ICNARC report on COVID-19 in critical care

This report contains data on all confirmed COVID-19 cases reported to ICNARC up to midnight on 19 March 2020 from critical care units participating in the Case Mix Programme (all NHS adult, general intensive care and combined intensive care/high dependency units in England, Wales and Northern Ireland, plus some specialist critical care units).

Reporting process

Critical care units participating in the Case Mix Programme are asked to:
- notify ICNARC as soon as they have an admission with confirmed COVID-19;
- submit early data for admissions with confirmed COVID-19, including demographics and first 24-hour physiology, as soon as possible after the end of the first 24 hours in the critical care unit;
- resubmit data, including critical care unit outcome and organ support, when the patient leaves the critical care unit; and
- submit final data when the patient leaves acute hospital.

Admissions to critical care

To date, ICNARC have been notified of 225 admissions to critical care units in England, Wales and Northern Ireland with confirmed COVID-19 either at or after admission to critical care. Of these, early data covering the first 24 hours in the critical care unit have been submitted to ICNARC for 199 admissions of 196 patients (Figure 1). Of the 196 patients, 16 patients have died, 17 patients were discharged alive from critical care and 163 patients were last reported as still being in critical care (Figure 2). The majority of patients (106) are being managed by the three London Operational Delivery Networks (Figure 3). Note that Figure 1 and Figure 2 are affected by a variable lag time in submission of data on the right-hand side of the chart, of about 1-3 days.
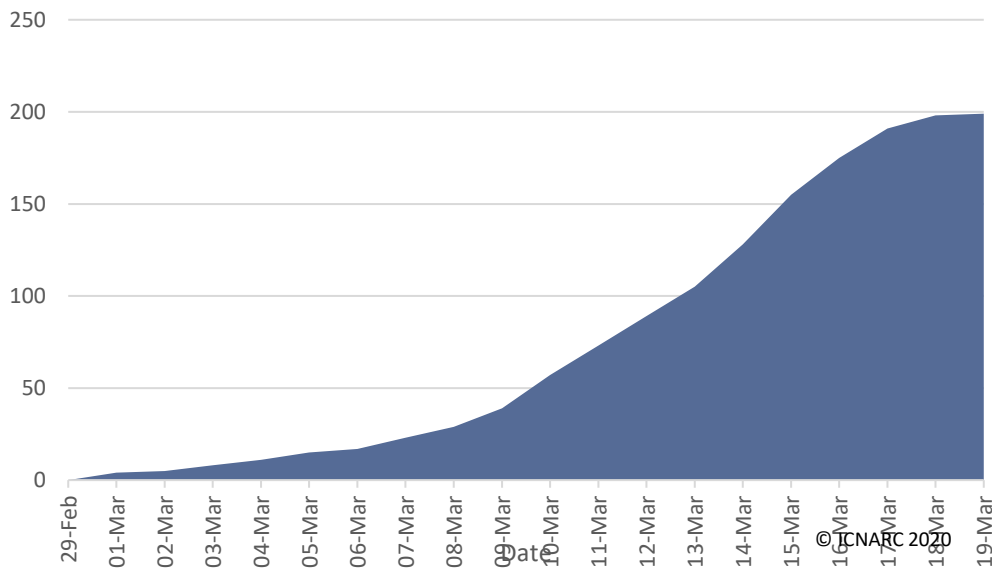
Figure 1   Cumulative number of critical care admissions with confirmed COVID-19 and 24h patient data received by date of admission to the critical care unit
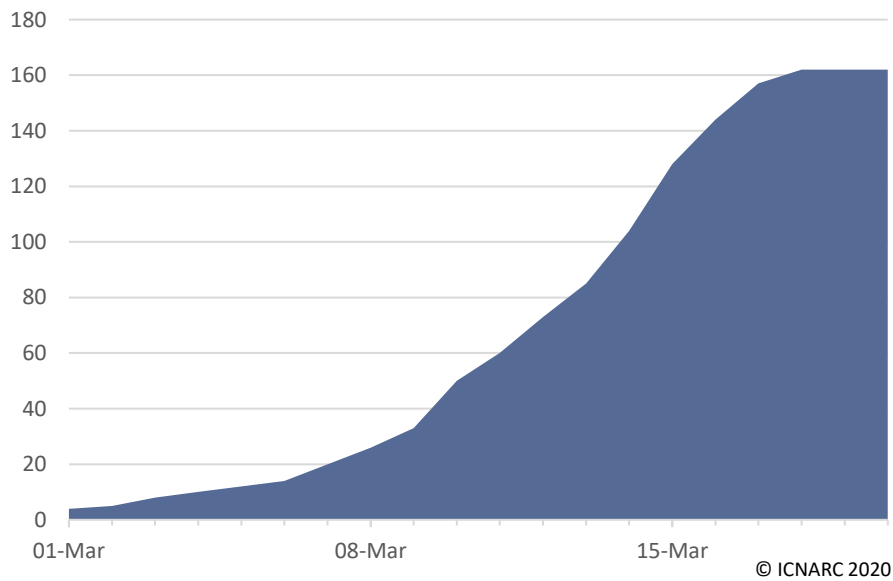

Figure 2   Number of critical care beds occupied by patients with confirmed COVID-19 by date

Legend: ■ Admissions logged   ■ Admissions with 24h data

London - South ODN
London - North East & North Central ODN
London - North West ODN
Thames Valley and Wessex ODN
Mid Trent CCN
Birmingham & Black Country CCN
Greater Manchester ODN
Central England CCN
South East Coast ODN
Wales - South East, Mid and West Region CCN
North of England CCN
South West CCN
Hertfordshire and Bedfordshire CCN
Lancashire & South Cumbria CCN
Norfolk, Suffolk and Cambridge CCN
West Yorkshire CCN
Cheshire & Merseyside CCN
Essex CCN
Wales - North Region CCN
North Trent ODN
North West Midlands CCN

Number of admissions with confirmed COVID-19

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Figure 3   Admissions by Critical Care Network

Characteristics of admitted patients

Characteristics of patients with confirmed COVID-19 admitted to critical care are summarised in Table 1. Of the 196 patients, 57 were female and 139 were male; the median age was 64 (interquartile range 52 to 73; Figure 4). 155 patients were reported as being able to live without assistance in daily activities prior to the onset of acute illness, 23 had previously required some assistance with daily activities and 0 required total assistance with all daily activities (18 unknown). 56 patients had a BMI of 25–30, 58 had a BMI of 30–40 and 13 had a BMI of 40 or higher (Figure 5). No patients were known to be pregnant at the time of admission.

During the first 24 hours following admission to the critical care unit, 132 patients received mechanical ventilation (21 unknown) and the median APACHE II score was 16 (interquartile range 11 to 19).

Table 1   Characteristics of patients admitted to critical care with confirmed COVID-19

Demographics	Patients with confirmed COVID-19 (N=196)
Age at admission (years)	
Mean (SD)	62.6 (13.4)
Median (IQR)	64 (52, 73)
Sex, n (%)	
Female	57 (29.1)
Male	139 (70.9)
Currently or recently pregnant, n (% of females)	
Currently pregnant	0 (0.0)
Recently pregnant (within 6 weeks)	2 (3.8)
Not known to be pregnant	51 (96.2)
Body mass index, n (%)	
<18.5	1 (0.6)
18.5-<25	49 (27.7)
25-<30	56 (31.6)
30-<40	58 (32.8)
40+	13 (7.3)
Medical history	
Dependency prior to admission to acute hospital, n (%)	
Able to live without assistance in daily activities	155 (87.1)
Some assistance with daily activities	23 (12.9)
Total assistance with all daily activities	0 (0.0)
Severe comorbidities*, n (%)	
Cardiovascular	0 (0.0)
Respiratory	3 (1.6)
Renal	4 (2.1)
Liver	0 (0.0)
Metastatic disease	2 (1.1)
Haematological malignancy	2 (1.1)
Immunocompromise	7 (3.7)
Acute severity†	
Mechanically ventilated, n (%) [N=175]	132 (75.4)
APACHE II Score	
Mean (SD)	15.4 (5.9)
Median (IQR)	16 (11, 19)

* Cardiovascular: symptoms at rest; Respiratory: shortness of breath with light activity or home ventilation; Renal: RRT for end-stage renal disease; Liver: biopsy-proven cirrhosis, portal hypertension or hepatic encephalopathy; Metastatic disease: distant metastases; Haematological malignancy: acute or chronic leukaemia, multiple myeloma or lymphoma; Immunocompromise: chemotherapy, radiotherapy or daily high dose steroid treatment in previous 6 months, HIV/AIDS or congenital immune deficiency

† Based on data from the first 24 hours following admission to the critical care unit
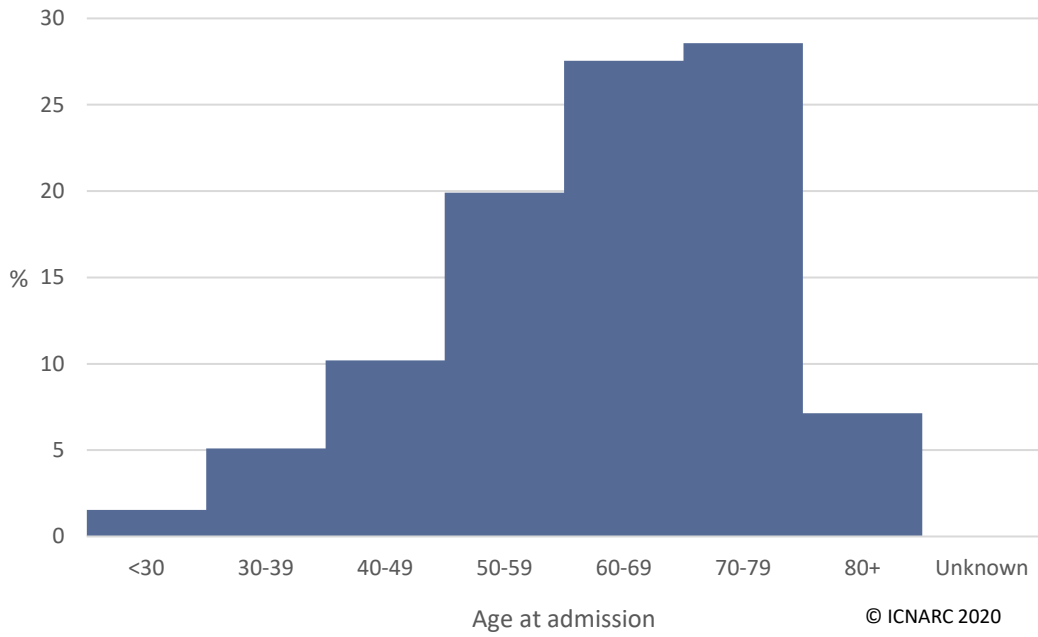
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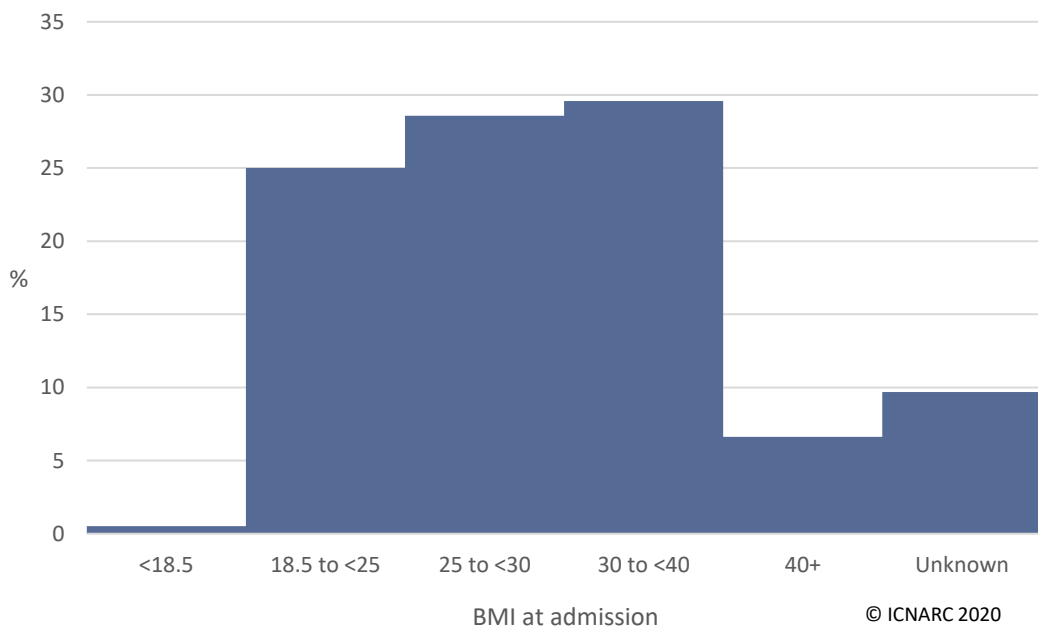Figure 4   Age distribution of patients admitted to critical care with confirmed COVID-19

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Figure 5   BMI distribution of critical care patients with confirmed COVID-19

Critical care unit outcomes have been received for 33 patients, of whom 16 patients have died and 17 were discharged alive from critical care (Figure 6). Lengths of stay and organ support are summarised in Table 2. Note that these figures may be biased towards short durations due to being based only on those with complete outcomes.

The median length of stay in critical care was 3 days for both survivors and non-survivors. Of patients with a critical care outcome reported, 11 (33.3%) received advanced respiratory support at any time during the critical care unit stay, 6 (18.2%) received advanced cardiovascular support and 4 (12.1%) received renal support (Figure 7). The median (IQR) duration of advanced respiratory support among those that received it was 5 (2, 7) calendar days (Figure 8).
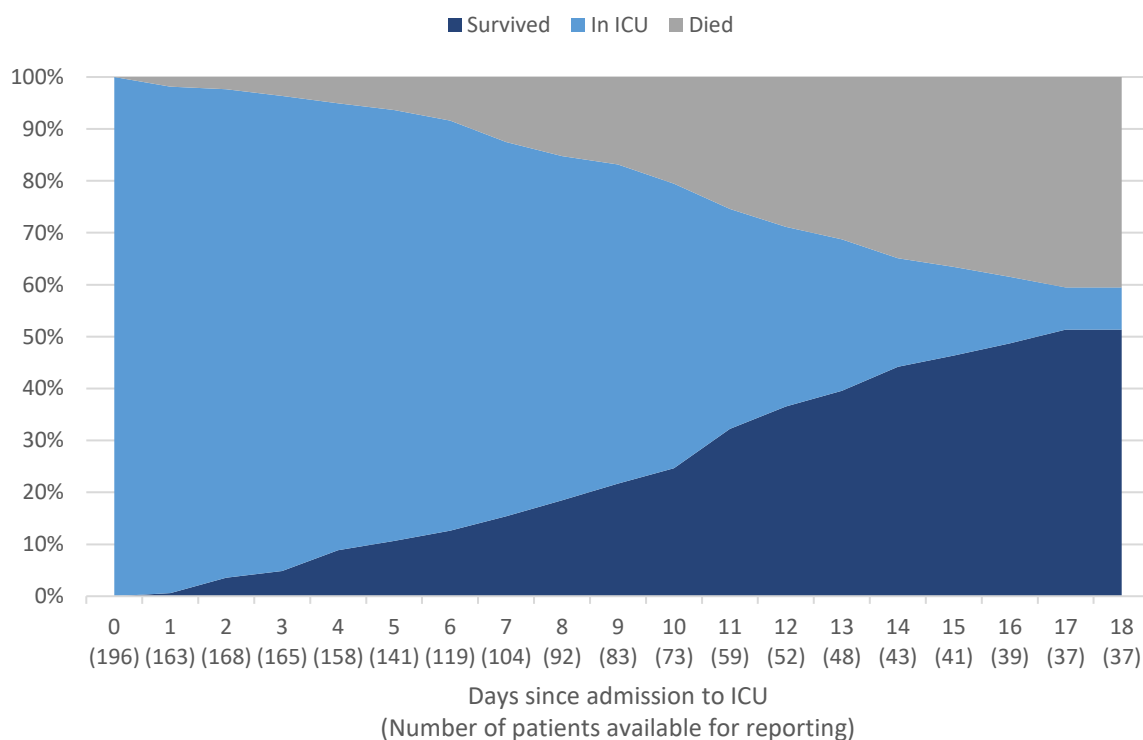

Figure 6   Survival to discharge from ICU

Table 2   Outcome, length of stay and organ support for patients admitted to critical care with confirmed COVID-19

Critical care unit outcome	Patients with confirmed COVID-19 and critical care outcome reported (N=33)
Outcome at end of critical care, n (%)	
Alive	17 (51.5)
Dead	16 (48.5)
Length of stay	
Length of stay in critical care (days), median (IQR)	
Survivors [N=16]	3 (1, 5)
Non-survivors [N=16]	3 (1.5, 6)
Organ support (Critical Care Minimum Dataset)*	
Receipt of organ support, n (%)	
Advanced respiratory support	11 (33.3)
Basic respiratory support	26 (78.8)
Advanced cardiovascular support	6 (18.2)
Basic cardiovascular support	26 (78.8)
Renal support	4 (12.1)
Liver support	0 (0.0)
Neurological support	1 (3.0)
Duration of organ support (calendar days), median (IQR)	
Advanced respiratory support [N=11]	5 (2, 7)
Total (advanced + basic) respiratory support [N=30]	4 (2, 6)
Advanced cardiovascular support [N=6]	3 (1, 5)
Total (advanced + basic) cardiovascular support [N=27]	4 (2, 7)
Renal support [N=4]	5 (3, 7)

* Recorded as number of calendar days (00:00-23:59) on which support was received at any time. Advanced respiratory: invasive ventilation, BPAP via trans-larygeal tube or tracheostomy, CPAP via translaryngeal tube, extracorporeal respiratory support; Basic respiratory: >50% oxygen by face mask, close observation due to potential for acute deterioration, physiotherapy/suction to clear secretions at least two-hourly, recently extubated after a period of mechanical ventilation, mask/hood CPAP/BPAP, non-invasive ventilation, CPAP via a tracheostomy, intubated to protect airway; Advanced cardiovascular: multiple IV/rhythm controlling drugs (at least one vasoactive), continuous observation of cardiac output, intra-aortic balloon pump, temporary cardiac pacemaker; Basic cardiovascular: central venous catheter, arterial line, single IV vasoactive/rhythm controlling drug; Renal: acute renal replacement therapy, renal replacement therapy for chronic renal failure where other organ support is received; Liver: management of coagulopathy and/or portal hypertension for acute on chronic hepatocellular failure or primary acute hepatocellular failure; Neurological: CNS depression sufficient to prejudice airway, invasive neurological monitoring, continuous IV medication to control seizures, therapeutic hypothermia
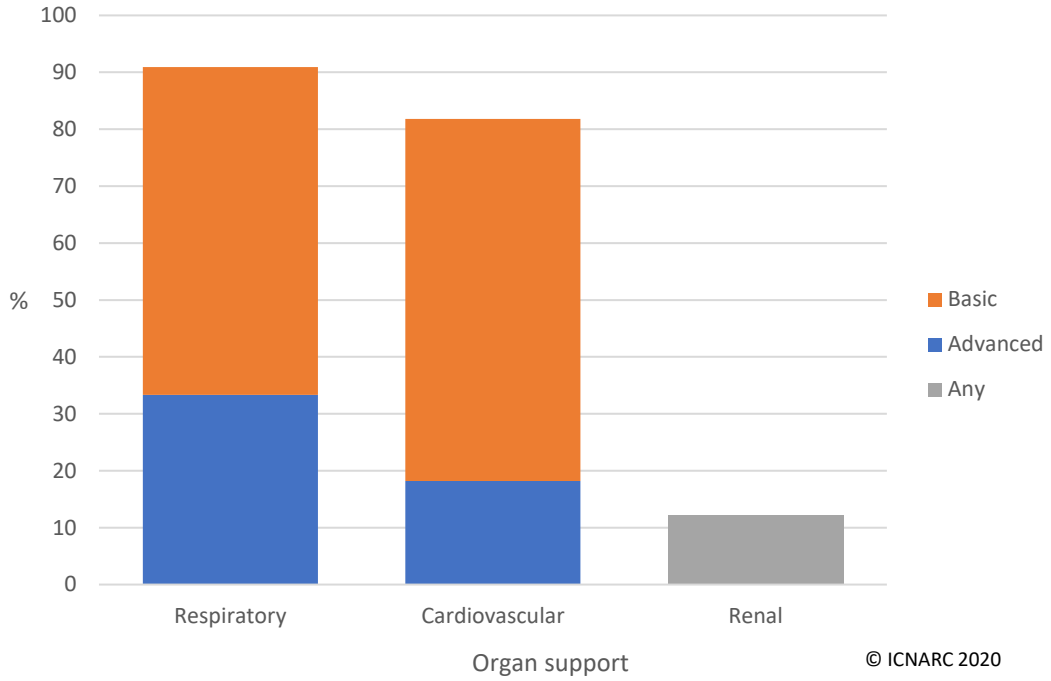
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Figure 7   Percentage of patients receiving organ support
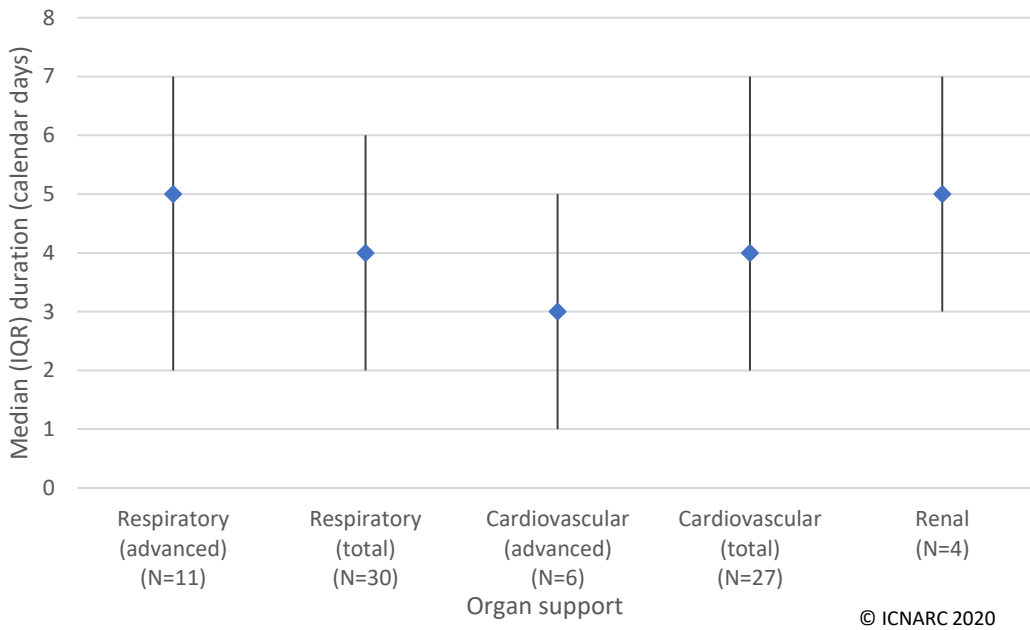

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Figure 8   Duration of organ support received (calendar days; median and interquartile range)

Acknowledgement

Please acknowledge the source of these data in all future presentations (oral and/or written), as follows:

"These data derive from the Case Mix Programme Database. The Case Mix Programme is the national clinical audit of patient outcomes from adult critical care coordinated by the Intensive Care National Audit & Research Centre (ICNARC). For more information on the representativeness and quality of these data, please contact ICNARC."