

PRICE COVID19 Data Report December 2021

Pakistan Registry of Intensive Care

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Abstract

Pakistan Registry of Intensive Care (PRICE) is a platform that has enabled standardized COVID-19 clinical data collection based on ISARIC/WHO Clinical Characterization Protocol. The near real-time data platform includes epidemiology, severity of illness, microbiology, treatment and outcomes of patients admitted with suspected or laboratory confirmed COVID19 infection to 67 intensive care and high dependency units across the country. Data has been extracted and analysed at regular intervals to inform stakeholders and improve care practices. This is our 28th report including all patients with suspected or confirmed COVID-19 from 26th March 2020 to 26th December 2021.

Key findings from 8624 patients who met eligibility criteria, are as follows:

- ▣ Median age of 60 years (IQR 50-70).
- ▣ The most common symptoms were shortness of breath (n = 6428, 77.8%), fever (n = 6091, 73.8%), and Cough (n = 3354, 38.9%)
- ▣ The most common comorbidity was hypertension followed by diabetes.
- ▣ During the course of illness 2804 (32.6%) patients received non-invasive ventilation, whereas 2474 (28.8%) patients had mechanical ventilation as their highest organ support. In addition, 2246 (26.1%) patients needed haemodynamic support and 1249 (14.7%) patients required renal replacement therapy as their highest organ support.
- ▣ Median APACHE II score was 18
- ▣ Overall mortality at ICU discharge was 39.2%
- ▣ Increasing age and requirement for invasive mechanical ventilation were independent risk factors for mortality increased the risk of death



PRICE report on critically ill COVID-19 patients across Pakistan

Reporting from 26th March 2020 - 26th December 2021

Background

Coronavirus disease 2019 (COVID-19), is an ongoing pandemic of viral pneumonia.(1, 2) The first case of COVID-19 in Pakistan was confirmed from Karachi on February 26, 2020, and similar to other countries, Pakistan experienced an upsurge in COVID-19 infections. 1287393 confirmed cases and 28784 deaths have been reported since the beginning of pandemic (3). There is paucity of clinical characterization data from low- and middle-income countries such as Pakistan for critically ill COVID-19 patients. (4-7). The Pakistan Registry of Intensive Care (PRICE), established in 2018, and part of the Wellcome funded “CRIT Care Asia” recruits more than 2000 monthly critical care admissions across a national network in Pakistan (8).

Aim of this report is to provide clinicians and stakeholders in critical care services in Pakistan with real-time information regarding the incidence, clinical character and service utilisation throughout the COVID-19 pandemic.

Methods

The same PRICE platform was adapted to incorporate ISARIC/WHO Clinical Characterization Protocol (CCP) tiers 0-3 capturing clinical and epidemiological data of patients admitted to the collaborating high dependency (HDU) and intensive care units (ICU) with clinically suspected or

laboratory confirmed COVID19 infection (9). A detailed description of data platform adaptation, data collection method and data management was published previously (9). Variables were added using a standardized nomenclature, Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT), that was already operationalized in the platform, enhancing interoperability at the organizational level and facilitating sharing with ISARIC (10). Data is captured contemporaneously to clinical care via the digital platform, with 24 hr cadence. Inbuilt field validation and range checks promote data quality. Data completeness for ISARIC tiers 0 and 1 was above 97% during a recent external performance review (11).

Data source

Information is entered in real-time from 67 participating units from 31 hospitals across the country and provides:

- ☐ A notification when a suspected case of COVID-19 is admitted
- ☐ Admission data for suspected COVID-19 cases, including demographics, characteristics, symptoms at presentation, comorbidities and travel history within 14 days
- ☐ Severity of illness, severity of illness assessed by Acute Physiology And Chronic Health Evaluation II (APACHE II) score
- ☐ Daily assessment of organ support and clinical treatments
- ☐ Discharge information, including status and outcome of any investigations to confirm COVID-19 diagnosis.
- ☐ All the enrolled patients in the registry were followed up to discharge and/or death.
- ☐ Statistical analysis was performed using R software (R core team 2021).

The PRICE team are committed to ensuring the registry provides high quality information, whilst recognising the need for timely accessible information during these events. As such this information is collated and reported ‘as captured’. This information may undergo revision as analysis evolves and is disseminated for the purpose of primary stakeholders to support clinical care and resource allocation.

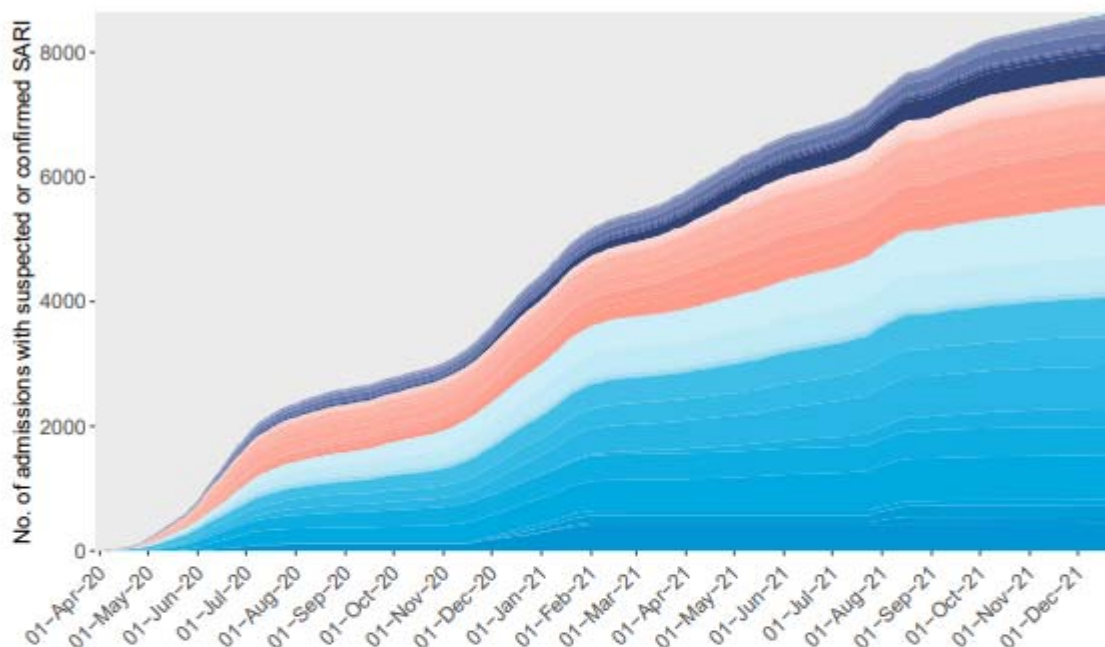
Results

This is the twenty-eighth report summarising the data on all suspected or confirmed COVID-19 cases from the 26th March 2020 to 26th December 2021 admitted to critical care units within the PRICE network that agreed to report data on severe acute respiratory infection (SARI).

Number of Admissions

A total of 8624 critical care admissions with suspected or confirmed SARI were reported (Figure 1).

Figure 1: Number of ICU admissions with suspected or confirmed SARI by units.



Unit (City)							
1 (BA)	11 (Punjab)	21 (Punjab)	31 (Punjab)	41 (Sindh)	51 (Sindh)	61 (Sindh)	
2 (BA)	12 (Punjab)	22 (Punjab)	32 (Punjab)	42 (Sindh)	52 (Sindh)	62 (Sindh)	
3 (KP)	13 (Punjab)	23 (Punjab)	33 (Punjab)	43 (Sindh)	53 (Sindh)	63 (Sindh)	
4 (KP)	14 (Punjab)	24 (Punjab)	34 (Punjab)	44 (Sindh)	54 (Sindh)	64 (Sindh)	
5 (KP)	15 (Punjab)	25 (Punjab)	35 (Punjab)	45 (Sindh)	55 (Sindh)	65 (Sindh)	
6 (KP)	16 (Punjab)	26 (Punjab)	36 (Punjab)	46 (Sindh)	56 (Sindh)	66 (Sindh)	
7 (KP)	17 (Punjab)	27 (Punjab)	37 (Punjab)	47 (Sindh)	57 (Sindh)	67 (Sindh)	
8 (KP)	18 (Punjab)	28 (Punjab)	38 (Punjab)	48 (Sindh)	58 (Sindh)		
9 (KP)	19 (Punjab)	29 (Punjab)	39 (Sindh)	49 (Sindh)	59 (Sindh)		
10 (KP)	20 (Punjab)	30 (Punjab)	40 (Sindh)	50 (Sindh)	60 (Sindh)		

Characteristics of admitted patients

Characteristics of patients with suspected SARI admitted to participating critical care units are summarised in Table 1 and 2, and these are compared with the characteristics of critically ill patients with non-SARI viral pneumonia during 2018-2021 from the same registry. The most common presenting symptoms were shortness of breath, fever and cough with no sputum.

Table 1: Demographics and medical history of admitted patients.

Demographics	Patients with suspected or confirmed SARI and admission data (N=8624)	Patients with viral pneumonia (non-SARI), 2018-2021 (N=153)
Age at admission (years)		
Mean (SD)	58.6 (15.7)	53.6 (19.6)
Median (IQR)	60.0 (50.0, 70.0)	56 (38.0, 68.0)
Sex, n (%)		
Male	5,384 (62.4)	86 (56.2)
Female	3,237 (37.5)	67 (43.8)
Currently pregnant, n (females) [N=1560]	87 (5.6)	*
Ethnicity, n (%) [N=8200]		
Black	3 (0.0)	*
East Asian	10 (0.1)	*
Other	2 (0.0)	*
South Asian	8,178 (99.7)	*
West Asian	6 (0.1)	*
White	1 (0.0)	*
Medical history		
Comorbidities, n (%) [N=8624]		
At least one comorbidity present	5,502 (63.8)	66 (43.1)
Hypertension	4,005 (46.4)	52 (34.0)
Diabetes	1,686 (19.6)	42 (27.5)
Type 2 Diabetes	1,033 (12.0)	0 (0.0)
Cardiovascular diseases	736 (8.5)	3 (2.0)

Type 1 Diabetes	493 (5.7)	0 (0.0)
Other comorbidity	260 (3.0)	0 (0.0)
Asthma	259 (3.0)	1 (0.7)
Depression	105 (1.2)	0 (0.0)
Cerebrovascular disease	96 (1.1)	2 (1.3)
Hypothyroidism	82 (1.0)	0 (0.0)
Renal failure, Moderate to severe	59 (0.7)	1 (0.7)
Dementia	54 (0.6)	0 (0.0)
Respiratory disease, Severe moderate	53 (0.6)	1 (0.7)
Renal failure, Mild	51 (0.6)	2 (1.3)
Chronic pulmonary disease	48 (0.6)	0 (0.0)
Respiratory disease, Mild	48 (0.6)	0 (0.0)
CKD requiring dialysis	47 (0.5)	0 (0.0)
Angina	37 (0.4)	1 (0.7)
Tuberculosis	29 (0.3)	1 (0.7)
Valve disease	23 (0.3)	1 (0.7)
Obesity	23 (0.3)	0 (0.0)
Congestive heart failure	22 (0.3)	0 (0.0)
Other neurological condition	18 (0.2)	0 (0.0)
Hepatic disease, Moderate to severe	18 (0.2)	0 (0.0)
Hepatic disease, Mild	16 (0.2)	0 (0.0)
Type 1 diabetes with complications	16 (0.2)	0 (0.0)
Myocardial infarction	15 (0.2)	0 (0.0)
Hyperthyroidism	15 (0.2)	0 (0.0)
Epilepsy	15 (0.2)	0 (0.0)
Diabetes with complications	15 (0.2)	0 (0.0)

Rheumatological condition	14 (0.2)	0 (0.0)
Type 2 diabetes with complications	10 (0.1)	0 (0.0)
Tumor	7 (0.1)	0 (0.0)
Peripheral vascular disease	7 (0.1)	0 (0.0)
Hyperlipidemia	7 (0.1)	0 (0.0)
Inflammatory bowel	6 (0.1)	0 (0.0)
HIV	5 (0.1)	0 (0.0)
Interstitial lung disease	4 (0.0)	0 (0.0)
Peptic ulcer	4 (0.0)	0 (0.0)
Malignant neoplasm	4 (0.0)	0 (0.0)
Arrhythmia	3 (0.0)	0 (0.0)
Metastatic cancer	2 (0.0)	0 (0.0)
AIDS	2 (0.0)	0 (0.0)
Leukemia	2 (0.0)	0 (0.0)
Chronic hematologic disease	2 (0.0)	0 (0.0)
GI bleeding	1 (0.0)	0 (0.0)
Lymphoma	1 (0.0)	0 (0.0)
Primary lung cancer	1 (0.0)	0 (0.0)
Non diabetic endocrine	1 (0.0)	0 (0.0)
Malnutrition	1 (0.0)	0 (0.0)

¹ *Data not available prior to SARI data collection.

² Includes patients with confirmed viral pneumonia (n=274) and those with pneumonia (other, but not bacterial or fungal) (n=99)

Table 2: Clinical characteristics on admission

Presenting characteristics	Patients with suspected or confirmed SARI and admission data (N=8624)	Patients with viral pneumonia (non-SARI), 2018-2021 (N=153)
History of travel in the last 14 days, n (%) [N=8149]	51 (0.6)	*
Symptoms, n (%) [N=8258]		
Shortness of breath	6,428 (77.8)	*
History of fever	6,091 (73.8)	*
Cough with no sputum	2,229 (27.0)	*
Cough with sputum	1,125 (13.6)	*
Sore throat	1,025 (12.4)	*
Muscle aches	467 (5.7)	*
Chest pains	444 (5.4)	*
Altered consciousness/ Confusion	311 (3.8)	*
Fatigue/Malaise	301 (3.6)	*
Vomiting/nausea	286 (3.5)	*
Diarrhoea	217 (2.6)	*
Abdominal Pain	179 (2.2)	*
Wheezing	168 (2.0)	*
Headache	154 (1.9)	*
Joint pain	87 (1.1)	*
Runny nose	80 (1.0)	*
Inability to walk	56 (0.7)	*
Cough with bloody sputum/haemoptysis	47 (0.6)	*
Loss of taste	42 (0.5)	*
Seizures	32 (0.4)	*
Bleeding	30 (0.4)	*
Loss of smell	23 (0.3)	*
Asymptomatic	21 (0.3)	*

Lower chest wall indrawing	11 (0.1)	*
Anorexia	7 (0.1)	*
Conjunctivitis	3 (0.0)	*
Skin rash	3 (0.0)	*
Ear pain	1 (0.0)	*
Skin ulcers	1 (0.0)	*

Severity of illness at anytime during ICU stay

Highest Organ support received at anytime during ICU stay, n (%)

Invasive ventilation [N=8597]	2,474 (28.8)	54 (35.3)
Non-invasive ventilation [N=8597]	2,804 (32.6)	22 (14.4)
Cardiovascular support [N=8603]	2,246 (26.1)	40 (26.1)
Renal replacement therapy [N=8495]	1,249 (14.7)	10 (6.5)
ECMO [N=6266]	00 (00)	*
Prone ventilation [N=8258]	3,111 (37.7)	4 (2.6)

Antimicrobial use at admission

Prescribed at admission, n (%)	7,453 (86.6)	138 (91.4)
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Antimicrobial type, n (%)

Piperacillin + Tazobactam	3,061 (35.5)	36 (23.5)
Meropenem	2,243 (26.0)	44 (28.8)
Azithromycin	1,755 (20.4)	26 (17.0)
Remdesivir	1,210 (14.0)	0 (0.0)
Ceftriaxone	920 (10.7)	28 (18.3)
Vancomycin	539 (6.2)	15 (9.8)
Levofloxacin	363 (4.2)	3 (2.0)
Moxifloxacin	322 (3.7)	4 (2.6)

Colistin(polymixin E)	170 (2.0)	9 (5.9)
Other antibiotic	138 (1.6)	2 (1.3)
Metronidazole(Flagyl)	116 (1.3)	8 (5.2)
Linezolid	74 (0.9)	3 (2.0)
Trimethoprim/Sulfamethoxazole	69 (0.8)	0 (0.0)
Ivermectin	69 (0.8)	0 (0.0)
Imipenem + Cilastatin	60 (0.7)	1 (0.7)
Trazabactam	55 (0.6)	4 (2.6)
Voriconazole	48 (0.6)	0 (0.0)
Teicoplanin	46 (0.5)	0 (0.0)
Cefoperazone + Sulbactam	43 (0.5)	3 (2.0)
Invermectin	29 (0.3)	0 (0.0)
Tigecycline	29 (0.3)	2 (1.3)
Acyclovir	29 (0.3)	1 (0.7)
Doxycycline	26 (0.3)	0 (0.0)
Amikacin	24 (0.3)	2 (1.3)
Augmentin	21 (0.2)	1 (0.7)
Cefixime	21 (0.2)	0 (0.0)
Erythromicine	18 (0.2)	0 (0.0)
Dexamethasone	17 (0.2)	0 (0.0)
Ciprofloxacin	17 (0.2)	0 (0.0)
Ceftazidime	12 (0.1)	0 (0.0)
Fluconazole	11 (0.1)	0 (0.0)

Cefotaxime	10 (0.1)	0 (0.0)
Clarithromycin	10 (0.1)	0 (0.0)
Clindamycin	10 (0.1)	0 (0.0)
Cefoperazone	9 (0.1)	1 (0.7)
Cefepime	8 (0.1)	0 (0.0)
Amphotericin-B	5 (0.1)	0 (0.0)
Cefuroxime	5 (0.1)	0 (0.0)
Baricitanib	4 (0.0)	0 (0.0)
Amoxicillin	4 (0.0)	0 (0.0)
Cefazolin	3 (0.0)	0 (0.0)
Favipiravir	3 (0.0)	0 (0.0)
Tobramycin	3 (0.0)	0 (0.0)
HCQ+ Oseltamavir	2 (0.0)	0 (0.0)
Oseltamavir	2 (0.0)	0 (0.0)
Co-amoxiclav	2 (0.0)	0 (0.0)
Penicillin	2 (0.0)	0 (0.0)
Antifungal	2 (0.0)	0 (0.0)
Ertapenem	2 (0.0)	0 (0.0)
Rifampicin	2 (0.0)	0 (0.0)
Timentin	2 (0.0)	0 (0.0)
Polymyxin	2 (0.0)	0 (0.0)
Actemira	1 (0.0)	0 (0.0)
Att	1 (0.0)	0 (0.0)

Dexamethasone	1 (0.0)	0 (0.0)
Vibramycin/ Tocilizumab	1 (0.0)	0 (0.0)
Actemra	1 (0.0)	0 (0.0)
Arbidol	1 (0.0)	0 (0.0)
Tocilizumab	1 (0.0)	0 (0.0)
Salbutanol	1 (0.0)	0 (0.0)
Azitma 500mg	1 (0.0)	0 (0.0)
Velosef	1 (0.0)	0 (0.0)
Dexamthasone	1 (0.0)	0 (0.0)
Vibramycine	1 (0.0)	0 (0.0)
Vinzet	1 (0.0)	0 (0.0)
Tienum,Actemra	1 (0.0)	0 (0.0)
Cotrimoxazole	1 (0.0)	0 (0.0)
Aztreonam	1 (0.0)	0 (0.0)
Ampicillin / Sulbactam	1 (0.0)	0 (0.0)
Isoniazid	1 (0.0)	1 (0.7)
Ampicillin	1 (0.0)	0 (0.0)
Caspofungin	1 (0.0)	0 (0.0)
Doxophylline	1 (0.0)	0 (0.0)
APACHE II Score		
Mean (SD)	19.3 (7.4)	22.2 (8.2)
Median(IQR)	18 (14.0, 23.0)	21(16.0, 28.0)

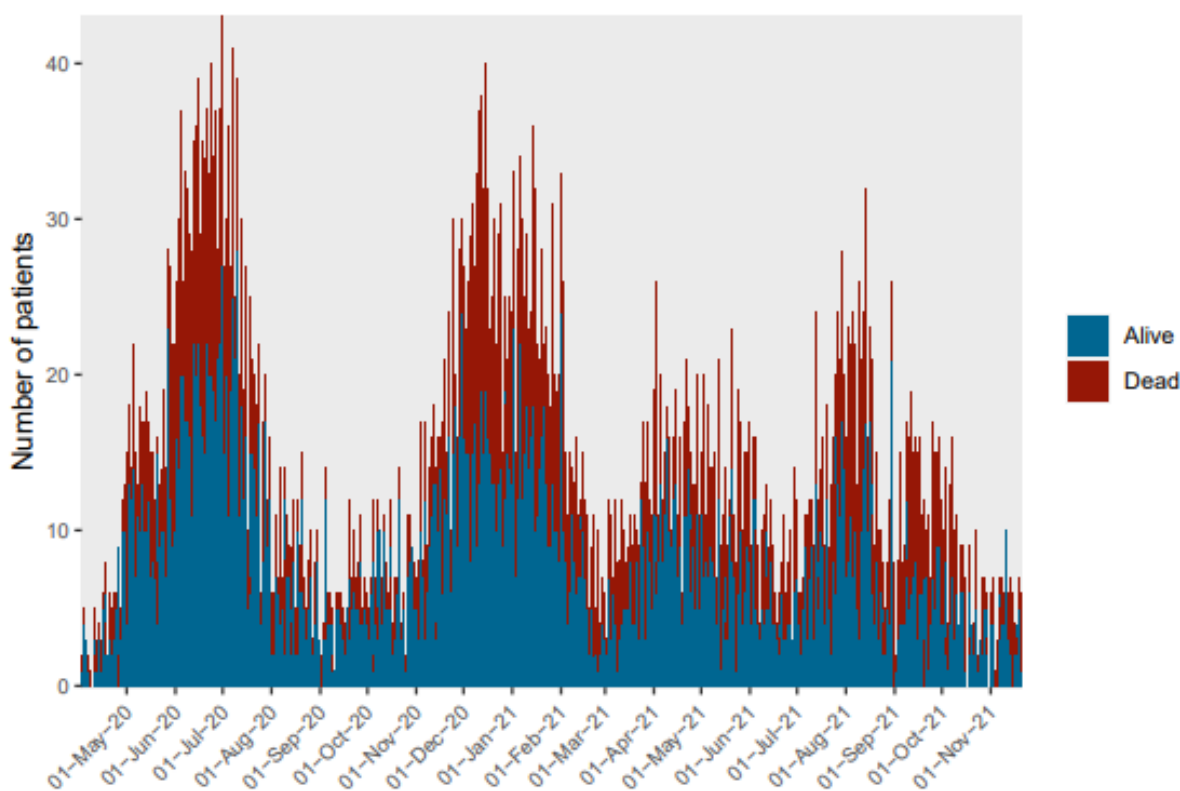
¹ Data not available prior to SARI data collection.

² Includes patients with confirmed viral pneumonia (n=81) and those with pneumonia (other, but not bacterial or fungal) (n=58)

Care provided in critical care and discharge status

Discharge data was available for 8521 patients. There were 5183 patients discharged alive from critical care (Figure 2). Table 3 outlines the length of stay and outcome for critical care admissions, and compares it with non-SARI viral pneumonia patients during 2018-2021.

Figure 2: Patient outcomes at ICU discharge



COVID-19 vaccine information

(Capturing COVID-19 vaccine information in the registry was enabled from 9th July 2021)

One thousand six hundred seventy-five critical care admissions of suspected or confirmed SARI have been notified from 9th July 2021 to 26th December 2021. Of them, COVID-19 vaccine information has been received for 841(50.2%) patients. There, 321 (38.2%) patients were vaccinated while 520 (61.8%) patients have not got any COVID-19 vaccine.

Table 5: COVID-19 vaccine information of the patients admitted to critical care with suspected or confirmed SARI

Vaccine status	Count [N = 841]
Vaccinated, n(%)	321 (38.2)
First dose received	321 (100.0)
Second dose received	151 (47.0)
Booster dose received	8 (2.5)
Non vaccinated, n(%)	520 (61.8)

Of 321 vaccinated patients, all have received their first dose, while 151 (47%) have received their second dose. 8 patients (2.5%) have received their booster dose.

Table 3: Outcome and length of stay for patients admitted to critical care with suspected or confirmed SARI

Critical care unit outcome	Patients with suspected or confirmed SARI and discharge data (N=8521)	Patients with viral pneumonia (non-SARI), 2018-2021 (N=153)
COVID-19 confirmed at discharge, n (%) [N=7579]	6234 (82.3)	*
Outcome at ICU discharge, n (%) [N=8521]		
Alive	5,183 (60.8)	107 (69.9)
Deceased	3,338 (39.2)	46 (30.1)
Outcome for patients invasively ventilated at admission, n (%) [N=1560]		
Alive	421 (27.0)	23 (47.9)
Deceased	1,139 (73.0)	25 (52.1)
Outcome for patient non-invasively ventilated at admission, n (%) [N=1742]		
Alive	899 (51.6)	6 (60.0)

Deceased	843 (48.4)	4 (40.0)
Outcome for vaccinated patients (at least one dose received), n (%) [N=298]**		
Alive	198 (66.4)	*
Deceased	100 (33.6)	*
Outcome for non-vaccinated patients, n (%) [N=479]		
Alive	300 (62.6)	*
Deceased	179 (37.4)	*
Length of stay in critical care (days), median (IQR)		
Alive	3.4 (1.7, 6.1)	4.0 (1.9, 6.8)
Deceased	4.0 (1.6, 8.0)	2.5 (0.8, 5.9)

¹ *Data not available prior to SARI data collection.

² **Vaccine information was enabled in the registry from 9th July 2021.

³ Includes patients with confirmed viral pneumonia (n=81) and those with pneumonia (other, but not bacterial or fungal) (n=58)

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