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Supporting Information

Supplementary methods and results

This appendix was part of the submitted manuscript and has been peer reviewed.
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Appendix to: Ellis RJ, Moffatt CRM, Aaron LT, et al. Factors associated with the hospitalisation and death of residential aged care residents with COVID-19 during the Omicron (BA.1) wave in Queensland. *Med J Aust* 2023; doi: 10.5694/mja2.51813.

Supplementary methods: definitions

- COVID-19 case: Confirmed case – laboratory polymerase chain reaction (PCR)-positive; probable case – rapid antigen test (RAT)-positive.[1] No epidemiological or clinical criteria were applied.
- COVID-19 death: Any death of a person with COVID-19 within 28 days of diagnosis, in the absence of a clear alternative cause (eg, trauma).
- COVID-19 hospitalisation: Any hospital presentation or admission within 14 days of COVID-19 diagnosis.
- Comorbid conditions: When thorough medical histories were available, the absence of records of a condition was deemed to indicate the person did not have the condition. When thorough medical histories were not available, the absence of records of a condition was recorded as "missing data".
    - Dementia: any documentation in medical records of a dementia syndrome.
    - Cognitive impairment: documentation of cognitive impairment but not of dementia syndrome.
    - Diabetes mellitus: any documentation in medical records of any type of diabetes mellitus.
    - Ischaemic heart disease: any documentation in medical records of ischaemic heart disease or any coronary ischaemic event, or coronary angiogram evidence suggesting coronary artery disease.
    - Cerebrovascular disease: any documentation in medical records of an ischaemic stroke or transient ischaemic even, or cerebral angiogram evidence suggesting cerebrovascular disease, or imaging evidence of cortical volume loss from a previous ischaemic event. Vascular dementia in isolation, or evidence of microangiopathic disease on imaging was not included in the definition of cerebrovascular disease.
    - Atrial fibrillation: as any documentation in medical records of atrial fibrillation or atrial flutter.
    - Heart failure: any documentation of heart failure, or echocardiogram findings suggesting reduced ejection fraction, significant valvular abnormalities, or systolic/diastolic dysfunction consistent with heart failure.
    - Chronic lung disease: any documentation of chronic lung pathology, including both restrictive and obstructive patterns of disease, or suggestive spirometry findings, or a history suggesting chronic lung disease (eg, extensive smoking history or occupational exposure) with clinical correlation in the absence of a formal diagnosis.
    - Asthma: any documented history of asthma.
    - Cancer history: any active history of malignancy (apart from non-melanoma skin cancer), or clinical findings convincingly suggestive of malignancy in the absence of a formal tissue diagnosis.
    - Chronic kidney disease: any documented history of chronic kidney disease, or at least two consecutive measurements at least three months of estimated glomerular filtration rate lower than 60 mL/min/1.73m^2 and no subsequent improvement.
    - Obesity: body mass index $\geq$ 30 kg/m^2.
- Cardiopulmonary resuscitation (CPR) status: grouped as "to be resuscitated" or "not to be resuscitated", based on advanced care planning documents, advanced resuscitation plans, and advanced health directives. A clearly documented CPR status in clinical notes was deemed sufficient if mentioned directly. The absence of documented CPR status when medical records were clearly in active use was deemed to indicate that a person should be resuscitated, as this would be the approach taken in a hospital cardiac arrest scenario. If no medical records were available, this value was recorded as missing.

1. Australian Department of Health. Coronavirus disease 2019 (COVID-19). CDNA National Guidelines for Public Health Units (version 7.0). Canberra: Australian Government; 2022. https://www.health.gov.au/resources/collections/cdna-series-of-national-guidelines-songs (viewed Nov 2022).

Table 1. COVID-19 diagnoses, hospitalisations, and deaths, by residential aged care facility (RACF) characteristic*

Characteristic	Number of residents	COVID-19 cases	Hospital admissions	Deaths
All	6794	1071 (15.8%)	151 [14%]	126 [12%]
Organisation type				
Not-for-profit	3206	502 (15.7%)	65 [13%]	58 [12%]
For-profit	3588	569 (15.8%)	86 [15%]	68 [12%]
Staff cases†				
< 10%	1018	60 (5.8%)	7 [12%]	8 [13%]
10–20%	3745	530 (14.1%)	73 [14%]	56 [11%]
> 20%	2448	481 (19.6%)	71 [15%]	62 [13%]
Socio-economic status‡				
Disadvantaged	1141	212 (18.5%)	42 [20%]	35 [17%]
Middle	2221	294 (13.2%)	48 [16%]	31 [11%]
Advantaged	3546	565 (15.9%)	61 [11%]	60 [11%]

COVID-19 = coronavirus disease 2019.

* Restricted to 71 RACFs in which COVID-19 infections of residents were reported.

† COVID-19 infections of staff members as proportion of reported RACF total permanent staff number.

‡ Based on SEIFA (2016) Index of Relative Socio-Economic Advantage and Disadvantage, determined from RACF postcode.[1] Groups distinguished by deciles: disadvantaged (deciles 1-3), middle (deciles 4-7), and advantaged (deciles 8-10).

1. Australian Bureau of Statistics. Socio-Economic Indices for Areas (SEIFA) 2016. 27 Mar 2018. https://www.abs.gov.au/ausstats/abs@.nsf/mf/2033.0.55.001.

Table 2. Characteristics of 1071 residential aged care facility residents in the Metro South Hospital and Health Service area of southeast Queensland diagnosed with COVID-19, 13 December 2021 – 24 January 2022, by cardiopulmonary resuscitation status

Characteristic	To be resuscitated	Not to be resuscitated	Status unknown
Number of people	500	431	140
Age (years)			
Under 70	49 (58%)	24 (29%)	11 (13%)
70–79	131 (52%)	87 (35%)	32 (13%)
80–89	209 (45%)	200 (43%)	55 (12%)
90 or more	111 (41%)	120 (44%)	42 (15%)
Sex			
Women	286 (48%)	235 (39%)	76 (13%)
Men	214 (45%)	196 (41%)	64 (14%)
Cognition			
No impairment	146 (57%)	108 (42%)	3 (1%)
Mild impairment	129 (51%)	112 (44%)	11 (4%)
Diagnosed dementia	207 (49%)	207 (49%)	6 (1%)
Missing data	18 (13%)	4 (3%)	120 (85%)
Vaccination doses			
None	40 (31%)	64 (49%)	27 (21%)
One	27 (47%)	24 (42%)	6 (11%)
Two	236 (46%)	215 (42%)	58 (11%)
Three or more	188 (53%)	124 (35%)	42 (12%)
Missing data	9 (45%)	4 (20%)	7 (35%)
Diabetes mellitus			
No	344 (52%)	307 (47%)	8 (1%)
Yes	135 (53%)	115 (45%)	6 (2%)
Missing data	21 (45%)	9 (20%)	126 (35%)
Ischaemic heart disease			
No	371 (56%)	285 (43%)	7 (1%)
Yes	108 (43%)	138 (55%)	5 (2%)
Missing data	21 (13%)	8 (5%)	128 (82%)
Cerebrovascular disease			
No	383 (56%)	293 (43%)	7 (1%)
Yes	96 (42%)	129 (56%)	4 (2%)
Missing data	21 (13%)	9 (6%)	129 (81%)
Atrial fibrillation			
No	387 (54%)	316 (44%)	10 (1%)
Yes	91 (46%)	106 (54%)	1 (<1%)
Missing data	22 (14%)	9 (6%)	129 (81%)
Heart failure			
No	430 (56%)	329 (43%)	11 (1%)
Yes	48 (34%)	93 (65%)	2 (1%)
Missing data	22 (14%)	9 (6%)	127 (80%)
Chronic lung disease			
No	392 (53%)	331 (45%)	11 (1%)
Yes	86 (48%)	91 (51%)	3 (2%)
Missing data	22 (14%)	9 (6%)	126 (80%)

Characteristic	To be resuscitated	Not to be resuscitated	Status unknown
Asthma			
No	437 (52%)	392 (47%)	12 (1%)
Yes	42 (58%)	29 (40%)	1 (1%)
Missing data	21 (13%)	10 (6%)	127 (80%)
Cancer history			
No	419 (55%)	336 (44%)	10 (1%)
Yes	59 (40%)	86 (48%)	2 (2%)
Missing data	22 (14%)	9 (6%)	128 (81%)
Hypertension			
No	197 (56%)	150 (43%)	2 (<1%)
Yes	284 (50%)	274 (48%)	12 (2%)
Missing data	19 (13%)	7 (5%)	126 (83%)
Chronic kidney disease			
No	386 (57%)	282 (42%)	8 (1%)
Yes	93 (39%)	140 (59%)	4 (2%)
Missing data	21 (13%)	9 (6%)	128 (81%)
Body mass index			
< 30 kg/m^2	377 (52%)	339 (47%)	7 (1%)
≥ 30 kg/m^2	76 (54%)	65 (46%)	1 (<1%)
Missing data	47 (23%)	27 (13%)	132 (64%)

Table 3. Likelihood of hospitalisation and death for 1071 residential aged care facility residents in the Metro South Hospital and Health Service area of southeast Queensland diagnosed with COVID-19, 13 December 2021 – 24 January 2022, by clinical characteristic: univariable and multivariable analyses

	Hospitalisation		Death	
Characteristic	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)
Age (years)[a]				
Per five years	1.03 (0.94–1.14)	1.06 (0.96–1.17)	1.31 (1.16–1.48)	1.38 (1.21–1.57)
Under 70	1	1	1	1
70–79	0.9 (0.5–2.0)	1.0 (0.5–2.0)	1.1 (0.4–3.2)	1.2 (0.4–3.4)
80–89	1.3 (0.6–2.5)	1.4 (0.7–2.7)	2.5 (1.0–6.5)	2.9 (1.1–7.5)
90 or more	1.0 (0.5–2.0)	1.1 (0.5–2.3)	2.7 (1.0–7.1)	3.5 (1.3–9.2)
Sex (men *v* women)[b]	1.6 (1.1–2.3)	1.7 (1.2–2.4)	2.0 (1.4–2.9)	2.5 (1.7–3.6)
Cognition[a,b,c]				
No impairment	1	1	1	1
Mild impairment	1.1 (0.6–1.8)	1.1 (0.7–1.9)	0.9 (0.5–1.7)	0.8 (0.4–1.6)
Diagnosed dementia	1.8 (1.1–2.7)	1.9 (1.2–3.0)	2.2 (1.3–3.6)	2.2 (1.3–3.7)
Vaccination status[a,b,d]				
None	4.5 (2.5–8.2)	5.1 (2.8–9.4)	11.0 (5.6–23.0)	13.0 (6.2–27.0)
One	3.6 (1.7–8.0)	4.0 (1.8–8.9)	4.4 (1.6–12.0)	4.5 (1.6–13.0)
Two	3.2 (1.9–5.1)	3.0 (1.8–4.9)	5.2 (2.7–10.0)	4.7 (2.4–9.0)
Three or more	1	1	1	1
Diabetes mellitus[a,b,e]	1.1 (0.7–1.6)	1.1 (0.7–1.6)	1.7 (1.1–2.6)	1.9 (1.3–3.0)
Ischaemic heart disease[a,b,f]	1.4 (1.0–2.1)	1.3 (0.9–1.9)	1.2 (0.8–1.8)	0.9 (0.6–1.5)
Cerebrovascular disease[a,b,f,g]	1.2 (0.8–1.8)	1.1 (0.7–1.6)	1.6 (1.0–2.4)	1.6 (1.0–2.4)
Atrial fibrillation[a,b]	1.4 (1.0–2.1)	1.1 (0.8–1.8)	1.6 (1.1–2.5)	1.2 (0.7–1.9)
Heart failure[a,b,f,h]	1.8 (1.2–2.8)	1.7 (1.1–2.7)	1.8 (1.1–2.8)	2.0 (1.2–3.3)
Chronic lung disease[a,b]	1.4 (1.0–2.2)	1.4 (0.9–2.1)	1.5 (1.0–2.4)	1.7 (1.1–2.7)
Asthma[a,b]	2.0 (1.1–3.4)	2.2 (1.2–3.8)	0.4 (0.1–1.0)	0.5 (0.2–1.3)
Cancer history[a,i]	1.5 (0.9–2.3)	1.3 (0.8–2.1)	1.7 (1.0–2.7)	1.4 (0.8–2.2)
Hypertension[a,b,e]	1.0 (0.7–1.4)	1.0 (0.7–1.5)	0.9 (0.6–1.4)	0.9 (0.6–1.3)
Chronic kidney disease[a,b,j]	1.7 (1.2–2.5)	1.7 (1.1–2.6)	1.8 (1.2–2.7)	1.5 (0.9–2.3)
Body mass index ≥ 30 kg/m^2[a,b]	1.0 (0.3–3.3)	1.1 (0.6–1.7)	0.6 (0.3–1.0)	0.7 (0.4–1.4)

(a)OR = (adjusted) odds ratio; CI = confidence interval.

Adjustments in multivariable analysis:

[a] Adjusted for sex

[b] Adjusted for age

[c] Adjusted for diabetes mellitus, ischaemic heart disease, cerebrovascular disease, hypertension

[d] Adjusted for cognition

[e] Adjusted for obesity

[f] Adjusted for diabetes mellitus, obesity, hypertension, chronic kidney disease

[g] Adjusted for atrial fibrillation

[h] Adjusted for ischaemic heart disease

[i] Adjusted for chronic lung disease

[j] Adjusted for diabetes, hypertension, obesity

Table 4. Likelihood of hospitalisation and death for 1071 residential aged care facility residents: sensitivity (univariable) analysis in which missing values are deemed to indicate either the presence or absence of a condition

	Missing > condition present		Missing > condition not present	
	Hospitalisation	Death	Hospitalisation	Death
Characteristic	OR (95% CI)		OR (95% CI)	
Cognition				
No impairment	1	1	1	1
Mild impairment	1.0 (0.6–1.7)	0.9 (0.5–1.7)	1.5 (0.9–2.5)	1.1 (0.6–1.9)
Diagnosed dementia	1.3 (0.8–2.0)	1.7 (1.1–2.8)	2.7 (1.7–4.0)	2.6 (1.7–4.1)
Diabetes mellitus	0.6 (0.4–0.9)	1.2 (0.8–1.7)	1.3 (0.9–1.9)	1.9 (1.3–2.9)
Ischaemic heart disease	0.8 (0.6–1.2)	0.9 (0.6–1.3)	1.7 (1.2–2.5)	1.4 (0.9–2.1)
Cerebrovascular disease	0.7 (0.5–1.0)	1.1 (0.7–1.6)	1.4 (1.0–2.1)	1.7 (1.2–2.6)
Atrial fibrillation	0.7 (0.5–1.1)	1.1 (0.7–1.6)	1.7 (1.1–2.5)	1.9 (1.2–2.9)
Heart failure	0.8 (0.5–1.2)	1.0 (0.7–1.6)	2.1 (1.4–3.2)	2.0 (1.2–3.1)
Chronic lung disease	0.7 (0.5–1.1)	1.0 (0.7–1.5)	1.8 (1.1–2.7)	1.8 (1.1–2.7)
Asthma	0.6 (0.4–1.0)	0.4 (0.2–0.7)	2.4 (1.4–4.2)	0.4 (0.2–1.2)
Cancer history	0.7 (0.4–1.0)	1.0 (0.6–1.4)	1.8 (1.2–2.8)	1.9 (1.2–3.0)
Hypertension	0.8 (0.5–1.1)	0.8 (0.5–1.2)	1.4 (1.0–2.0)	1.2 (0.8–1.7)
Chronic kidney disease	1.0 (0.7–1.4)	1.2 (0.8–1.7)	2.0 (1.4–3.0)	2.0 (1.3–2.9)
Body mass index ≥ 30 kg/m^2	0.4 (0.3–0.6)	0.5 (0.3–0.7)	1.3 (0.8–2.1)	0.6 (0.3–1.2)

CI = confidence interval; OR = odds ratio.