.9–16.7)	2.47 (1.89–3.23)	1.78 (1.36–2.32)
25–29	19.8 (18.7–20.9)	2.38 (1.84–3.09)	1.62 (1.24–2.10)
30–34	21.0 (19.8–22.2)	2.93 (2.29–3.75)	1.94 (1.51–2.48)
35–39	23.4 (22.1–24.8)	4.84 (3.85–6.09)	3.10 (2.46–3.90)
40–44	27.8 (26.3–29.4)	5.99 (4.79–7.49)	3.64 (2.91–4.55)
45–49	35.4 (33.4–37.4)	11.3 (9.11–14.0)	6.27 (5.05–7.78)
50–54	44.7 (42.3–47.3)	16.8 (13.7–20.8)	8.49 (6.87–10.5)
55–59	58.3 (55.2–61.7)	25.4 (20.6–31.2)	11.2 (9.12–13.9)
60–64	77.2 (73.0–81.6)	37.7 (30.7–46.4)	14.5 (11.8–17.8)
65–69	101 (95.8–107)	54.5 (44.4–66.9)	17.7 (14.4–21.8)
70–74	132 (124–139)	90.4 (73.7–110)	24.7 (20.1–30.3)
75–79	164 (155–173)	156 (127–191)	36.1 (29.4–44.4)
80–84	195 (184–206)	272 (222–333)	54.6 (44.4–67)
85 or older	229 (217–242)	640 (523–783)	114 (92.9–140)
<b>Sex</b>			
Male	1.00	1.00	1.00
Female	0.71 (0.70–0.71)	0.72 (0.70–0.73)	0.84 (0.82–0.86)
<b>Socio-economic status (IRSAD)</b>			
Quintile 1 (most disadvantaged)	1.00	1.00	1.00
Quintile 2	0.87 (0.86–0.87)	0.88 (0.86–0.91)	0.94 (0.91–0.96)
Quintile 3	0.80 (0.80–0.81)	0.82 (0.80–0.85)	0.89 (0.87–0.92)
Quintile 4	0.73 (0.72–0.73)	0.73 (0.71–0.75)	0.81 (0.79–0.84)
Quintile 5 (most advantaged)	0.64 (0.63–0.64)	0.59 (0.57–0.61)	0.69 (0.67–0.71)
<b>Morbidity count</b>			
0			1.00
1			3.83 (3.69–3.98)
2			5.38 (5.18–5.59)
3			6.96 (6.69–7.24)
4			8.68 (8.33–9.04)
5			11.4 (10.9–11.9)
6			13.4 (12.8–14.1)
7			16.2 (15.4–17.1)
8 or more			22.8 (21.8–23.8)

CI = confidence interval; IRSAD = Index of Relative Socio-economic Advantage and Disadvantage. \* Adjusted for age group, sex, and socio-economic status. † As for Model 1, with additional adjustment for morbidity count.