Supporting Information

Supplementary material

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Appendix 1

Identification of cases and controls

Similar to a previous study[1] which investigated the association between SARS-CoV-2 infection and the incidence of hospitalisation with selected respiratory and non-respiratory conditions using Victorian Admitted Episodes Dataset (VAED) data, we identified COVID-19 cases by identifying either of the following COVID-19 specific codes (see table below) on any of the 40 diagnoses (principal or other diagnoses) during their admission episodes. We did similar approach when identifying the control (viral pneumonia) and post-COVID-19 conditions cases.

Classifications	**Additional diagnosis**
COVID-19	
Lab-confirmed COVID-19 with symptoms	**Primary:** As per ACS 0001 principal guidelines **Additional Dx:** B97.2 Coronavirus as the cause of diseases classified to other chapters to identify the infectious agent U07.1 Emergency use of U07.1 [COVID-19 virus identified]
Lab-confirmed COVID-19 without symptoms	**Primary:** B34.2 Coronavirus infection, unspecified site **Additional Dx:** U07.1 Emergency use of U07.1 [COVID-19, virus identified]
Clinically diagnosed or probable COVID-19 with symptoms	**Primary:** As per ACS 0001 principal guidelines **Additional Dx:** B97.2 Coronavirus as the cause of diseases classified to other chapters to identify the infectious agent U07.2 Emergency use of U07.2 [COVID-19, virus not identified], to identify cases documented as clinically diagnosed COVID-19 but laboratory testing is inconclusive, not available or unspecified
Clinically diagnosed or probable COVID-19 without symptoms	**Primary:** B34.2 Coronavirus infection, unspecified **Additional Dx:** U07.2 Emergency use of U07.2 [COVID-19, virus not identified], to identify cases documented as clinically diagnosed COVID-19 but laboratory testing is inconclusive, not available or unspecified
Changes as of 01July 2022	**As of 1 July 2022:** U07.11 Coronavirus disease 2019 [COVID-19], virus identified, asymptomatic U07.12 Coronavirus disease 2019 [COVID-19], virus identified symptomatic Effective 1 July 2022, deactivation of: • U07.1 Emergency use of U07.1 • U07.7 Emergency use of U07.7
COVID-19 pneumonia (subset of COVID-19 and post-COVID-19 condition)	
COVID-19 pneumonia COVID-19 — pneumonitis Pneumonia — coronavirus disease 2019	J128 Other viral pneumonia J18.9 Pneumonia, unspecified **Additional Dx:** U07.1 Emergency use of U07.1 [COVID-19 virus identified] U07.2 Emergency use of U07.2 [COVID-19, virus not identified], to identify cases documented as clinically diagnosed COVID-19 but laboratory testing is inconclusive, not available or unspecified B97.2 Coronavirus as the cause of diseases classified to other chapters to identify the infectious agent B34.2 Coronavirus infection, unspecified U07.11 Coronavirus disease 2019 [COVID-19], virus identified, asymptomatic U07.12 Coronavirus disease 2019 [COVID-19], virus identified symptomatic U07.3 Emergency use of U07.3 [Personal history of COVID-19] as an additional diagnosis where clinical documentation indicates that the patient has previously confirmed COVID-19 that is no longer current U07.4 Emergency use of U07.4 [Post COVID-19 condition] as an additional diagnosis where clinical documentation indicates a current condition is causally related to previous COVID-19
Post-COVID-19 conditions	
Post-COVID-19 conditions	U07.3 Emergency use of U07.3 [Personal history of COVID-19] as an additional diagnosis where clinical documentation indicates that the patient has previously confirmed COVID-19 that is no longer current U07.4 Emergency use of U07.4 [Post COVID-19 condition] as an additional diagnosis where clinical documentation indicates a current condition is causally related to previous COVID-19
Pneumonia control	

Classifications	Additional diagnosis
Pneumonia, unspecified Other viral pneumonia	J128 Other viral pneumonia J18.9 Pneumonia, unspecified J12.0 Adenoviral pneumonia J12.1 Respiratory syncytial virus pneumonia J12.2 Parainfluenza virus pneumonia J12.3 Human metapneumovirus pneumonia J12.9 Viral pneumonia, unspecified AND U06.0 Emergency use of U06.0 [COVID-19, ruled out] to identify suspected but ruled out COVID-19 AND Without COVID-19 diagnosis (U071; U072; U07.11; U07.12; B34.2; or B97.2)

Notes: COVID-19 = coronavirus disease 2019. Dx = diagnosis; diagnoses were based on *How to classify COVID-19: guidance for data analysts using ICD-10-AM Eleventh Edition*.[2]

Appendix 2

Variables included in the generalised linear regression model

Variable	Definition	Any COVID-19; COVID-19 pneumonia; Viral pneumonia	Post-COVID-19 condition
Admission source	Describes where the patient was residing/living prior to admission.	X	
Care type	The nature of the clinical service provided to an admitted patient during an episode of care. A multi day stay patient may receive more than one type of care (such as acute care and rehabilitation) during the period of hospitalisation: the period of hospitalisation is then broken into episodes of care, one for each type of care (care type). The episode of care ends when the care type changes, or the patient separates from hospital.	X	
Country of birth	The country in which the person was born as represented by a code.	X	
ACSC flag	Denote the Victorian ambulatory care-sensitive conditions (ACSCs) and are conditions for which hospitalisation is thought to be avoidable with the application of public health interventions and early disease management, usually delivered in an ambulatory setting such as primary care.	X	
Charlson comorbidity index score	The Charlson comorbidity index is a method of categorizing comorbidities of patients based on the International Classification of Diseases (ICD) diagnosis.	X	X
Number of diagnoses	Diagnosis number based on the number of diagnostic code (at least one [principal diagnosis] and up to 40 ICD-10-AM codes reflecting injuries, disease conditions, patient characteristics and circumstances impacting this episode of care).	X	X
Gender	How a person describes their gender, as represented by a code. Gender is about social and cultural differences in identity, expression, and experience.	X	X
Hospital insurance level	To monitor patterns of hospital insurance usage to inform health policy and planning. The patient's hospital insurance status, regardless of whether they elect to be a public or private patient or are a compensable or ineligible patient.	X	X
Intensive care hours	Total duration of stay (hours) in an approved intensive care unit (ICU) or neonatal intensive care unit (NICU), during this episode of care. Duration is reported in hours, rounded up to the nearest hour.	X	X
Length of stay	The length of stay of an admitted patient is measured in patient days. A same day patient should be allocated a length of stay of one patient day. The length of stay of an overnight or multi-day stay patient is calculated by subtracting the admission date from the separation date and deducting total leave with and without permission days.	X	X
Mechanical ventilation hours	Total duration of mechanical ventilation (MV) in hours provided in an approved intensive care unit (ICU) or neonatal intensive care (NICU) during this episode of care.	X	
Non-invasive ventilation hours	Total number of hours of non-invasive ventilatory support (including high flow therapy) without the use of an endotracheal tube (ETT) or tracheostomy provided to patients in an approved intensive care unit (ICU).	X	
Separation accommodation type	For analysis of patient movement during an episode. (a) The accommodation type or types occupied by the patient during their admission, including changes to this item during the episode. (b) The accommodation type last occupied by the patient on the day of separation.	X	X
VicDRG level	A clinical-complexity grading of diagnosis related group (DRG). The DRG classification system clusters patients into groups that are clinically meaningful and resource-use homogenous.	X	X
VicDRG type	Either intervention, medical, other or surgical.	X	
VicDRG specialty	Type of specialist.	X	

Variable	Definition	Any COVID-19; COVID-19 pneumonia; Viral pneumonia	Post-COVID-19 condition
Subacute care	Derived based on the availability of FIMSCORE.	X	
Age group	Age by the time of admission.	X	X
Lockdown	Episodes during lockdown period.	X	
ICU	Derived whether there is a reported direct ICU cost or not.	X	X
Survival	Created using separation mode (status at separation of the person, and place to which the person is released (where applicable).	X	X
Patient type	Either public, private, compensable, DVA or ineligible		X

Notes: ACSC = ambulatory care-sensitive conditions. COVID-19 = coronavirus disease 2019. DRG = diagnosis-related groups. DVA = Department of Veterans' Affairs. ETT = endotracheal tube. FIMSCORE = functional independence measure score. ICD = International Classification of Diseases. ICU = intensive care unit. MV = mechanical ventilation. NICU = neonatal intensive care unit. VicDRG = Victorian diagnostic-related groups.

Model specifications

In our analysis, we ran unified generalised linear regression models with gamma distribution and log link to analyse the total costs, direct costs and indirect cost of patients diagnosed with any COVID-19 vs viral pneumonia (Model 1), COVID-19 pneumonia vs viral pneumonia (Model 2) and a separate model for post-COVID-19 condition (Model 3). The following models were used based on Glick et al[3]

$$\log\big(E(y)\big) = \log(\mu) = \beta_0 + \beta_1 x_1 + \cdots + \beta_p x_p$$

where y is the dependent or outcome variable (cost), x_i, β_i are the dependent variables and their corresponding model coefficients, and log(•) is the log link function.

Variance–covariance matrix (VCE) was used to adjust for the standard errors for clustering at the patient identifier level.[4]

Model 1: A dummy variable comparing patients with "any COVID-19" to those with "viral pneumonia" was included in the model, adjusted for potential confounding variables, such as length of stay, across patient cohorts (see table above).

Model 2: A dummy variable comparing patients with "COVID-19-pneumonia" to those with "viral pneumonia" was included in the model, adjusted for potential confounding variables, such as length of stay, across patient cohorts (see table above).

Model 3: No dummy variable was created to estimate the cost for post-COVID-19 condition, given that it is not compared to other patient cohort. This model also addresses the potential confounding variables, such as length of stay, across patient cohorts (see table above).

Appendix 3

Admission cross tabulations

Admission information	Any COVID-19	Viral pneumonia	*P* value A	COVID-19 pneumonia	*P* value B	Post-COVID-19 condition
Number of admissions	**3012**	**15 761**		**1158**		**185**
Admission source: describes where the patient was residing/living prior to admission			< 0.001		< 0.001	
Transfer from mental health residential facility	0 (0%)	≤ 5 (0%)		0 (0%)		0 (0%)
Transfer from transition care bed-based program	25 (1%)	15 (0%)		9 (1%)		0 (0%)
Admission from private residence	2252 (75%)	13 518 (86%)		880 (76%)		153 (83%)
Transfer from aged care residential facility	284 (9%)	799 (5%)		112 (10%)		≤ 5 (2%)
Statistical admission	108 (4%)	171 (1%)		28 (2%)		≤ 5 (2%)
Transfer from acute hospital/extended care/rehab/geriatric centre	343 (11%)	1 254 (8%)		129 (11%)		24 (13%)
Admission type: the category of admission (patient characteristic) relating to this episode of care			< 0.001		< 0.001	
Emergency admission	1983 (66%)	13 990 (89%)		912 (79%)		108 (58%)
Maternity	29 (1%)	15 (0%)		≤ 5 (0%)		10 (5%)
Other emergency admission	136 (5%)	408 (3%)		40 (3%)		≤ 5 (3%)
Elective admission	756 (25%)	1177 (7%)		177 (15%)		58 (31%)
Not applicable	108 (4%)	171 (1%)		28 (2%)		≤ 5 (2%)
Care type: the nature of the clinical service provided to an admitted patient during an episode of care			< 0.001		< 0.001	
Nursing home type/non-acute	≤ 5 (0%)	0 (0%)		0 (0%)		0 (0%)
Other care (acute)	2708 (90%)	15 268 (97%)		1094 (94%)		165 (89%)
Acute adult mental health	20 (1%)	22 (0%)		≤ 5 (0%)		≤ 5 (1%)
Acute aged persons mental health (APMH)	≤ 5 (0%)	13 (0%)		0 (0%)		0 (0%)
Acute specialist mental health	0 (0%)	≤ 5 (0%)		0 (0%)		0 (0%)
Designated rehabilitation program	66 (2%)	95 (1%)		17 (1%)		≤ 5 (3%)
Palliative care program	≤ 5 (0%)	75 (0%)		0 (0%)		≤ 5 (2%)
Geriatric evaluation and management program	209 (7%)	284 (2%)		46 (4%)		10 (5%)
Maintenance care	≤ 5 (0%)	≤ 5 (0%)		0 (0%)		0 (0%)

Number of diagnoses: frequency of diagnosis			< 0.001		< 0.001	
1	≤ 5 (0%)	0 (0%)		0 (0%)		0 (0%)
2–5	642 (21%)	1931 (12%)		194 (17%)		59 (32%)
6–10	1261 (42%)	5407 (34%)		431 (37%)		65 (35%)
11–20	917 (30%)	6550 (42%)		418 (36%)		54 (29%)
21–30	147 (5%)	1525 (10%)		82 (7%)		7 (4%)
31 and over	43 (1%)	348 (2%)		33 (3%)		0 (0%)
Insurance status: derived from hospital insurance status ID which is used to monitor patterns of hospital insurance usage to inform health policy and planning			< 0.001		< 0.001	
Unknown	19 (1%)	506 (3%)		≤ 5 (0%)		≤ 5 (1%)
Private health insurance	548 (18%)	3 425 (22%)		192 (17%)		37 (20%)
Public funded	2445 (81%)	11 830 (75%)		961 (83%)		147 (79%)
Program ID: identifies the specified program, if any, which applies to this episode of care			< 0.001		< 0.001	
NDIS participant	0 (0%)	13 (65%)		0 (0%)		0 (0%)
COVID-19 surge response	52 (98%)	0 (0%)		10 (100%)		0 (0%)
Specialist ABI rehabilitation	0 (0%)	≤ 5 (15%)		0 (0%)		0 (0%)
Specialist spinal rehabilitation	≤ 5 (2%)	≤ 5 (20%)		0 (0%)		0 (0%)
Separation accommodation type reference ID: separation accommodation type						
Overnight accommodation (shared room)	1831 (61%)	12 183 (77%)	< 0.001	788 (68%)	< 0.001	107 (58%)
Overnight accommodation (single room)	548 (18%)	2 489 (16%)		268 (23%)		28 (15%)
Same day	18 (1%)	98 (1%)		≤ 5 (0%)		14 (8%)
HITH	330 (11%)	275 (2%)		76 (7%)		9 (5%)
Emergency department	≤ 5 (0%)	7 (0%)		0 (0%)		0 (0%)
NICU/SCN	≤ 5 (0%)	≤ 5 (0%)		0 (0%)		0 (0%)
Medical assessment	9 (0%)	36 (0%)		≤ 5 (0%)		≤ 5 (1%)
Restorative care of site	≤ 5 (0%)	≤ 5 (0%)		0 (0%)		0 (0%)
Short stay observation unit	271 (9%)	670 (4%)		18 (2%)		26 (14%)
Separation mode reference ID: status at separation of the person, and place to which the person is released (where applicable)			< 0.001		< 0.001	
Separation and transfer to mental health residential facility	≤ 5 (0%)	6 (0%)		0 (0%)		0 (0%)

Separation and transfer to transition care bed-based program	9 (0%)	83 (1%)		≤ 5 (0%)		0 (0%)
Death	378 (13%)	1104 (7%)		220 (19%)		8 (4%)
Separation to private accommodation or home	1880 (62%)	9993 (63%)		676 (58%)		143 (77%)
Separation and transfer to aged care residential facility	253 (8%)	1319 (8%)		75 (6%)		15 (8%)
Statistical separation	104 (3%)	639 (4%)		23 (2%)		≤ 5 (3%)
Separation and transfer to acute hospital/extended care	362 (12%)	2395 (15%)		156 (13%)		11 (6%)
Left against medical advice	25 (1%)	222 (1%)		7 (1%)		≤ 5 (2%)
VicDRG level: a clinical-complexity grading of DRGs			< 0.001		< 0.001	
Primary	1947 (65%)	9081 (58%)		815 (70%)		61 (33%)
Secondary	494 (16%)	3023 (19%)		53 (5%)		74 (40%)
Tertiary	273 (9%)	2371 (15%)		187 (16%)		15 (8%)
Undefined	298 (10%)	1286 (8%)		103 (9%)		35 (19%)
VicDRG type: type of care			< 0.001		< 0.001	
Intervention	132 (4%)	694 (4%)		97 (8%)		15 (8%)
Medical	2631 (87%)	13 042 (83%)		883 (76%)		145 (78%)
Other	210 (7%)	1020 (6%)		170 (15%)		8 (4%)
Surgical	39 (1%)	1005 (6%)		8 (1%)		17 (9%)
Lockdown period: admission during lockdown period			< 0.001		< 0.001	
No lockdown	384 (13%)	8324 (53%)		113 (10%)		120 (65%)
Lockdown	2628 (87%)	7437 (47%)		1045 (90%)		65 (35%)

Notes: ABI = acquired brain injury. APMH = acute aged persons mental health. COVID-19 = coronavirus disease 2019. DRG = diagnosis related groups. HITH = hospital in the home. ID = identifier. NDIS = National Disability Insurance Scheme. NICU = neonatal intensive care unit. *P* value A = comparison between any COVID-19 and viral pneumonia. *P* value B = comparison between viral and COVID-19 pneumonia. SCN = special care nursery. VicDRG = Victorian diagnostic-related groups; ≤ 5 cells with frequency less than or equal to 5 or statistics based on less than or equal to 5 patients has been suppressed for confidentiality reasons. All $P < 0.001$ were statistically significant after Bonferroni adjustment. Pearson χ^2 was used for the comparison of categorical values.

Appendix 4

Median cost (AUD) by service group (unadjusted/crude cost)

	Any COVID-19, median (IQR)	Viral pneumonia, median (IQR)	*P* value A	COVID-19 pneumonia, median (IQR)	*P* value B	Post COVID-19 condition, median (IQR)
Total costs	11 935 (3742–31 223)	8 762 (4 318–19 824)	< 0.001	18 278 (7 140–44 800)	< 0.001	5 156 (1 854–13 401)
A. Direct costs	9 798 (3 001–25 997)	6 959 (3 434–15 885)	< 0.001	15 158 (5 757–38 821)	< 0.001	3 925 (1 506–10 190)
ICU	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
Nursing	1 367 (10–4 395)	1 950 (801–4 147)	< 0.001	2 488 (562–5 097)	0.016	1 109 (14–3 076)
Medical	865 (0–2 832)	1 163 (514–2 519)	< 0.001	1 309 (195–3 508)	0.399	749 (187–2174)
Allied health	112 (0–738)	186 (0–740)	< 0.001	341 (1–1 063)	< 0.001	11 (0–357)
Other	189 (10–616)	218 (56–589)	< 0.001	314 (81–794)	< 0.001	87 (10–421)
Pharmacy	200 (48–566)	291 (92–710)	< 0.001	375 (130–861)	< 0.001	111 (18–351)
Nursing supplies	244 (27–636)	302 (120–721)	< 0.001	354 (131–798)	0.021	133 (4–427)
Pathology	31 (0–238)	93 (0–343)	< 0.001	68 (0–366)	0.0550	0 (0–68)
NBA	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	0.002*	0 (0–0)
Medical supplies	5 (0–57)	16 (1–97)	< 0.001	16 (0–84)	< 0.001	9 (1–32)
THEATREOR	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
Prosthesis	0 (0–0)	0 (0–1)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
THEATRENONOR	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
Other supplies	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
PNDC	0 (0–0)	0 (0–0)	0.191	0 (0–0)	0.786	0 (0–0)
B. Indirect costs	1 776 (584–4 571)	1 751 (798–3 908)	0.313	2 778 (1 208–6 379)	< 0.001	1 067 (347–2 588)
Nursing	156 (14–492)	185 (73–424)	< 0.001	268 (72–619)	< 0.001	98 (5–402)
ICU	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
Nursing supplies	181 (2–604)	274 (102–616)	< 0.001	322 (43–748)	0.415	119 (1–403)
Admin	211 (12–624)	221 (68–520)	0.177	350 (101–799)	< 0.001	143 (5–389)
Other	186 (27–575)	225 (82–527)	< 0.001	313 (123–751)	< 0.001	114 (11–350)
COVID	6 (0–359)	0 (0–13)	< 0.001	39 (0–510)	< 0.001	0 (0–0)
Medical supplies	50 (0–192)	97 (32–245)	< 0.001	61 (1–214)	< 0.001	41 (5–194)
Medical	49 (6–146)	65 (24–147)	< 0.001	81 (25–196)	< 0.001	40 (7–124)
HITH	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
Pathology	9 (0–45)	17 (0–66)	< 0.001	17 (2–66)	< 0.001	3 (0–12)
Allied health	13 (1–53)	17 (4–57)	< 0.001	23 (6–73)	< 0.001	7 (0–30)
COVIDEX	0 (0–0)	0 (0–0)	0.043	0 (0–0)	< 0.001	0 (0–0)
Imaging	0 (0–15)	9 (0–63)	< 0.001	5 (0–36)	< 0.001	0 (0–10)
ED	0 (0–0)	0 (0–52)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
Pharmacy	5 (0–20)	12 (1–42)	< 0.001	7 (1–29)	< 0.001	1 (0–12)
THEATREOR	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	0.003	0 (0–2)
CCU	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
Prosthesis	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
NBA	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	0.267	0 (0–0)
Other supplies	0 (0–0)	0 (0–0)	0.246	0 (0–0)	0.031	0 (0–0)
THEATRENONOR	0 (0–0)	0 (0–0)	< 0.001	0 (0–0)	< 0.001	0 (0–0)
PNDC	0 (0–0)	0 (0–0)	0.191	0 (0–0)	0.786	0 (0–0)

Notes: Admin = administration salaries and wages. CCU = coronary care unit. COVID-19 = coronavirus disease 2019. COVIDEX = costs associated with COVID-19 admission. ED = emergency department. HITH = Hospital in the home. ICU = intensive care unit. IQR = interquartile range; 25th percentile (P25) and 75th percentile (P75) range. NBA = National Blood Authority. PNDC = post-natal domiciliary care. *P* value A = comparison between any COVID-19 and viral pneumonia. *P* value B = comparison between viral and COVID-19 pneumonia. THEATRENONOR = theatre non-operating. THEATREOR = theatre operating. Wilcoxon rank-sum was used for the comparison of median cost between groups. $P < 0.05$ value with * represents significance after the Bonferroni adjustment. All $P < 0.001$ were statistically significant after Bonferroni adjustment.

Appendix 5

Mean cost (AUD) by service group (unadjusted/crude cost)

	Any COVID-19, mean (SD)	Viral pneumonia, mean (SD)	*P* value A	COVID-19 pneumonia, mean (SD)	*P* value B	Post-COVID-19 condition, mean (SD)
Total costs	31 254 (99 266)	18 522 (36 111)	< 0.001	47 900 (150 442)	< 0.001	11 202 (17 668)
A. Direct costs	26 803 (91 281)	15 015 (29 967)	< 0.001	41 925 (139 459)	< 0.001	8 940 (13 946)
ICU	3 956 (22 422)	2 581 (12 244)	< 0.001	8 344 (33 642)	< 0.001	590 (2 431)
Nursing	3 634 (6 376)	3 512 (7 535)	0.405	3 991 (5 380)	0.034	2 769 (4 882)
Medical	2 433 (4 721)	2 236 (4 023)	0.017	3 004 (5 794)	< 0.001	1 551 (2 249)
Allied health	738 (1 882)	700 (2 611)	0.445	982 (2 058)	< 0.001	438 (1 098)
Other	713 (1 938)	552 (1 261)	< 0.001	805 (2 029)	< 0.001	393 (883)
Pharmacy	700 (3 361)	768 (2 722)	0.229	1 073 (4 584)	< 0.001	420 (1 387)
Nursing supplies	570 (1 104)	657 (1 781)	0.009	697 (1 084)	0.450	362 (614)
Pathology	341 (1 494)	343 (955)	0.892	544 (2 180)	< 0.001	160 (685)
NBA	126 (1 126)	230 (1 543)	< 0.001	208 (1 482)	0.633	138 (1 145)
Medical supplies	117 (761)	152 (602)	0.006	152 (765)	0.977	70 (220)
THEATREOR	111 (1 102)	493 (2 414)	< 0.001	87 (982)	< 0.001	780 (2 084)
PROSTHESIS	36 (655)	264 (5 200)	0.016	13 (121)	0.100	70 (570)
THEATRENONOR	3 (40)	67 (554)	< 0.001	4 (39)	< 0.001	46 (204)
Other supplies	1 (15)	1 (21)	0.274	0 (5)	0.174	0 (0)
PNDC	0 (5)	0 (1)	0.040	0 (0)	0.786	2 (33)
B. Indirect costs	4 451 (9 207)	3 507 (6 614)	< 0.001	5 975 (11 858)	< 0.001	2262 (3 833)
Nursing	651 (1 846)	393 (878)	< 0.001	611 (1 464)	< 0.001	309 (667)
ICU	593 (3 193)	385 (1 862)	< 0.001	1 194 (4 578)	< 0.001	74 (337)
Nursing supplies	547 (1 083)	568 (1 475)	0.457	625 (946)	0.196	402 (794)
Admin	546 (1 020)	451 (993)	< 0.001	633 (941)	< 0.001	328 (623)
Other	514 (936)	455 (866)	< 0.001	586 (781)	< 0.001	295 (516)
COVID	512 (2 139)	86 (373)	< 0.001	776 (2 950)	< 0.001	7 (43)
Medical supplies	190 (630)	251 (599)	< 0.001	210 (668)	0.030	202 (623)
Medical	148 (298)	133 (288)	0.008	197 (356)	< 0.001	99 (158)
HITH	79 (372)	16 (180)	< 0.001	62 (314)	< 0.001	38 (372)
Pathology	59 (194)	76 (218)	< 0.001	87 (233)	0.099	26 (132)
Allied health	54 (155)	61 (162)	0.036	77 (209)	0.002*	30 (60)
COVIDEX	48 (443)	8 (100)	< 0.001	79 (330)	< 0.001	1 (4)
Imaging	31 (129)	59 (139)	< 0.001	50 (186)	0.039	22 (55)
ED	28 (86)	56 (169)	< 0.001	18 (60)	< 0.001	28 (101)
Pharmacy	21 (70)	38 (117)	< 0.001	30 (100)	0.018	17 (68)
THEATREOR	17 (158)	83 (433)	< 0.001	13 (135)	< 0.001	126 (339)
CCU	5 (89)	58 (355)	< 0.001	4 (77)	< 0.001	12 (118)
Prosthesis	1 (8)	5 (84)	0.017	1 (6)	0.127	1 (6)
NBA	1 (7)	2 (32)	0.005	1 (11)	0.290	0 (1)
Other supplies	1 (8)	1 (14)	0.065	0 (5)	0.103	0 (0)
THEATRENONOR	0 (7)	13 (113)	< 0.001	1 (7)	< 0.001	8 (34)
PNDC	0 (3)	0 (0)	0.027	0 (0)	0.786	1 (10)

Notes: Admin = administration salaries and wages. CCU = coronary care unit. COVID-19 = coronavirus disease 2019. COVIDEX = costs associated with COVID-19 admission. ED = emergency department. HITH = hospital in the home. ICU = intensive care unit. NBA = National Blood Authority. PNDC = post-natal domiciliary care. *P* value A = comparison between any COVID-19 and viral pneumonia. *P* value B = comparison between viral and COVID-19 pneumonia. SD = standard deviation. THEATRENONOR = theatre non-operating. THEATREOR = theatre operating. The *t* test was used for the comparison of mean cost between groups. $P < 0.05$ value with * represents significance after the Bonferroni adjustment. All $P < 0.001$ were statistically significant after Bonferroni adjustment.

Appendix 6
Unadjusted cost (AUD) comparison between those that were admitted to ICU and those were not admitted to ICU

Table 1: Unadjusted median cost (AUD) for ICU admissions

Admitted to ICU	Any COVID-19, median (IQR)	Viral pneumonia, median (IQR)	*P* value A	COVID-19 pneumonia, median (IQR)	*P* value B	Post-COVID-19 condition, median (IQR)
Total costs	55 319 (27 112–12 4183)	33 538 (17 554–60 829)	< 0.001	62 602 (29 874–133 762)	< 0.001	26 992 (19 475–38 579)
Direct	47 738 (22 899–113 906)	27 451 (14 349–50 779)	< 0.001	53 452 (25 997–115 645)	< 0.001	22 326 (16 171–32 715)
Indirect	7 515 (3 693–17 051)	5 697 (3 033–10 420)	< 0.001	7 862 (3 963–17 215)	< 0.001	4 671 (3 816–5 847)

Notes: COVID-19 = coronavirus disease 2019. ICU = intensive care unit. IQR = interquartile range; 25th percentile (P25) and 75th percentile (P75) range. *P* value A = comparison between any COVID-19 and viral pneumonia. *P* value B = comparison between viral and COVID-19 pneumonia. To compare the median crude costs between groups, a Wilcoxon rank-sum test was employed.

Table 2: Unadjusted mean cost (AUD) for ICU admissions

Admitted to ICU	Any COVID-19, mean (SD)	Viral pneumonia, mean (SD)	*P* value A	COVID-19 pneumonia, mean (SD)	*P* value B	Post-COVID-19 condition, mean (SD)
Total costs	120 504 (264 533)	51 823 (66 217)	< 0.001	136 157 (304 099)	< 0.001	29 235 (11 255)
Direct	106 767 (245 827)	43 056 (55 924)	< 0.001	121 779 (283 195)	< 0.001	24 331 (9 635)
Indirect	13 737 (20 087)	8 767 (11 119)	< 0.001	14 377 (21 902)	< 0.001	4 903 (1 967)

Notes: COVID-19 = coronavirus disease 2019. ICU = intensive care unit. *P* value A = comparison between any COVID-19 and viral pneumonia. *P* value B = comparison between viral and COVID-19 pneumonia. SD = standard deviation. The *t* test was used for the comparison of mean cost between groups.

Table 3: Unadjusted median cost (AUD) for non-ICU admissions

Not admitted to ICU	Any COVID-19, median (IQR)	Viral pneumonia, median (IQR)	*P* value A	COVID-19 pneumonia, median (IQR)	*P* value B	Post-COVID-19 condition, median (IQR)
Total costs	9 683 (3 077–24 956)	7 262 (3 844–14 744)	< 0.001	13 842 (5 891–28 629)	< 0.001	4 250 (1 740–10 797)
Direct	7 875 (2 478–20 487)	5 792 (3 029–11 681)	< 0.001	11 540 (4 744–24 408)	< 0.001	3 377 (1 422–7 841)
Indirect	1 503 (497–3 514)	1 445 (692–2 981)	0.6041	2 074 (967–4 367)	< 0.001	916 (293–2 095)

Notes: COVID-19 = coronavirus disease 2019. ICU = intensive care unit. IQR = interquartile range; 25th percentile (P25) and 75th percentile (P75) range. *P* value A = comparison between any COVID-19 and viral pneumonia. *P* value B = comparison between viral and COVID-19 pneumonia. To compare the median crude costs between groups, a Wilcoxon rank-sum test was employed.

Table 4: Unadjusted mean cost (AUD) for non-ICU admissions

Not admitted to ICU	Any COVID-19, mean (SD)	Viral pneumonia, mean (SD)	*P* value A	COVID-19 pneumonia, mean (SD)	*P* value B	Post-COVID-19 condition, mean (SD)
Total costs	19 634 (29 597)	12 613 (22 935)	< 0.001	23 848 (31 224)	< 0.001	9 495 (17 224)
Direct	16 391 (25 047)	10 040 (18 396)	< 0.001	20 162 (27 360)	< 0.001	7 483 (13 417)
Indirect	3 242 (5 542)	2 574 (4 878)	< 0.001	3 685 (4 910)	< 0.001	2 012 (3 875)

Notes: COVID-19 = coronavirus disease 2019. ICU = intensive care unit. *P* value A = comparison between any COVID-19 and viral pneumonia. *P* value B = comparison between viral and COVID-19 pneumonia. SD = standard deviation. The *t* test was used for the comparison of mean cost between group.

Appendix 7: CHEERS 2022 checklist

Topic	No.	Item	Location where item is reported
Title			
	1	Identify the study as an economic evaluation and specify the interventions being compared.	Title, page 1.
Abstract			
	2	Provide a structured summary that highlights context, key methods, results, and alternative analyses.	Abstract, pages 1–2.
Introduction			
Background and objectives	3	Give the context for the study, the study question, and its practical relevance for decision making in policy or practice.	Introduction, paragraph 1 and paragraph 6.
Methods			
Health economic analysis plan	4	Indicate whether a health economic analysis plan was developed and where available.	Not applicable.
Study population	5	Describe characteristics of the study population (such as age range, demographics, socioeconomic, or clinical characteristics).	Methods, paragraph 3.
Setting and location	6	Provide relevant contextual information that may influence findings.	Methods, paragraph 2.
Comparators	7	Describe the interventions or strategies being compared and why chosen.	Methods, paragraph 1.
Perspective	8	State the perspective(s) adopted by the study and why chosen.	Methods, paragraph 1.
Time horizon	9	State the time horizon for the study and why appropriate.	Methods, paragraph 7.
Discount rate	10	Report the discount rate(s) and reason chosen.	Not applicable given the short analysis period.
Selection of outcomes	11	Describe what outcomes were used as the measure(s) of benefit(s) and harm(s).	Not applicable.
Measurement of outcomes	12	Describe how outcomes used to capture benefit(s) and harm(s) were measured.	Not applicable.
Valuation of outcomes	13	Describe the population and methods used to measure and value outcomes.	Not applicable.
Measurement and valuation of resources and costs	14	Describe how costs were valued.	Methods, paragraphs 10–11.
Currency, price date, and conversion	15	Report the dates of the estimated resource quantities and unit costs, plus the currency and year of conversion.	Methods, paragraph 8.
Rationale and description of model	16	If modelling is used, describe in detail and why used. Report if the model is publicly available and where it can be accessed.	Methods, paragraphs 10–11.

Topic	No.	Item	Location where item is reported
Analytics and assumptions	17	Describe any methods for analysing or statistically transforming data, any extrapolation methods, and approaches for validating any model used.	Methods, paragraphs 10–11.
Characterising heterogeneity	18	Describe any methods used for estimating how the results of the study vary for subgroups.	Not applicable. This study did not undertake a subgroup analysis.
Characterising distributional effects	19	Describe how impacts are distributed across different individuals or adjustments made to reflect priority populations.	Not applicable. This study did not undertake a subgroup analysis.
Characterising uncertainty	20	Describe methods to characterise any sources of uncertainty in the analysis.	Not applicable.
Approach to engagement with patients and others affected by the study	21	Describe any approaches to engage patients or service recipients, the general public, communities, or stakeholders (such as clinicians or payers) in the design of the study.	Not applicable.
Results			
Study parameters	22	Report all analytic inputs (such as values, ranges, references) including uncertainty or distributional assumptions.	Results, pages 9–11 Tables 2 to 6, Appendix 3–6.
Summary of main results	23	Report the mean values for the main categories of costs and outcomes of interest and summarise them in the most appropriate overall measure.	Results, pages 9–11 Tables 2 to 6, Appendix 3–6.
Effect of uncertainty	24	Describe how uncertainty about analytic judgments, inputs, or projections affect findings. Report the effect of choice of discount rate and time horizon, if applicable.	Limitation, pages 12–13.
Effect of engagement with patients and others affected by the study	25	Report on any difference patient/service recipient, general public, community, or stakeholder involvement made to the approach or findings of the study	Not applicable.
Discussion			
Study findings, limitations, generalisability, and current knowledge	26	Report key findings, limitations, ethical or equity considerations not captured, and how these could affect patients, policy, or practice.	Discussion, pages 11–13.
Other relevant information			
Source of funding	27	Describe how the study was funded and any role of the funder in the identification, design, conduct, and reporting of the analysis	Funding, page 14.
Conflicts of interest	28	Report authors conflicts of interest according to journal or International Committee of Medical Journal Editors requirements.	Conflict of interest, page 14.

From[5]: Husereau, D., Drummond, M., Augustovski, F. et al. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) statement: updated reporting guidance for health economic evaluations. BMC Med 20, 23 (2022). https://doi.org/10.1186/s12916-021-02204-0

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5. Husereau D, Drummond M, Augustovski F, et al. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) statement: updated reporting guidance for health economic evaluations. *BMC Med* 2022; 20: 23.