

ICNARC report on COVID-19 in critical care 05 June 2020

This report presents analyses of data on patients critically ill with confirmed COVID-19 reported to ICNARC up to 4pm on 04 June 2020 from critical care units participating in the Case Mix Programme (the national clinical audit covering all NHS adult, general intensive care and combined intensive care/high dependency units in England, Wales and Northern Ireland, plus some additional specialist and non-NHS critical care units). Please note that adult critical care units in Scotland, paediatric intensive care units and neonatal intensive care units do not participate in the Case Mix Programme.

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 critical care;
- resubmit data for the whole critical care stay, including critical care outcome and organ support, when the patient leaves critical care; and
- submit final data when the patient leaves acute hospital.

The same data are reported for an historic cohort of patients critically ill with viral pneumonia (non-COVID-19) admitted between 1 January 2017 and 31 December 2019.

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* Please see individual notes for Tables/Figures

Participation and population coverage

Critical care unit participation

Total number of units:	<u>289</u>
Units with at least one patient notified:	<u>252</u>
Units with zero patients:	33
Units with uncertain participation:	4

Admissions to critical care

To date, ICNARC have been notified of 12,375 admissions for critical care with confirmed COVID-19, either at or after the start of critical care, in England, Wales and Northern Ireland. Of these, early data covering the first 24 hours of critical care have been submitted to ICNARC for 11,719 admissions for 9623 patients (Figures 1-3). Of the 9623 patients, 8533 have outcomes reported and 1090 patients were last reported as still receiving critical care (Figure 4). The largest numbers of patients (2823) have been managed by the three London Operational Delivery Networks (Figure 5). Please note that Figures 2-4 are affected by a variable lag time for submission of data of about 1-3 days (shaded grey).

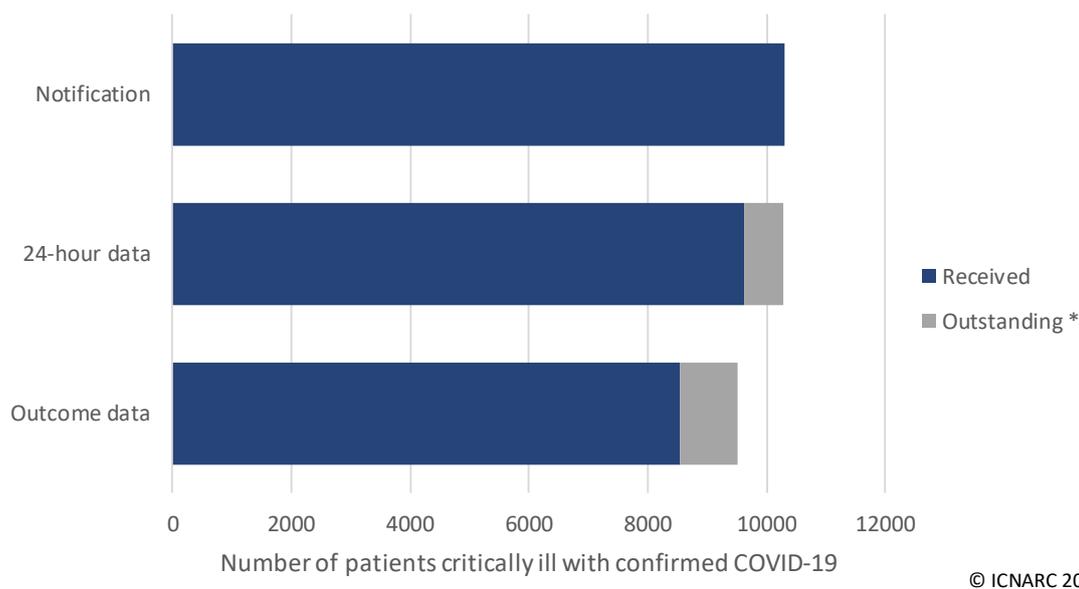


Figure 1 Numbers of patients with data included in this report and outstanding *

* Please note that 24-hour data are considered outstanding where ICNARC was notified of the admission at least 48 hours previously and outcome data are considered outstanding when at least 10 days have elapsed since the start of critical care.

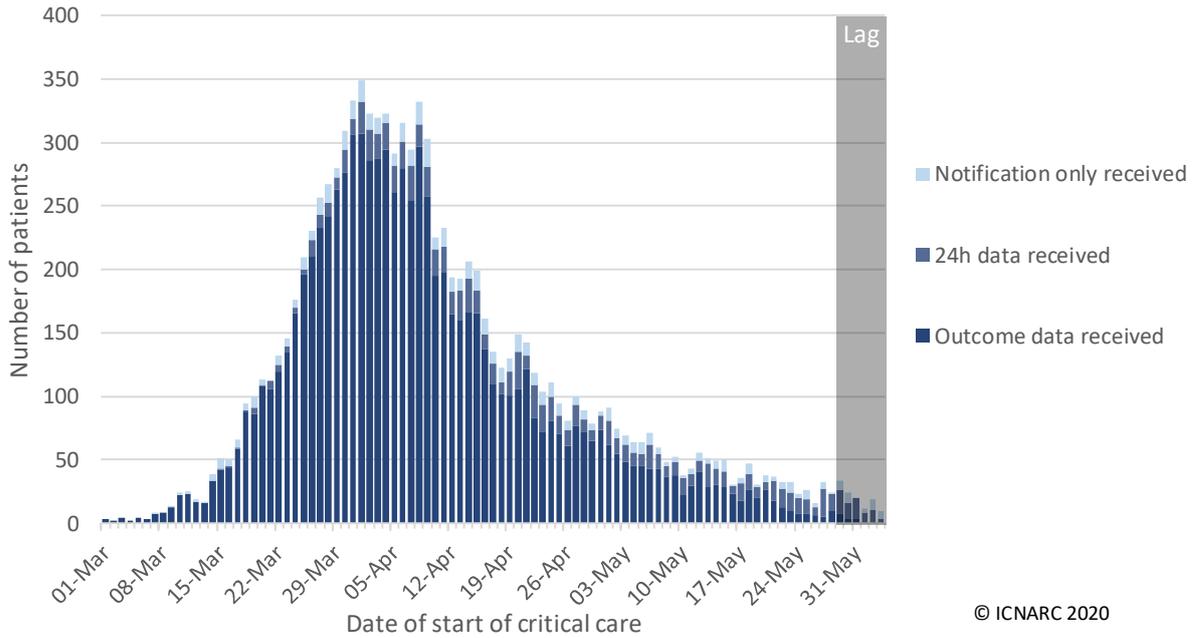


Figure 2 Number of new patients critically ill with confirmed COVID-19 by date of start of critical care

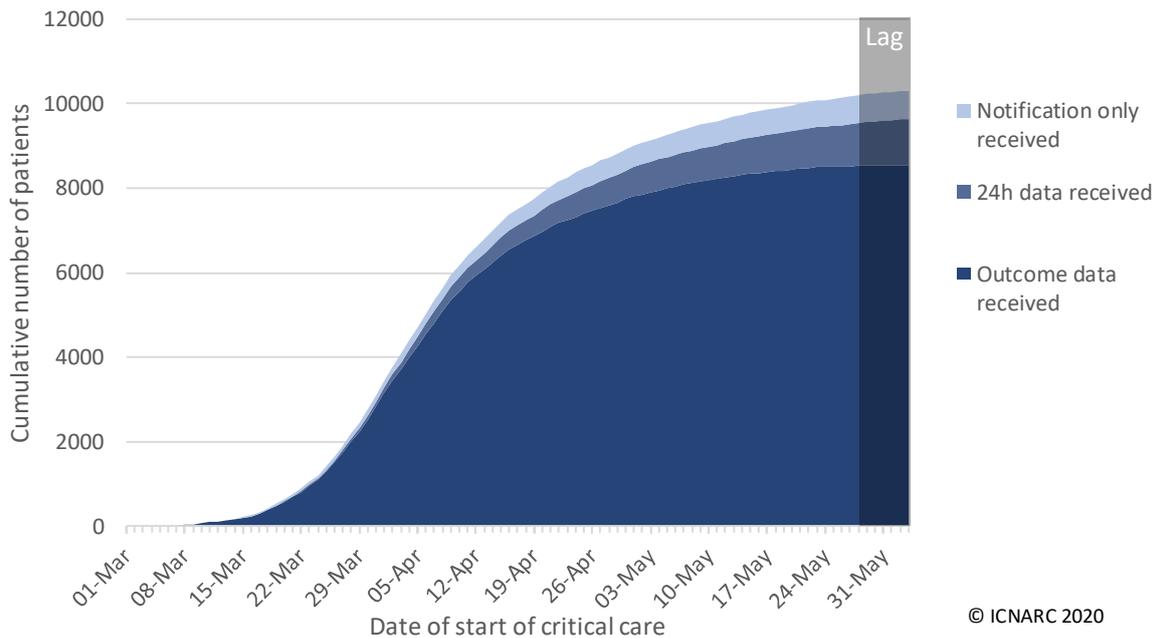


Figure 3 Cumulative number of patients critically ill with confirmed COVID-19 by date of start of critical care

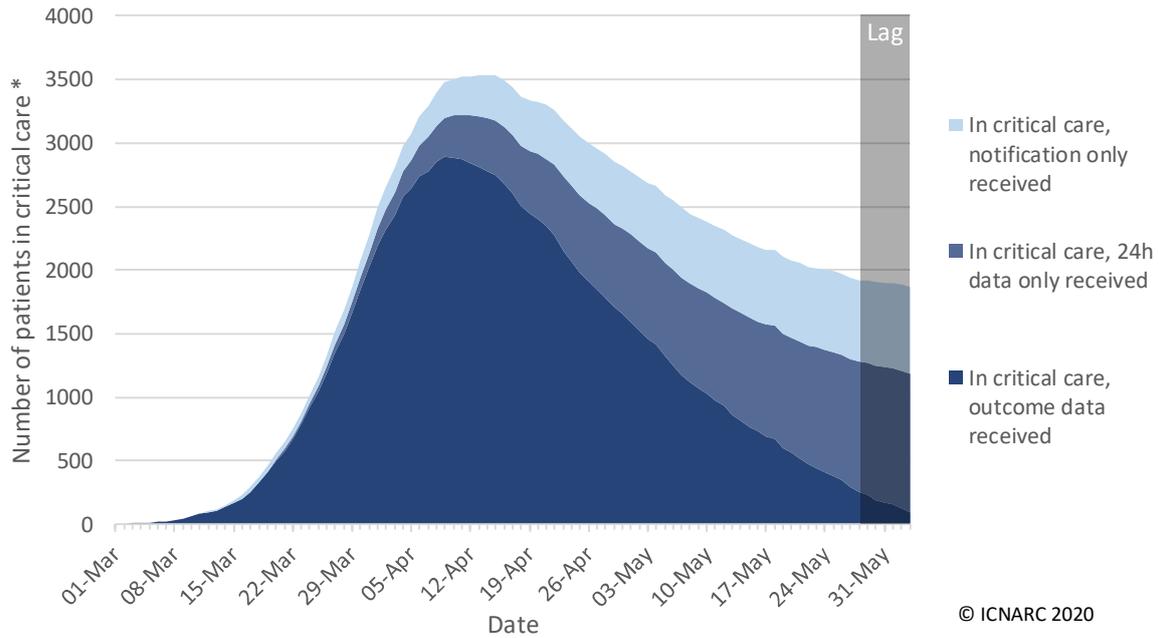


Figure 4 Total number of patients critically ill with confirmed COVID-19 by date *

* Please note that patients whose outcome data have not been received are assumed to remain in critical care as of 04 June 2020.

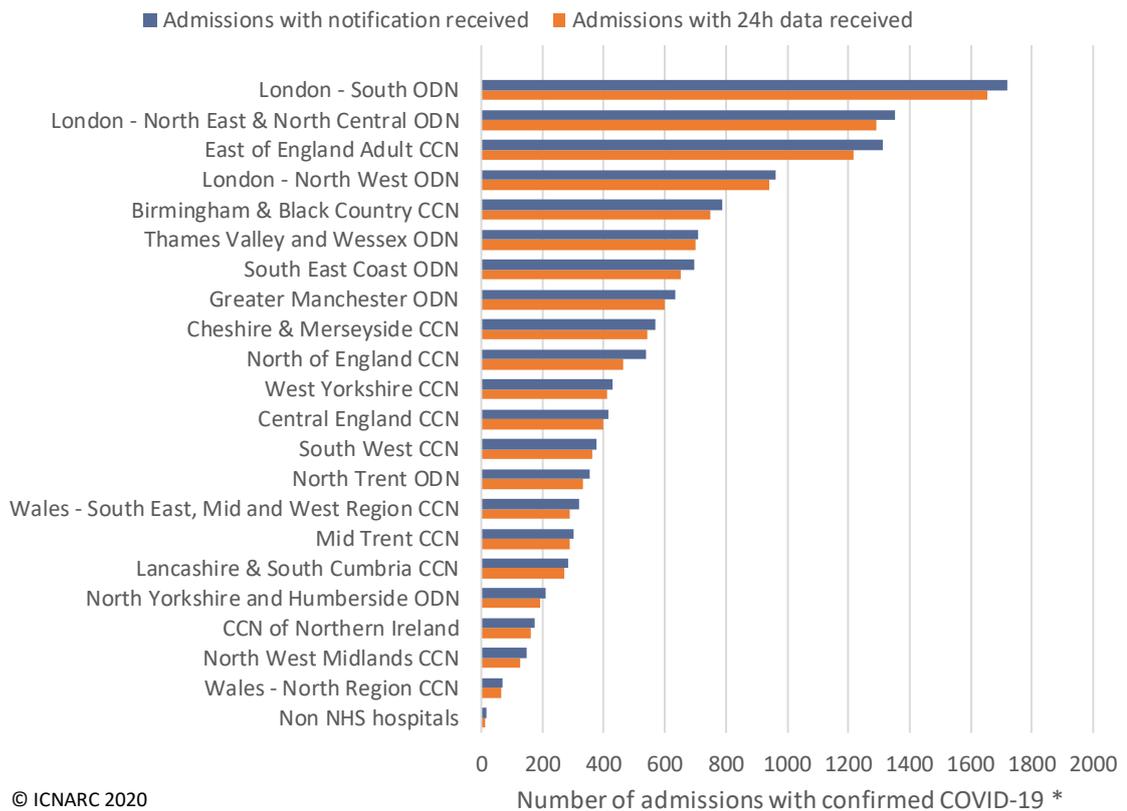


Figure 5 Number of admissions critically ill with confirmed COVID-19 by Critical Care Network *

ODN: Organisational Delivery Network; CCN: Critical Care Network. * Please note that this figure represents the number of admissions (i.e. includes transfers between units and readmissions) and NOT the number of patients.

Patient characteristics

Characteristics of patients critically ill with confirmed COVID-19 are summarised in Table 1 and Table 2 and compared with an historic cohort of patients critically ill with viral pneumonia (non-COVID-19) admitted between 1 January 2017 and 31 December 2019.

Table 1 Patient characteristics: demographics

Demographics	Patients with confirmed COVID-19 and 24h data (N=9623)	Patients with viral pneumonia (non-COVID-19), 2017-19 (N=5782)
Age at admission (years) [N=9619]		
Mean (SD)	58.8 (12.6)	58.0 (17.4)
Median (IQR)	60 (51, 68)	61 (48, 71)
Sex, n (%) [N=9619]		
Female	2805 (29.2)	2641 (45.7)
Male	6814 (70.8)	3141 (54.3)
Currently or recently pregnant, n (% of females aged 16-49) [N=676]		
Currently pregnant	24 (3.6)	56 (7.4)
Recently pregnant (within 6 weeks)	34 (5.0)	29 (3.8)
Not known to be pregnant	618 (91.4)	674 (88.8)
Ethnicity, n (%) [N=8774]		
White	5882 (67.0)	4951 (88.4)
Mixed	151 (1.7)	52 (0.9)
Asian	1316 (15.0)	325 (5.8)
Black	852 (9.7)	155 (2.8)
Other	573 (6.5)	117 (2.1)
Index of Multiple Deprivation (IMD) quintile *, n (%) [N=9447]		
1 (least deprived)	1387 (14.7)	873 (15.3)
2	1533 (16.2)	999 (17.5)
3	1838 (19.5)	1115 (19.5)
4	2312 (24.5)	1232 (21.6)
5 (most deprived)	2377 (25.2)	1489 (26.1)
Body mass index *, n (%) [N=8908]		
<18.5	60 (0.7)	310 (5.5)
18.5-<25	2251 (25.3)	1933 (34.2)
25-<30	3105 (34.9)	1691 (29.9)
30-<40	2797 (31.4)	1330 (23.5)
40+	695 (7.8)	394 (7.0)

* Please see Definitions on page 34.

Table 2 Patient characteristics: medical history and indicators of acute severity *

Medical history	Patients with confirmed COVID-19 and 24h data (N=9623)	Patients with viral pneumonia (non-COVID-19), 2017-19 (N=5782)
Dependency prior to admission to acute hospital *, n (%) [N=9326]		
Able to live without assistance in daily activities	8455 (90.7)	4244 (73.6)
Some assistance with daily activities	840 (9.0)	1392 (24.1)
Total assistance with all daily activities	31 (0.3)	134 (2.3)
Very severe comorbidities *, n (%) [N=9405]		
Cardiovascular	59 (0.6)	78 (1.4)
Respiratory	98 (1.0)	295 (5.1)
Renal	156 (1.7)	120 (2.1)
Liver	39 (0.4)	54 (0.9)
Metastatic disease	44 (0.5)	68 (1.2)
Haematological malignancy	166 (1.8)	268 (4.6)
Immunocompromise	324 (3.4)	503 (8.7)
Prior hospital length of stay [N=9606]		
Mean (SD)	2.5 (6.9)	2.7 (13.0)
Median (IQR)	1 (0, 3)	1 (0, 2)
CPR within previous 24h, n (%) [N=9552]		
In the community	44 (0.5)	21 (0.4)
In hospital	59 (0.6)	85 (1.5)
Indicator of acute severity		
Mechanically ventilated within first 24h *, n (%) [N=9127]	5588 (61.2)	2482 (43.0)
APACHE II Score [N=9317]		
Mean (SD)	14.9 (5.3)	17.2 (6.3)
Median (IQR)	14 (11, 18)	17 (13, 21)
PaO ₂ /FiO ₂ ratio † (kPa), median (IQR) [N=8708]	15.7 (11.2, 22.0)	18.0 (11.6, 26.4)
PaO ₂ /FiO ₂ ratio †, n (%) [N=8708]		
≤ 13.3 kPa (≤ 100 mmHg)	3246 (37.3)	1819 (33.3)
> 13.3 and ≤ 26.7 kPa (> 100 and ≤ 200 mmHg)	4196 (48.2)	2318 (42.4)
> 26.7 kPa (> 200 mmHg)	1266 (14.5)	1328 (24.3)

* Please see Definitions on page 34. Indicators of acute severity are based on data from the first 24 hours of critical care. † Derived from the arterial blood gas with the lowest PaO₂ during the first 24 hours of critical care.

The distribution of age and sex is presented in Figure 6. The distribution of ethnicity, matched on 2011 census ward for location of patients critically ill with COVID-19, is presented in Figure 7.

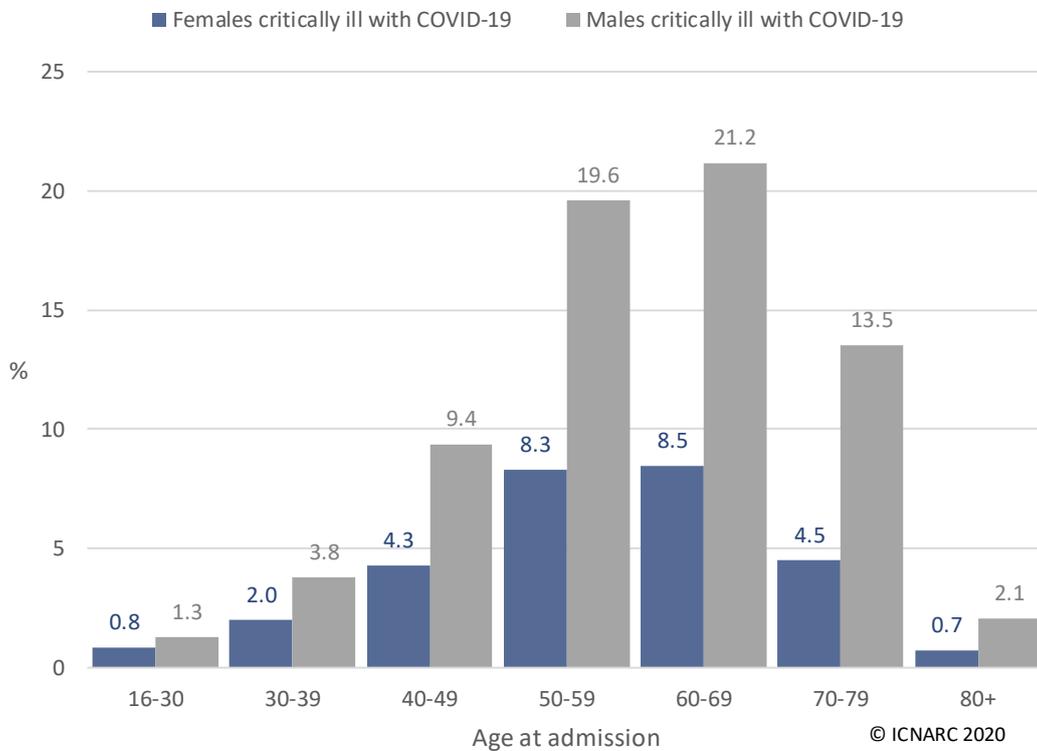


Figure 6 Age and sex distribution of patients critically ill with confirmed COVID-19

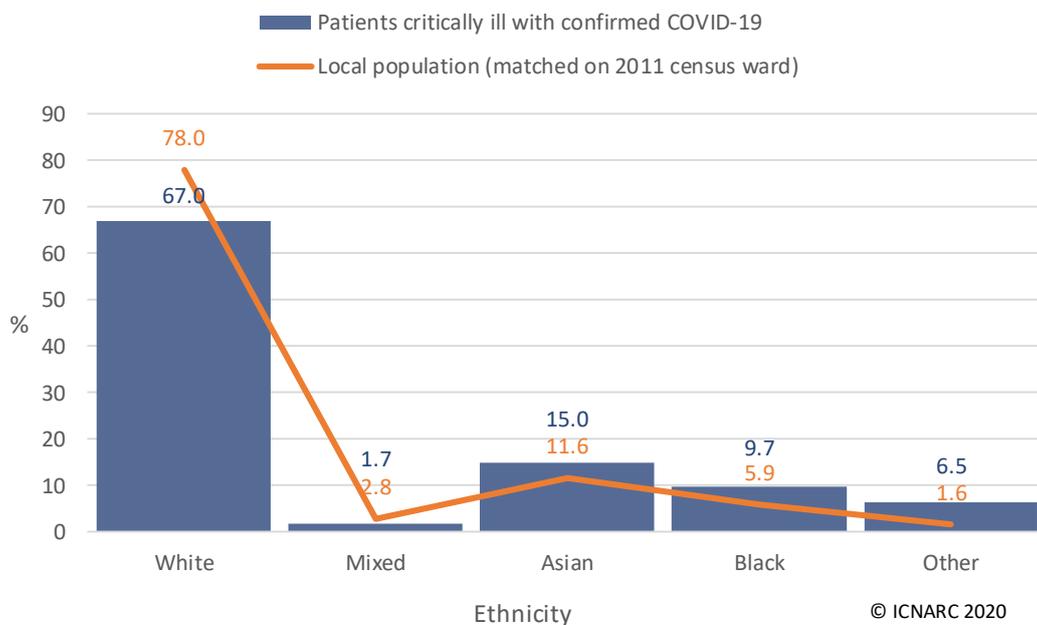


Figure 7 Ethnicity distribution of patients critically ill with confirmed COVID-19

The distribution of Index of Multiple Deprivation (IMD) is presented in Figure 8. The distribution of body mass index (BMI), compared with an age- and sex-matched population (from the Health Survey for England 2018), is presented in Figure 9.

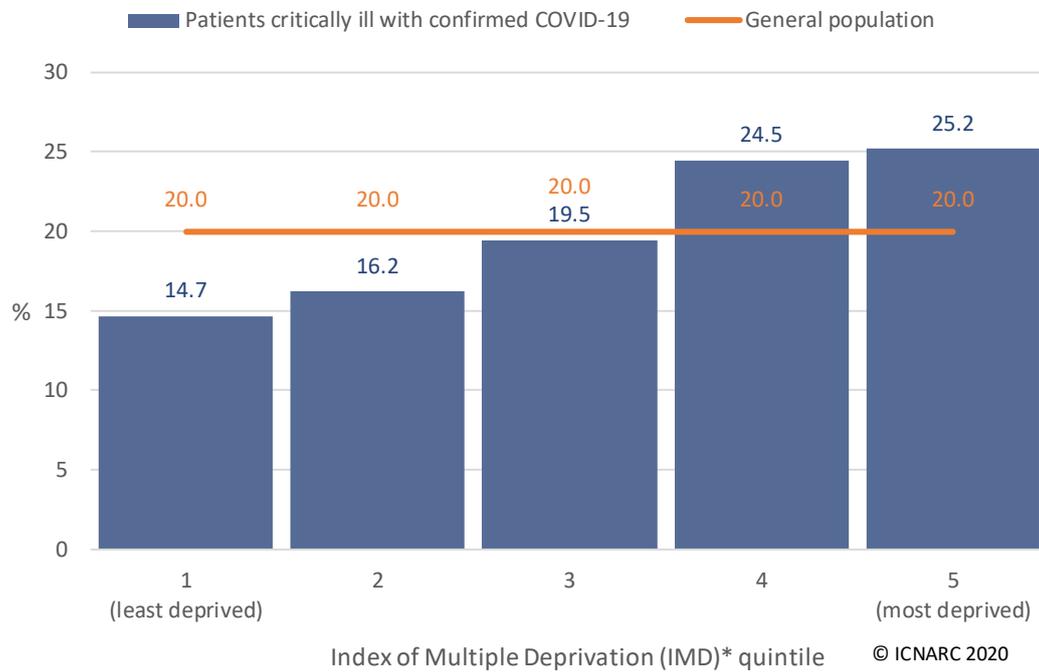


Figure 8 Index of Multiple Deprivation (IMD) * distribution of patients critically ill with confirmed COVID-19

* Please see Definitions on page 34.

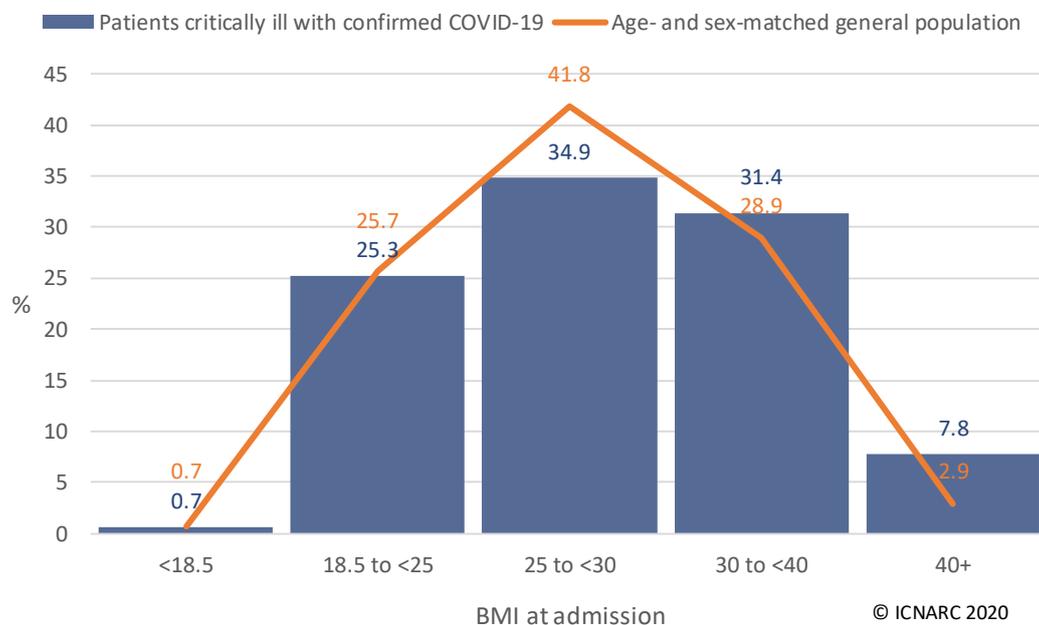


Figure 9 BMI distribution of patients critically ill with confirmed COVID-19

Patient characteristics by ethnicity

Characteristics of patients critically ill with confirmed COVID-19 by ethnicity, for patients of white ethnicities compared with patients of all non-white ethnicities combined (mixed, Asian, black or other), are summarised in Table 3 and Table 4.

Table 3 Patient characteristics: demographics by ethnicity

Demographics	Patients of white ethnicity (N=5882)	Patients of non-white ethnicity (N=2892)
Age at admission (years) [N=8772]		
Mean (SD)	60.6 (12.4)	55.6 (12.4)
Median (IQR)	61 (53, 70)	57 (48, 64)
Sex, n (%) [N=8772]		
Female	1728 (29.4)	864 (29.9)
Male	4153 (70.6)	2027 (70.1)
Currently or recently pregnant, n (% of females) [N=633]		
Currently pregnant	11 (3.0)	11 (4.1)
Recently pregnant (within 6 weeks)	13 (3.6)	20 (7.4)
Not known to be pregnant	338 (93.4)	240 (88.6)
Index of Multiple Deprivation (IMD) quintile *, n (%) [N=8626]		
1 (least deprived)	1040 (18.0)	233 (8.2)
2	1076 (18.6)	324 (11.4)
3	1166 (20.1)	514 (18.1)
4	1215 (21.0)	877 (30.9)
5 (most deprived)	1291 (22.3)	890 (31.4)
Body mass index *, n (%) [N=8154]		
<18.5	36 (0.7)	22 (0.8)
18.5-<25	1231 (22.6)	808 (29.9)
25-<30	1843 (33.8)	983 (36.4)
30-<40	1835 (33.7)	746 (27.6)
40+	506 (9.3)	144 (5.3)

* Please see Definitions on page 34. Patients with ethnicity recorded as 'not stated' excluded.

Table 4 Patient characteristics: medical history and indicators of acute severity by ethnicity

Medical history	Patients of white ethnicity (N=5882)	Patients of non-white ethnicity (N=2892)
Dependency prior to admission to acute hospital *, n (%) [N=8564]		
Able to live without assistance in daily activities	5109 (89.1)	2643 (93.4)
Some assistance with daily activities	606 (10.6)	176 (6.2)
Total assistance with all daily activities	20 (0.3)	10 (0.4)
Very severe comorbidities *, n (%) [N=8627]		
Cardiovascular	46 (0.8)	9 (0.3)
Respiratory	74 (1.3)	18 (0.6)
Renal	67 (1.2)	80 (2.8)
Liver	30 (0.5)	6 (0.2)
Metastatic disease	36 (0.6)	7 (0.2)
Haematological malignancy	125 (2.2)	30 (1.1)
Immunocompromise	231 (4.0)	71 (2.5)
Prior hospital length of stay [N=8761]		
Mean (SD)	2.6 (7.2)	2.2 (6.7)
Median (IQR)	1 (0, 3)	1 (0, 3)
CPR within previous 24h, n (%) [N=8737]		
In the community	28 (0.5)	13 (0.2)
In hospital	32 (0.5)	19 (0.3)
Indicator of acute severity		
Mechanically ventilated within first 24h *, n (%) [N=8344]	3211 (57.1)	1866 (68.5)
APACHE II Score [N=8519]		
Mean (SD)	15.0 (5.3)	14.7 (5.4)
Median (IQR)	15 (12, 18)	14 (11, 18)
PaO ₂ /FiO ₂ ratio † (kPa), median (IQR) [N=7957]	16.0 (11.2, 22.0)	15.4 (11.3, 21.8)
PaO ₂ /FiO ₂ ratio †, n (%) [N=7957]		
≤ 13.3 kPa (≤ 100 mmHg)	1966 (36.9)	976 (37.1)
> 13.3 and ≤ 26.7 kPa (> 100 and ≤ 200 mmHg)	2567 (48.2)	1286 (48.9)
> 26.7 kPa (> 200 mmHg)	793 (14.9)	369 (14.0)

* Please see Definitions on page 34. Patients with ethnicity recorded as 'not stated' excluded. Indicators of acute severity are based on data from the first 24 hours of critical care. † Derived from the arterial blood gas with the lowest PaO₂ from the first 24 hours of critical care.

Patient characteristics by receipt of organ support

Characteristics of patients critically ill with confirmed COVID-19 who received advanced respiratory support at any point during critical care and those who received basic respiratory support only are summarised in Table 5 and Table 6. Characteristics of patients critically ill with confirmed COVID-19 who received renal support at any point during critical care and those who did not receive renal support are summarised in Table 7 and Table 8. Most patients who received renal support (95.5%) also received advanced respiratory support.

Table 5 Patient characteristics: demographics by receipt of respiratory support *

Demographics	Patients receiving advanced respiratory support (N=6128)	Patients receiving only basic respiratory support (N=2131)
Age at admission (years) [N=8258]		
Mean (SD)	58.8 (12.0)	59.2 (14.3)
Median (IQR)	60 (52, 67)	60 (50, 70)
Sex, n (%) [N=8257]		
Female	1692 (27.6)	706 (33.1)
Male	4434 (72.4)	1425 (66.9)
Currently or recently pregnant, n (% of females aged 16-49) [N=580]		
Currently pregnant	10 (2.5)	9 (4.9)
Recently pregnant (within 6 weeks)	21 (5.3)	9 (4.9)
Not known to be pregnant	366 (92.2)	165 (90.2)
Ethnicity, n (%) [N=7562]		
White	3607 (64.7)	1516 (76.3)
Mixed	95 (1.7)	28 (1.4)
Asian	878 (15.8)	234 (11.8)
Black	601 (10.8)	115 (5.8)
Other	393 (7.1)	95 (4.8)
Index of Multiple Deprivation (IMD) quintile *, n (%) [N=8116]		
1 (least deprived)	857 (14.2)	354 (17.0)
2	964 (16.0)	361 (17.3)
3	1171 (19.4)	381 (18.3)
4	1532 (25.4)	450 (21.6)
5 (most deprived)	1508 (25.0)	538 (25.8)
Body mass index *, n (%) [N=7712]		
<18.5	31 (0.5)	17 (0.9)
18.5-<25	1395 (24.0)	483 (25.5)
25-<30	2091 (35.9)	644 (34.1)
30-<40	1875 (32.2)	568 (30.0)
40+	429 (7.4)	179 (9.5)

* Please see Definitions on page 34. Patients receiving no respiratory support excluded due to small numbers.

Table 6 Patient characteristics: medical history and indicators of acute severity by receipt of respiratory support *

Medical history	Patients receiving advanced respiratory support (N=6128)	Patients receiving only basic respiratory support (N=2131)
Dependency prior to admission to acute hospital *, n (%) [N=8104]		
Able to live without assistance in daily activities	5581 (92.7)	1770 (84.9)
Some assistance with daily activities	430 (7.1)	298 (14.3)
Total assistance with all daily activities	9 (0.1)	16 (0.8)
Very severe comorbidities *, n (%) [N=8139]		
Cardiovascular	18 (0.3)	31 (1.5)
Respiratory	38 (0.6)	55 (2.6)
Renal	68 (1.1)	56 (2.7)
Liver	19 (0.3)	16 (0.8)
Metastatic disease	19 (0.3)	17 (0.8)
Haematological malignancy	86 (1.4)	57 (2.7)
Immunocompromise	184 (3.0)	101 (4.8)
Prior hospital length of stay [N=8257]		
Mean (SD)	2.2 (6.7)	2.8 (7.4)
Median (IQR)	1 (0, 3)	1 (0, 3)
CPR within previous 24h, n (%) [N=8243]		
In the community	33 (0.3)	4 (0.2)
In hospital	54 (0.6)	2 (0.1)
Indicator of acute severity		
Mechanically ventilated within first 24h *, n (%) [N=8016]	4817 (81.0)	---
APACHE II Score [N=8103]		
Mean (SD)	15.3 (5.1)	14.0 (5.4)
Median (IQR)	15 (12, 18)	14 (10, 17)
PaO ₂ /FiO ₂ ratio † (kPa), median (IQR) [N=7667]	15.2 (10.9, 21.2)	17.5 (12.5, 24.0)
PaO ₂ /FiO ₂ ratio †, n(%) [N=7667]		
≤ 13.3 kPa (≤ 100 mmHg)	2344 (39.9)	524 (29.2)
> 13.3 and ≤ 26.7 kPa (> 100 and ≤ 200 mmHg)	2782 (47.4)	953 (53.1)
> 26.7 kPa (> 200 mmHg)	745 (12.7)	319 (17.8)

* Please see Definitions on page 34. Patients receiving no respiratory support excluded due to small numbers. Indicators of acute severity are based on data from the first 24 hours of critical care. † Derived from the arterial blood gas with the lowest PaO₂ from the first 24 hours of critical care.

Table 7 Patient characteristics: demographics by receipt of renal support *

Demographics	Patients receiving any renal support (N=2164)	Patients not receiving any renal support (N=6290)
Age at admission (years) [N=8454]		
Mean (SD)	59.5 (11.1)	58.7 (13.3)
Median (IQR)	60 (53, 68)	60 (50, 68)
Sex, n (%) [N=8452]		
Female	479 (22.1)	1999 (31.8)
Male	1684 (77.9)	4290 (68.2)
Currently or recently pregnant, n (% of females aged 16-49) [N=600]		
Currently pregnant	2 (1.8)	20 (4.1)
Recently pregnant (within 6 weeks)	3 (2.8)	30 (6.1)
Not known to be pregnant	104 (95.4)	441 (89.8)
Ethnicity, n (%) [N=7742]		
White	1194 (60.4)	4053 (70.3)
Mixed	26 (1.3)	98 (1.7)
Asian	328 (16.6)	810 (14.0)
Black	304 (15.4)	431 (7.5)
Other	124 (6.3)	374 (6.5)
Index of Multiple Deprivation (IMD) quintile *, n (%) [N=8303]		
1 (least deprived)	283 (13.3)	952 (15.4)
2	320 (15.0)	1038 (16.8)
3	423 (19.8)	1156 (18.7)
4	549 (25.7)	1484 (24.1)
5 (most deprived)	558 (26.2)	1540 (25.0)
Body mass index *, n (%) [N=7890]		
<18.5	12 (0.6)	40 (0.7)
18.5-<25	459 (22.0)	1484 (25.6)
25-<30	728 (34.9)	2061 (35.5)
30-<40	720 (34.6)	1768 (30.4)
40+	164 (7.9)	454 (7.8)

* Please see Definitions on page 34. Includes 136 patients requiring chronic renal replacement therapy for end stage renal disease prior to critical care; outcomes for these patients are similar.

Table 8 Patient characteristics: medical history and indicators of acute severity by receipt of renal support *

Medical history	Patients receiving any renal support (N=2164)	Patients not receiving any renal support (N=6290)
Dependency prior to admission to acute hospital *, n (%) [N=8292]		
Able to live without assistance in daily activities	1986 (92.8)	5518 (89.7)
Some assistance with daily activities	148 (6.9)	609 (9.9)
Total assistance with all daily activities	5 (0.2)	26 (0.4)
Very severe comorbidities *, n (%) [N=8328]		
Cardiovascular	9 (0.4)	43 (0.7)
Respiratory	14 (0.7)	81 (1.3)
Renal	104 (4.8)	32 (0.5)
Liver	2 (0.1)	33 (0.5)
Metastatic disease	9 (0.4)	32 (0.5)
Haematological malignancy	30 (1.4)	117 (1.9)
Immunocompromise	72 (3.4)	224 (3.6)
Prior hospital length of stay [N=8452]		
Mean (SD)	2.1 (4.5)	2.5 (7.7)
Median (IQR)	1 (0, 3)	1 (0, 3)
CPR within previous 24h, n (%) [N=8437]		
In the community	11 (0.2)	26 (0.4)
In hospital	14 (0.2)	44 (0.8)
Indicator of acute severity		
Mechanically ventilated within first 24h *, n (%) [N=8191]	1681 (79.5)	3296 (54.2)
APACHE II Score [N=8289]		
Mean (SD)	16.9 (5.5)	14.2 (5.0)
Median (IQR)	16 (13, 20)	14 (11, 17)
PaO ₂ /FiO ₂ ratio † (kPa), median (IQR) [N=7802]	14.3 (10.4, 20.0)	16.5 (11.6, 23.0)
PaO ₂ /FiO ₂ ratio †, n(%) [N=7802]		
≤ 13.3 kPa (≤ 100 mmHg)	920 (44.3)	1956 (34.2)
> 13.3 and ≤ 26.7 kPa (> 100 and ≤ 200 mmHg)	940 (45.2)	2821 (49.3)
> 26.7 kPa (> 200 mmHg)	219 (10.5)	946 (16.5)

* Please see Definitions on page 34. Includes 136 patients requiring chronic renal replacement therapy for end stage renal disease prior to critical care; outcomes for these patients are similar. Indicators of acute severity are based on data from the first 24 hours of critical care. † Derived from the arterial blood gas with the lowest PaO₂ from the first 24 hours of critical care.

Outcomes, length of stay and organ support

Critical care outcomes have been received for 8533 (of 9623) patients, of whom 3615 patients have died and 4918 have been discharged alive from critical care (Figures 10 and 11). Length of stay in critical care and duration of organ support in critical care are summarised in Table 9 and compared with an historic cohort of patients critically ill with viral pneumonia (non-COVID-19) admitted between 1 January 2017 and 31 December 2019. Receipt and duration of organ support are summarised graphically in Figure 12 and in Figure 13, respectively.

Please note that Figure 11 is biased towards longer lengths of stay in critical care due to the time lag in notification of a patients' discharge or death, while Table 9 and Figures 12 and 13 are biased towards patients with shorter lengths of stay in critical care due to the emerging nature of the UK epidemic. Figure 10 and Figure 11 assume that patients are still in critical care unless ICNARC has been notified otherwise, and Table 9 and Figures 12 and 13 include only those patients who have either died or been discharged from critical care.

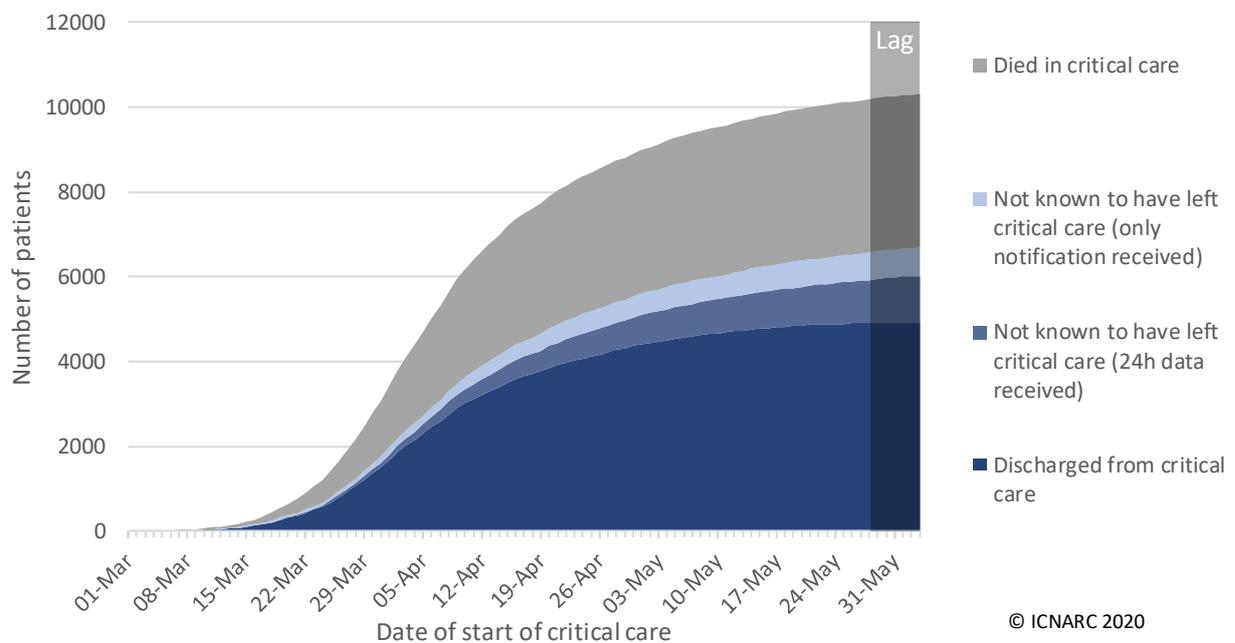
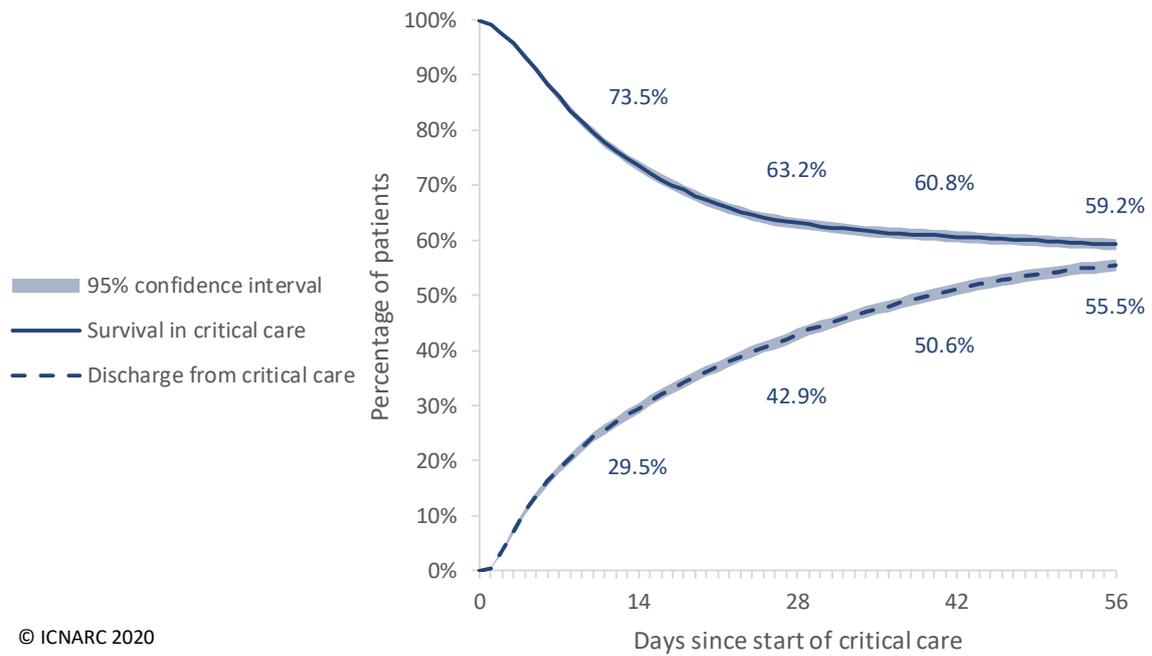


Figure 10 Cumulative outcomes by date of start of critical care *

* Please note that patients whose outcome data have not been received are assumed to remain in critical care as of 04 June 2020.



Died while receiving critical care	0	2473	3381	3540	3566
Still receiving critical care	9549	4098	1860	858	328
Discharged from critical care	0	2749	3937	4597	4852
Censored	0	229	371	554	803

Figure 11 Survival and discharge among patients with at least 24h data received

Please note that due to the time lag in notification of patients' discharge or death, this figure is expected to be biased towards *longer* lengths of stay in critical care. Patients who are still in critical care are included only for the period in which they are known to have been in critical care, i.e. from their date of admission until 04 June 2020. Due to the emerging nature of the UK epidemic, the total number of patients available for reporting becomes smaller at longer lengths of follow-up. Compared with the survival statistics presented in Tables 9, 13 and 14, this approach makes better use of all available data, including data about patients who are still in critical care.

Table 9 Outcome, length of stay and organ support *

Critical care outcomes among patients who have been discharged or died	Patients with COVID-19 and outcome reported (N=8533)	Patients with viral pneumonia (non-COVID-19), 2017-19 (N=5626)
Outcome at end of critical care, n (%)		
Discharged	4918 (57.6)	4423 (78.6)
Died	3615 (42.4)	1203 (21.4)
Length of stay		
Length of stay in critical care (days), median (IQR)		
Survivors	11 (4, 24)	6 (3, 13)
Non-survivors	9 (5, 15)	6 (3, 13)
Organ support (Critical Care Minimum Dataset) *		
Receipt of organ support, at any point, n (%)		
Advanced respiratory support	6128 (72.4)	2721 (48.4)
Basic respiratory support	5535 (65.4)	4527 (80.5)
Advanced cardiovascular support	2446 (28.9)	1261 (22.4)
Basic cardiovascular support	7836 (92.5)	5219 (92.8)
Renal support	2164 (25.6)	957 (17.0)
Liver support	76 (0.9)	53 (0.9)
Neurological support	668 (7.9)	320 (5.7)
Combinations of advanced respiratory, advanced cardiovascular and renal support, n (%):		
Advanced respiratory support only	2757 (32.3)	1257 (22.3)
Advanced cardiovascular support only	29 (0.3)	79 (1.4)
Renal support only	89 (1.0)	116 (2.1)
Advanced respiratory and advanced cardiovascular support only	1296 (15.2)	640 (11.4)
Advanced respiratory and renal support only	963 (11.3)	299 (5.3)
Advanced cardiovascular and renal support only	9 (0.1)	17 (0.3)
Advanced respiratory, advanced cardiovascular and renal support	1112 (13.0)	525 (9.3)
Duration of organ support (calendar days), median (IQR)		
Advanced respiratory support	12 (7, 21)	9 (4, 17)
Total (advanced + basic) respiratory support	10 (5, 19)	6 (3, 12)
Advanced cardiovascular support	3 (2, 6)	3 (2, 5)
Total (advanced + basic) cardiovascular support	11 (5, 20)	6 (3, 12)
Renal support	7 (3, 14)	6 (3, 12)

Please note that owing to the emerging nature of the epidemic, the sample of patients with confirmed COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. those who died or recovered quickly. This does not apply to the comparison patients with viral pneumonia (non-COVID-19), 2017-19. * Please see Definitions on page 34.

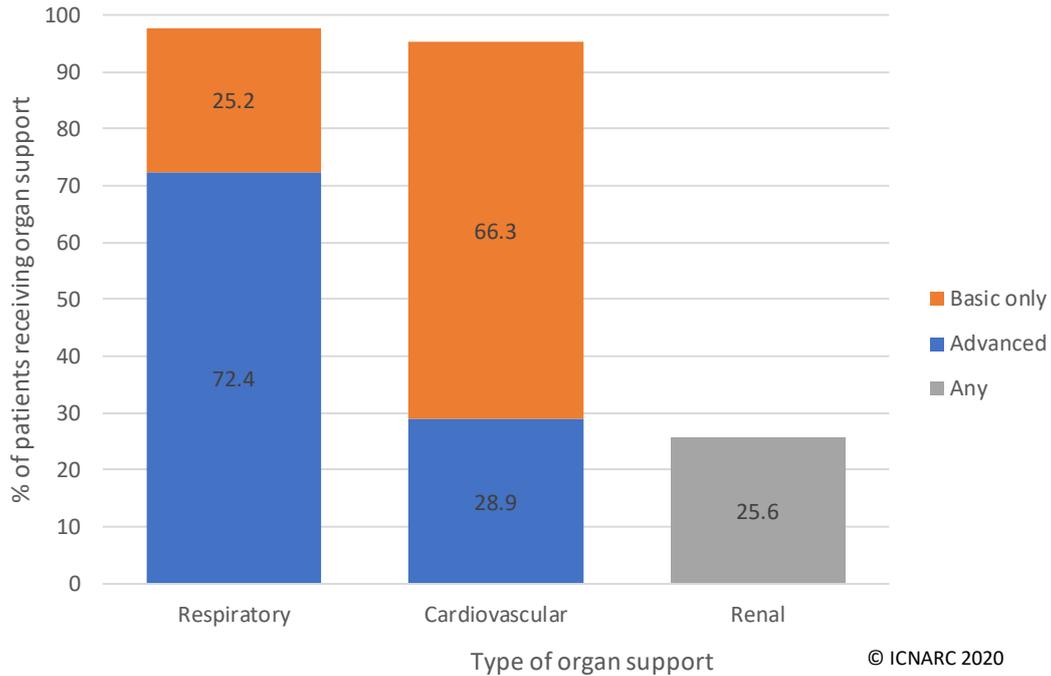


Figure 12 Percentage of patients receiving organ support *

Please note that owing to the emerging nature of the epidemic, the sample of patients with confirmed COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. patients who died or recovered quickly. * Please see Definitions on page 34.

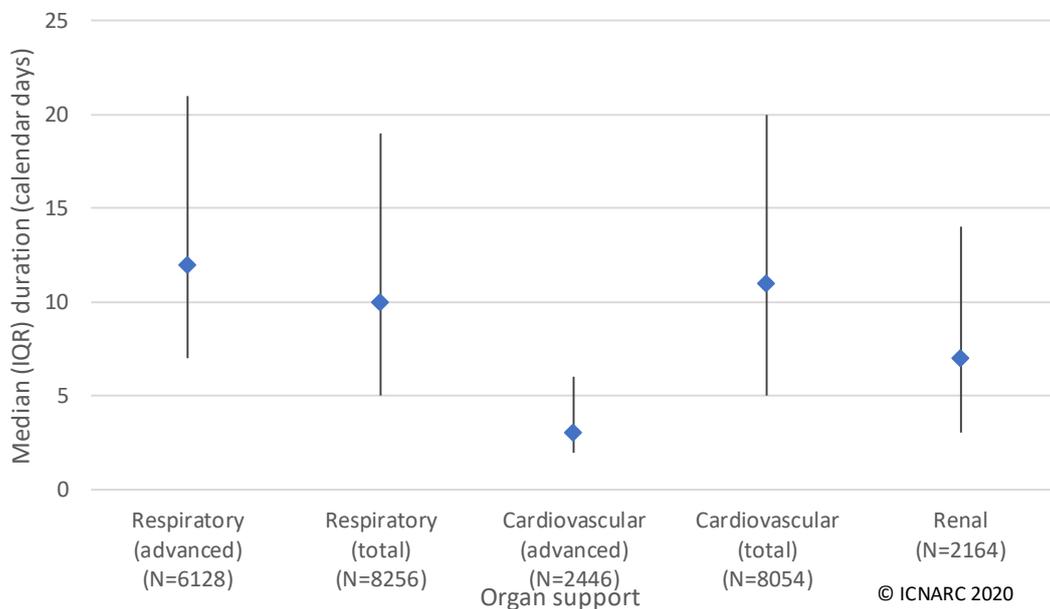


Figure 13 Duration of organ support received *

This Figure presents median and interquartile range, in calendar days. Please note that owing to the emerging nature of the epidemic, the sample of patients with confirmed COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. patients who died or recovered quickly. * Please see Definitions on page 34.

Outcomes by patient characteristics

Critical care outcomes for patients critically ill with confirmed COVID-19 across major patient subgroups are summarised in Table 10 and compared with an historic cohort of patients critically ill with viral pneumonia (non-COVID-19) admitted between 1 January 2017 and 31 December 2019.

Table 10 Outcome by patient characteristics

Patient characteristic	Patients with COVID-19 and outcome reported (N=8533)		Patients with viral pneumonia (non-COVID-19), 2017-19 (N=5782)
	Discharged alive from critical care	Died in critical care	Died in critical care
	n (%)	n (%)	(%)
Age at admission (years)			
16-39	569 (83.8)	110 (16.2)	(7.1)
40-49	895 (77.1)	266 (22.9)	(12.1)
50-59	1497 (64.0)	843 (36.0)	(19.1)
60-69	1259 (50.3)	1246 (49.7)	(25.7)
70-79	597 (37.7)	988 (62.3)	(31.2)
80+	100 (38.2)	162 (61.8)	(30.8)
Sex			
Female	1580 (63.1)	923 (36.9)	(19.1)
Male	3338 (55.4)	2690 (44.6)	(23.3)
Ethnicity			
White	3110 (58.8)	2182 (41.2)	(21.7)
Mixed	66 (53.2)	58 (46.8)	(14.0)
Asian	595 (51.7)	555 (48.3)	(19.4)
Black	400 (54.0)	341 (46.0)	(12.4)
Other	321 (63.9)	181 (36.1)	(18.6)
Index of Multiple Deprivation (IMD) quintile *			
1 (least deprived)	749 (59.7)	505 (40.3)	(22.3)
2	794 (57.9)	578 (42.1)	(22.6)
3	924 (57.8)	676 (42.3)	(22.5)
4	1138 (55.7)	906 (44.3)	(20.1)
5 (most deprived)	1208 (57.2)	903 (42.8)	(20.3)
Body mass index			
<25	1155 (57.0)	872 (43.0)	(23.1)
25-<30	1546 (55.0)	1265 (45.0)	(22.5)
30-<40	1530 (61.1)	973 (38.9)	(18.9)
40+	389 (62.4)	234 (37.6)	(13.6)
Assistance required with daily activities			
No	4432 (58.6)	3136 (41.4)	(19.4)
Yes	393 (49.6)	399 (50.4)	(27.2)
Any very severe comorbidities *			
No	4535 (58.6)	3203 (41.4)	(18.8)
Yes	315 (47.4)	349 (52.6)	(32.8)

Please note that owing to the emerging nature of the epidemic, the sample of patients with COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death (i.e. those who died or recovered quickly). This does not apply to the comparison patients with viral pneumonia (non-COVID-19), 2017-19. * Please see Definitions on page 34.

Critical care outcomes for patients of white ethnicities compared with patients of non-white ethnicities are summarised in Table 11.

Table 11 Outcome, length of stay and organ support by ethnicity

Critical care unit outcomes among patients who have been discharged or died	Patients of white ethnicity (N=5292)	Patients of non-white ethnicity (N=2517)
Outcome at end of critical care, n (%)		
Alive	3110 (58.8)	1382 (54.9)
Dead	2182 (41.2)	1135 (45.1)
Length of stay		
Length of stay in critical care (days), median (IQR)		
Survivors	10 (4, 23)	14 (5, 27)
Non-survivors	8 (4, 15)	10 (5, 16)
Organ support (Critical Care Minimum Dataset)*		
Receipt of organ support, at any point, n (%)		
Advanced respiratory support	3607 (68.7)	1967 (78.7)
Basic respiratory support	3547 (67.5)	1533 (61.4)
Advanced cardiovascular support	1438 (27.4)	774 (31.0)
Basic cardiovascular support	4819 (91.7)	2352 (94.2)
Renal support	1194 (22.8)	782 (31.3)
Liver support	28 (0.5)	33 (1.3)
Neurological support	420 (8.0)	200 (8.0)
Duration of organ support (calendar days), median (IQR)		
Advanced respiratory support	12 (6, 20)	13 (7, 21)
Total (advanced + basic) respiratory support	10 (5, 19)	12 (6, 21)
Advanced cardiovascular support	3 (2, 6)	3 (2, 6)
Total (advanced + basic) cardiovascular support	10 (5, 19)	12 (6, 21)
Renal support	7 (3, 13)	7 (3, 14)

Please note that owing to the emerging nature of the epidemic, the sample of patients with COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. those who died or recovered quickly. * Please see Definitions on page 34. Patients with ethnicity reported as 'not stated' excluded.

Outcomes by receipt of organ support

Figure 14 presents 30-day survival for patients critically ill with confirmed COVID-19 who received mechanical ventilation during the first 24 hours of critical care compared with patients who did not.

Critical care outcomes for patients critically ill with confirmed COVID-19 who received advanced respiratory support at any point during critical care and who received basic respiratory support only are summarised in Table 13. Critical care outcomes for patients critically ill with confirmed COVID-19 who received renal support at any point during critical care and who did not receive renal support are summarised in Table 14.

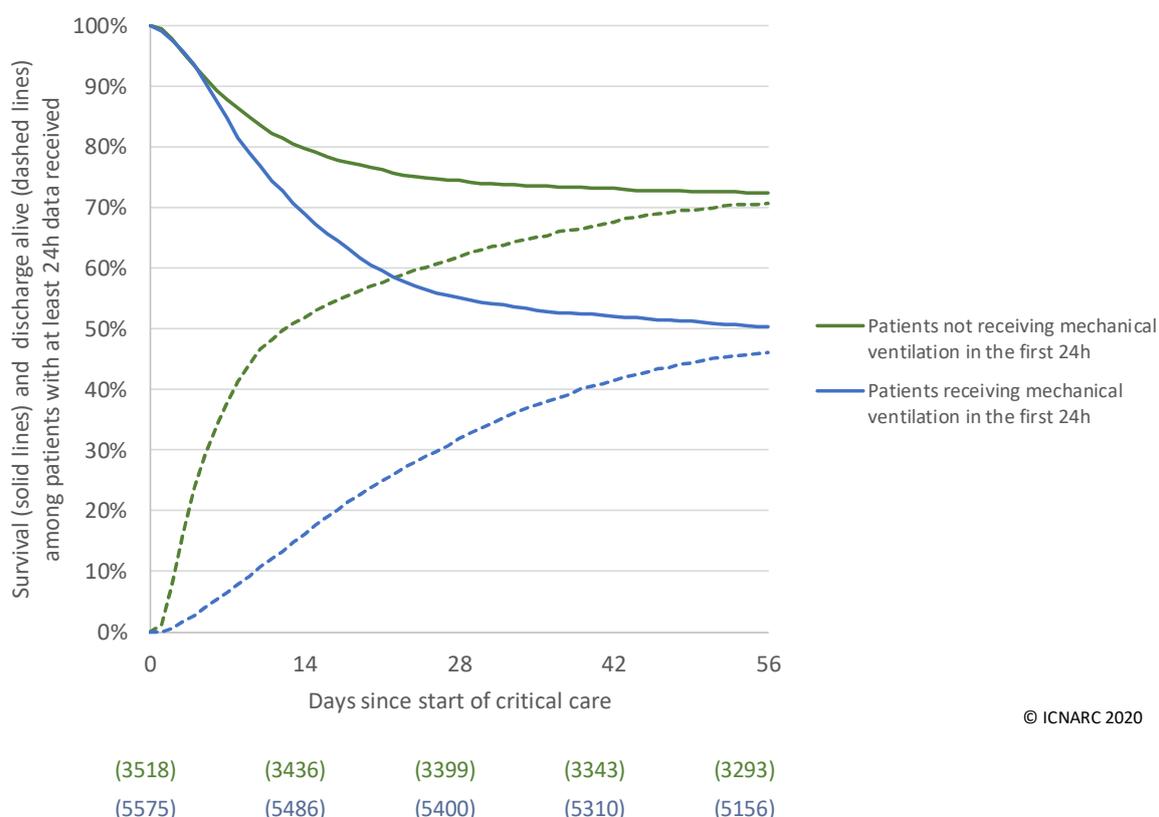


Figure 14 Survival and discharge by mechanical ventilation during the first 24 hours *

* Please see Definitions on page 34. Patients who are still in critical care are included only for the period in which they are known to have been in critical care, i.e. from their date of start of critical care until 04 June 2020. The numbers of patients available for reporting (in brackets) are the number of patients who are known to have either died or been discharged on or before that time point plus the number of patients known to have been still in critical care beyond that time point. Due to the emerging nature of the UK epidemic, the total number of patients available for reporting becomes smaller at longer lengths of follow-up. Compared with the survival statistics presented in Tables 9, 13 and 14, this approach makes better use of all available data, including data about patients who are still in critical care.

Table 12 Outcome by combinations of organ support *

Organ support received *	Patients with COVID-19 and outcome reported (N=8533)		Patients with viral pneumonia (non-COVID-19), 2017-19 (N=5782)
	Discharged alive from critical care	Died in critical care	Died in critical care
	n (%)	n (%)	(%)
Any respiratory support			
Basic only	1713 (80.4)	418 (19.6)	(11.2)
Advanced	2991 (48.8)	3137 (51.2)	(33.3)
Any renal support	822 (37.8)	1351 (62.2)	(46.1)
Combinations of advanced respiratory, advanced cardiovascular and renal support:			
Advanced respiratory support only	1714 (62.2)	1043 (37.8)	(18.7)
Advanced respiratory and advanced cardiovascular support only	532 (41.0)	764 (59.0)	(40.2)
Advanced respiratory and renal support only	432 (44.9)	531 (55.1)	(38.8)
Advanced respiratory, advanced cardiovascular and renal support	313 (28.1)	799 (71.9)	(56.6)

Please note that owing to the emerging nature of the epidemic, the sample of patients with COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. those who died or recovered quickly. * Please see Definitions on page 34.

Table 13 Outcome, length of stay and organ support by receipt of respiratory support *

Critical care outcomes among patients who have been discharged or died	Patients receiving advanced respiratory support * (N=6128)	Patients receiving only basic respiratory support * (N=2131)
Outcome at end of critical care, n (%)		
Discharged	2991 (48.8)	1713 (80.4)
Died	3137 (51.2)	418 (19.6)
Length of stay		
Length of stay in critical care (days), median (IQR)		
Survivors	20 (12, 31)	4 (2, 7)
Non-survivors	10 (5, 16)	4 (2, 7)
Organ support (Critical Care Minimum Dataset) *		
Receipt of organ support, at any point, n (%)		
Basic respiratory support	3397 (55.5)	2131 (100.0)
Advanced cardiovascular support	2408 (39.3)	29 (1.4)
Basic cardiovascular support	5891 (96.1)	1788 (83.9)
Renal support	2066 (33.8)	74 (3.5)
Liver support	72 (1.2)	3 (0.1)
Neurological support	649 (10.6)	18 (0.8)
Duration of organ support (calendar days), median (IQR)		
Total (advanced + basic) respiratory support	14 (8, 23)	4 (3, 7)
Advanced cardiovascular support	3 (2, 6)	2 (1, 3)
Total (advanced + basic) cardiovascular support	14 (8, 23)	4 (3, 7)
Renal support	7 (3, 14)	3 (2, 5)

Please note that owing to the emerging nature of the epidemic, the sample of patients with COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. those who died or recovered quickly. * Please see Definitions on page 34. Patients receiving no respiratory support excluded due to small numbers.

Table 14 Outcome, length of stay and organ support by receipt of renal support *

Critical care outcomes among patients who have been discharged or died	Patients receiving any renal support * (N=2164)	Patients not receiving any renal support * (N=6290)
Outcome at end of critical care, n (%)		
Discharged	815 (37.7)	4058 (64.5)
Died	1349 (62.3)	2232 (35.5)
Length of stay		
Length of stay in critical care (days), median (IQR)		
Survivors	27 (17.5, 37)	9 (4, 19)
Non-survivors	12 (7, 19)	7 (4, 13)
Organ support (Critical Care Minimum Dataset) *		
Receipt of organ support, at any point, n (%)		
Advanced respiratory support	2066 (95.5)	4053 (64.4)
Basic respiratory support	1077 (49.8)	4445 (70.7)
Advanced cardiovascular support	1118 (51.7)	1324 (21.0)
Basic cardiovascular support	2087 (96.4)	5733 (91.1)
Liver support	47 (2.2)	29 (0.5)
Neurological support	271 (12.6)	397 (6.3)
Duration of organ support (calendar days), median (IQR)		
Advanced respiratory support	16 (10, 24)	11 (6, 18)
Total (advanced + basic) respiratory support	17 (10, 26)	8 (4, 16)
Advanced cardiovascular support	4 (2, 6)	3 (1, 5)
Total (advanced + basic) cardiovascular support	17 (10, 26)	9 (4, 16)

Please note that owing to the emerging nature of the epidemic, the sample of patients with COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. those who died or recovered quickly. * Please see Definitions on page 34. Includes 136 patients requiring chronic renal replacement therapy for end stage renal disease prior to critical care; outcomes for these patients are similar.

Critical care outcomes for patients critically ill with confirmed COVID-19 who received advanced respiratory support at any point during critical care and who received basic respiratory support only across major patient subgroups are summarised in Table 15. Critical care outcomes for patients critically ill with confirmed COVID-19 who received renal support at any point during critical care and who did not receive renal support across major patient subgroups are summarised in Table 16.

Table 15 Outcome by receipt of respiratory support * and patient characteristics

Patient characteristic	Patients receiving advanced respiratory support * (N=6128)		Patients receiving only basic respiratory support * (N=2131)	
	Discharged alive from critical care	Died in critical care	Discharged alive from critical care	Died in critical care
	n (%)	n (%)	n (%)	n (%)
Age at admission (years)				
16-39	327 (76.2)	102 (23.8)	204 (97.1)	6 (2.9)
40-49	583 (71.1)	237 (28.9)	279 (92.1)	24 (7.9)
50-59	964 (55.2)	781 (44.8)	490 (91.1)	48 (8.9)
60-69	794 (41.6)	1116 (58.4)	413 (79.7)	105 (20.3)
70-79	304 (27.2)	814 (72.8)	259 (61.4)	163 (38.6)
80+	18 (17.1)	87 (82.9)	68 (48.6)	72 (51.4)
Sex				
Female	912 (53.9)	780 (46.1)	579 (82.0)	127 (18.0)
Male	2079 (46.9)	2355 (53.1)	1134 (79.6)	291 (20.4)
Ethnicity				
White	1771 (49.1)	1836 (50.9)	1201 (79.2)	315 (20.8)
Mixed	41 (43.2)	54 (56.8)	24 (85.7)	4 (14.3)
Asian	388 (44.2)	490 (55.8)	182 (77.8)	52 (22.2)
Black	288 (47.9)	313 (52.1)	96 (83.5)	19 (16.5)
Other	228 (58.0)	165 (42.0)	82 (86.3)	13 (13.7)
Index of Multiple Deprivation (IMD) quintile				
1 (least deprived)	425 (49.6)	432 (50.4)	288 (81.4)	66 (18.6)
2	467 (48.4)	497 (51.6)	293 (81.2)	68 (18.8)
3	587 (50.1)	584 (49.9)	304 (79.8)	77 (20.2)
4	719 (46.9)	813 (53.1)	370 (82.2)	80 (17.8)
5 (most deprived)	737 (48.9)	771 (51.1)	417 (77.5)	121 (22.5)
Body mass index				
<25	682 (47.8)	744 (52.2)	400 (80.0)	100 (20.0)
25-<30	963 (46.1)	1128 (53.9)	521 (80.9)	123 (19.1)
30-<40	1004 (53.5)	871 (46.5)	480 (84.5)	88 (15.5)
40+	226 (52.7)	203 (47.3)	148 (82.7)	31 (17.3)
Assistance required with daily activities				
No	2760 (49.5)	2821 (50.5)	1500 (84.7)	270 (15.3)
Yes	179 (40.8)	260 (59.2)	181 (57.6)	133 (42.4)
Any very severe comorbidities *				
No	2824 (49.8)	2849 (50.2)	1531 (83.5)	302 (16.5)
Yes	126 (34.3)	241 (65.7)	161 (60.5)	105 (39.5)

Please note that owing to the emerging nature of the epidemic, the sample of patients with COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. those who died or recovered quickly. * Please see Definitions on page 34. Patients receiving no respiratory support excluded due to small numbers.

Table 16 Outcome by receipt of renal support * and patient characteristics

Patient characteristic	Patients receiving any renal support * (N=2164)		Patients not receiving any renal support * (N=6290)	
	Discharged alive from critical care	Died in critical care	Discharged alive from critical care	Died in critical care
	n (%)	n (%)	n (%)	n (%)
Age at admission (years)				
16-39	57 (56.4)	44 (43.6)	503 (88.6)	65 (11.4)
40-49	181 (63.5)	104 (36.5)	706 (81.9)	156 (18.1)
50-59	265 (42.1)	365 (57.9)	1223 (72.3)	469 (27.7)
60-69	214 (29.6)	509 (70.4)	1031 (58.7)	724 (41.3)
70-79	91 (22.9)	306 (77.1)	502 (42.5)	679 (57.5)
80+	7 (25.0)	21 (75.0)	93 (40.1)	139 (59.9)
Sex				
Female	198 (41.3)	281 (58.7)	1365 (68.3)	634 (31.7)
Male	617 (36.6)	1067 (63.4)	2693 (62.8)	1597 (37.2)
Ethnicity				
White	453 (37.9)	741 (62.1)	2628 (64.8)	1425 (35.2)
Mixed	12 (46.2)	14 (53.8)	54 (55.1)	44 (44.9)
Asian	109 (33.2)	219 (66.8)	482 (59.5)	328 (40.5)
Black	128 (42.1)	176 (57.9)	271 (62.9)	160 (37.1)
Other	48 (38.7)	76 (61.3)	271 (72.5)	103 (27.5)
Index of Multiple Deprivation (IMD) quintile				
1 (least deprived)	121 (42.8)	162 (57.2)	614 (64.5)	338 (35.5)
2	112 (35.0)	208 (65.0)	673 (64.8)	365 (35.2)
3	180 (42.6)	243 (57.4)	732 (63.3)	424 (36.7)
4	177 (32.2)	372 (67.8)	958 (64.6)	526 (35.4)
5 (most deprived)	213 (38.2)	345 (61.8)	989 (64.2)	551 (35.8)
Body mass index				
<25	166 (35.2)	305 (64.8)	976 (64.0)	548 (36.0)
25-<30	240 (33.0)	488 (67.0)	1291 (62.6)	770 (37.4)
30-<40	315 (43.8)	405 (56.3)	1208 (68.3)	560 (31.7)
40+	74 (45.1)	90 (54.9)	310 (68.3)	144 (31.7)
Assistance required with daily activities				
No	747 (37.6)	1239 (62.4)	3647 (66.1)	1871 (33.9)
Yes	57 (37.3)	96 (62.7)	334 (52.6)	301 (47.4)
Any very severe comorbidities *				
No	724 (37.4)	1214 (62.6)	3769 (65.8)	1960 (34.2)
Yes	84 (40.4)	124 (59.6)	230 (50.8)	223 (49.2)

Please note that owing to the emerging nature of the epidemic, the sample of patients with COVID-19 represented in this table is biased towards patients with *shorter* lengths of stay in critical care prior to discharge or death, i.e. those who died or recovered quickly. * Please see Definitions on page 34. Includes 136 patients requiring chronic renal replacement therapy for end stage renal disease prior to critical care; outcomes for these patients are similar.

Multivariable analyses

Patient population:

- A multivariable Cox proportional hazards regression model was developed based solely on available data from patients critically ill with confirmed COVID-19 with a start of critical care between 1 March and 21 April 2020.
- All patients were followed up for a minimum of 7 days, and outcomes were censored at 30 days following the start of critical care. Patients discharged alive from hospital within 30 days, and those ending critical care within 30 days with missing hospital outcome were assumed to survive to 30 days.
- Patients either with a duration of critical care of less than 24 hours or with no data recorded for any core physiology (temperature, systolic blood pressure, heart rate or respiratory rate) were excluded.

Prognostic factors:

- Prognostic factors were selected, a priori, based on established relationships with outcome for critically ill patients and on emerging information from the COVID-19 pandemic.
- Continuous prognostic factors were assessed for non-linearity using restricted cubic splines with up to five knots.
- Missing data were imputed using fully conditional specification (with models fitted in ten multiply imputed datasets and results combined).

Results:

- Of 6989 patients, 58 had a duration of critical care of less than 24 hours and 595 had no data recorded for any core physiology; a cohort of 6336 patients were included in the model.
- The results of the multivariable modelling are presented in Figures 15-17.

Explanation:

- The figures present the hazard ratio (solid lines or points) for values of each prognostic factor compared with a reference value (as indicated).
- A hazard ratio is a measure of how much more or less likely the event (death) is to occur.

For example, a patient aged 70 has a hazard ratio of approximately 2 compared with a patient aged 60; this means that they are twice as likely to die within 30 days of the start of critical care. In contrast, a patient aged 40 has a hazard ratio of approximately 0.5 compared with a patient aged 60; this means that they are half as likely to die within 30 days of the start of critical care. A hazard ratio of 1 means that the risk of death is the same.

- The hazard ratios indicate the association between each prognostic factor and the outcome adjusted for the effect of all the other variables in the model.

For example, the hazard ratio for dependency is adjusted for patients with dependency being older on average than those without dependency.

- The estimated hazard ratios are shown with 95% confidence intervals (as dashed lines or vertical spikes) indicating a range of possible values for the hazard ratio that will include the true value 19 times out of 20.

A manuscript reporting the full details of the modelling is being prepared for publication.

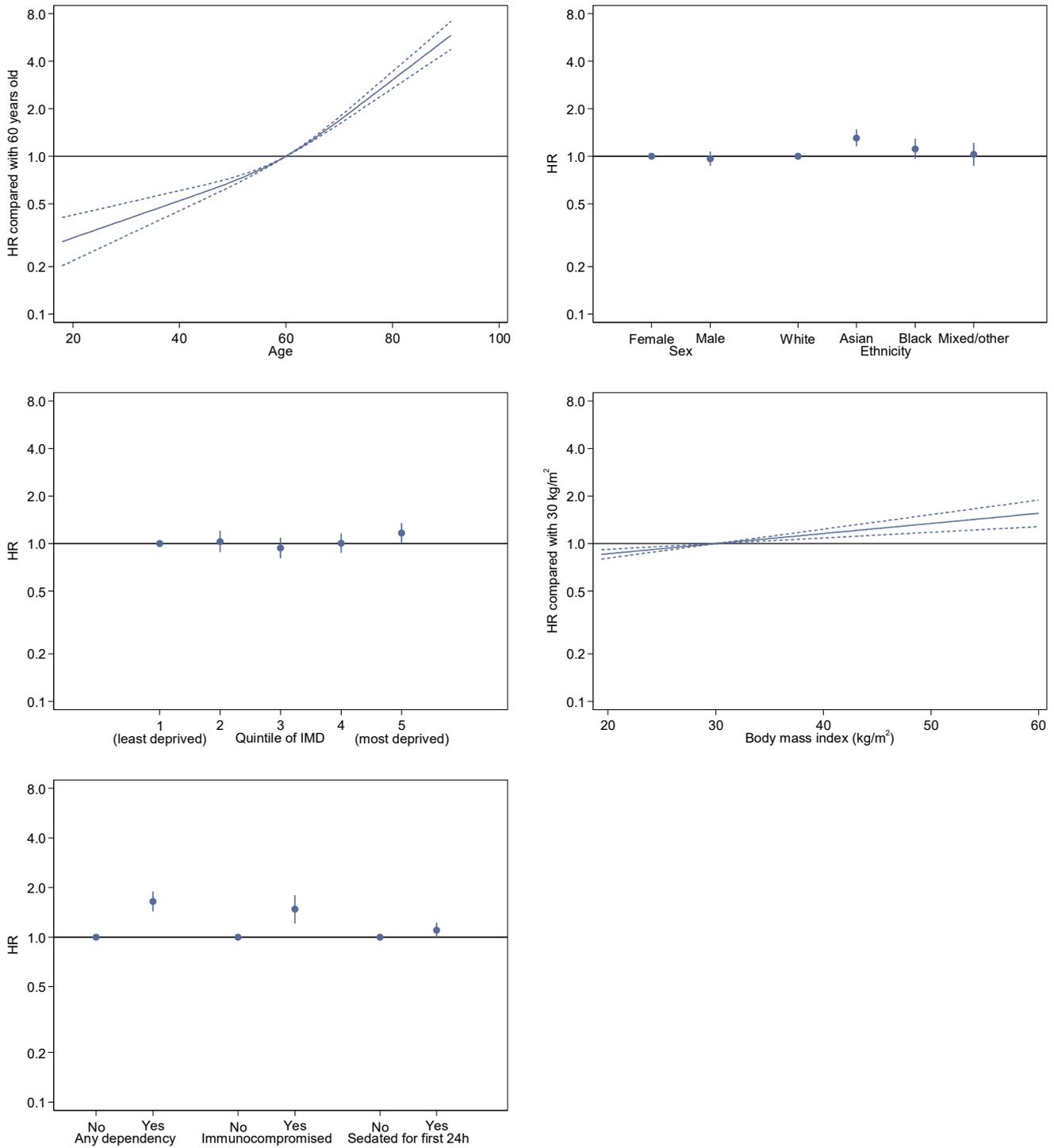


Figure 15 Hazard ratios and 95% confidence intervals from Cox proportional hazards regression model for death within 30 days following start of critical care: demographics and medical history

Please note that hazard ratios (HR) are reported relative to the median value for age (60 years) and the threshold for defining obesity for body mass index (30 kg/m²). Immunocompromised includes the conditions as defined on page 34 and also metastatic disease and haematological malignancy.

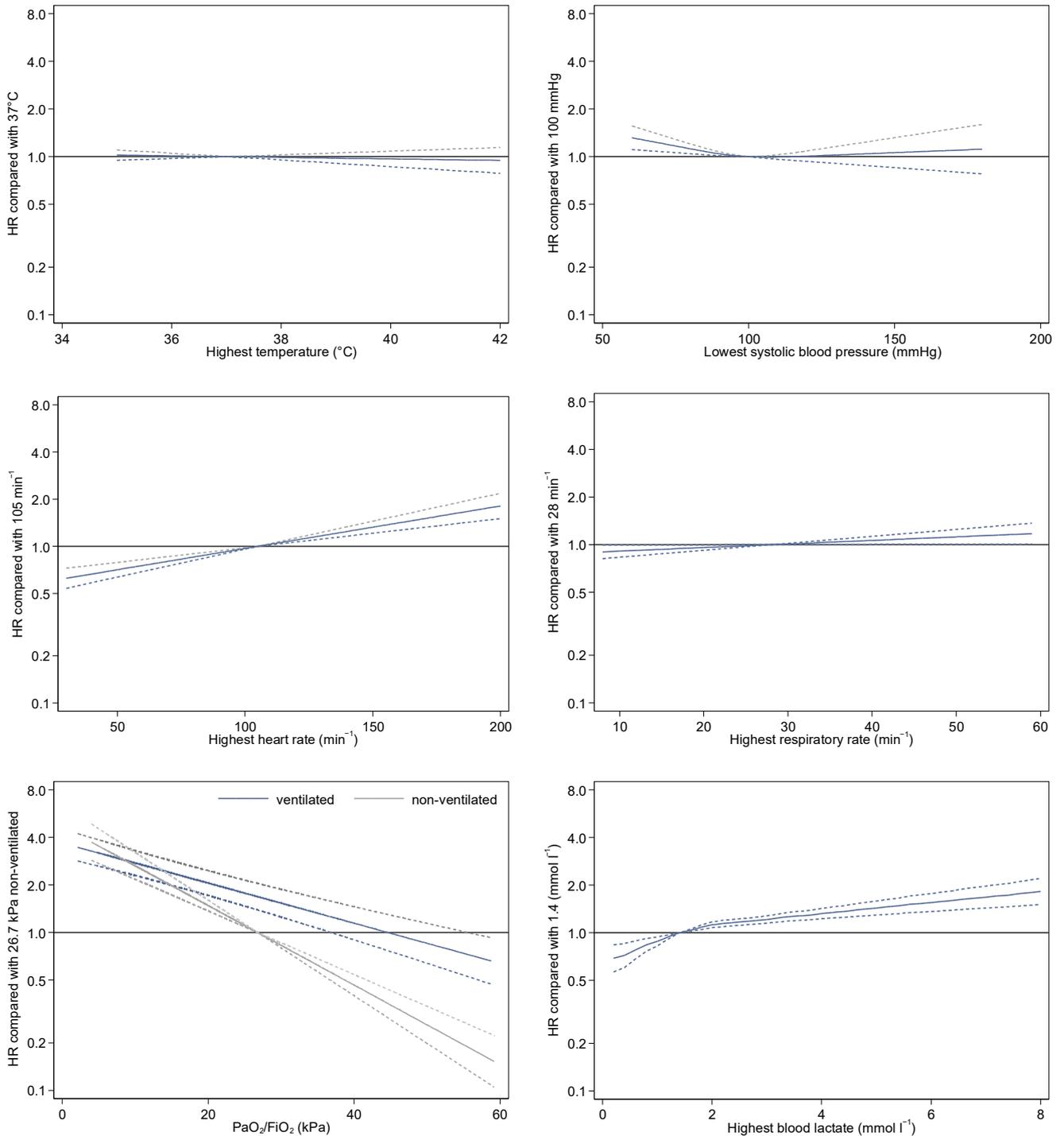


Figure 16 Hazard ratios and 95% confidence intervals from Cox proportional hazards regression model for death within 30 days following start of critical care: physiology (1)

Please note that hazard ratios (HR) are reported relative to the median value for each physiological parameter (as indicated on the y-axis) except for $\text{PaO}_2/\text{FiO}_2$ which is reported relative to the threshold for defining ARDS (26.7 kPa).

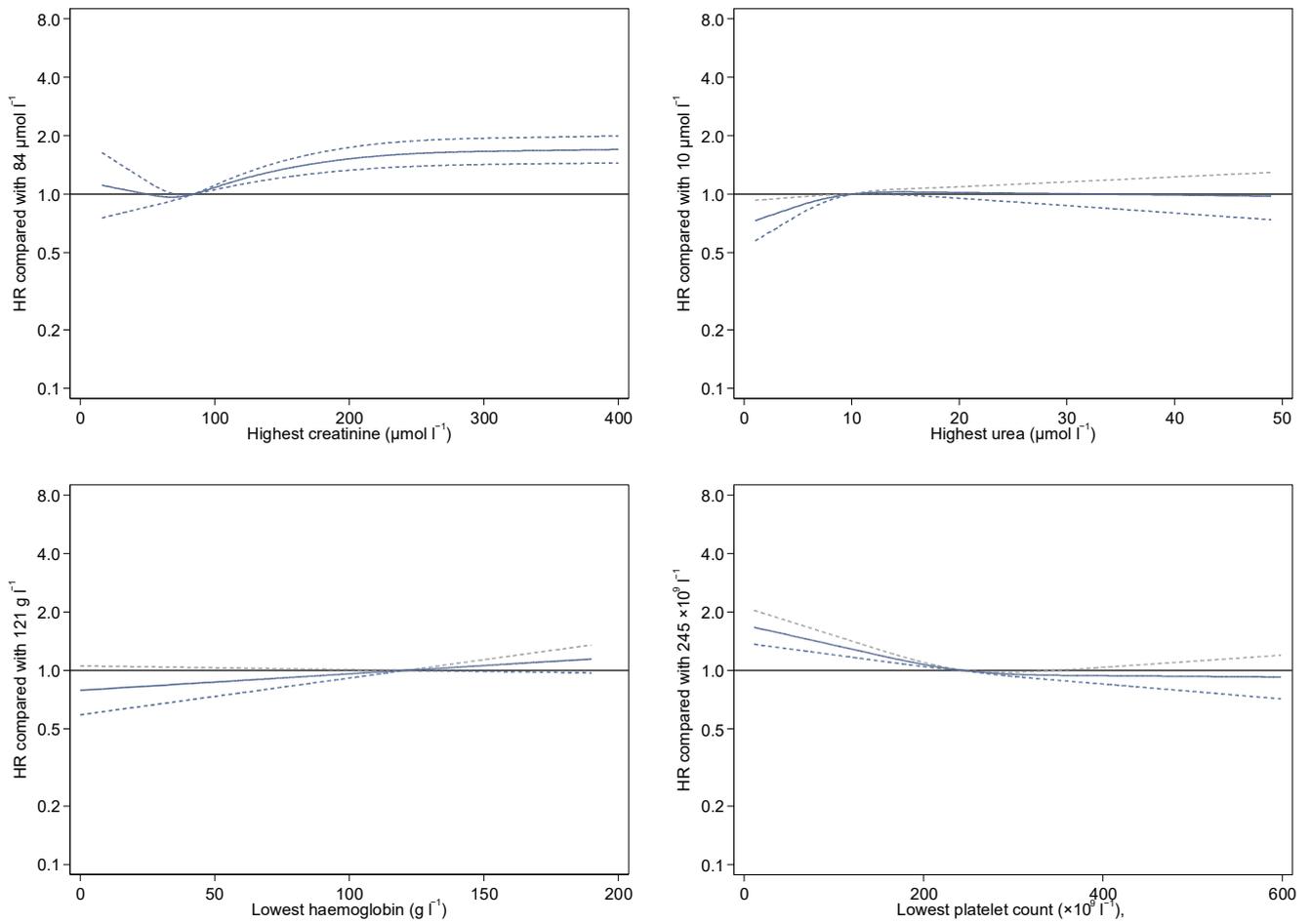


Figure 17 Hazard ratios and 95% confidence intervals from Cox proportional hazards regression model for death within 30 days following start of critical care: physiology (2)

Please note that hazard ratios (HR) are reported relative to the median value for each physiological parameter (as indicated on the y-axis).

Data completeness

Completeness of key variables is summarised in Table 17.

Table 17 Data completeness of key variables

Variable	N missing %
24h variables (N=9623)	
NHS number (used to combine transfers and readmissions)	225 (2.3)
Age	4 (0.0)
Sex	4 (0.0)
Currently or recently pregnant	11 (1.6) †
Ethnicity	849 (8.8)
Index of Multiple Deprivation	176 (1.8)
BMI	715 (7.4)
Prior dependency *	297 (3.1)
Very severe comorbidities	218 (2.3)
Prior hospital length of stay	17 (0.2)
CPR within previous 24h	71 (0.7)
Mechanical ventilation during the first 24h *	496 (5.2)
APACHE II Score	303 (3.1)
PaO ₂ /FiO ₂ ratio	915 (9.5)
Outcome variables (N=8533)	
Length of stay in critical care	80 (0.9)
Advanced respiratory support *	70 (0.8)
Basic respiratory support *	67 (0.8)
Advanced cardiovascular support *	73 (0.9)
Basic cardiovascular support *	63 (0.7)
Renal support *	79 (0.9)
Liver support *	87 (1.0)
Neurological support *	87 (1.0)

* Please see Definitions on page 34; † % of female patients aged 16-49 years

Definitions

Patients are classified as either:

- Notification only received: ICNARC has received a notification of the patient's admission to critical care but has not received any patient data from the first 24 hours or beyond
- 24h data only received: ICNARC has received patient data relating to the first 24 hours in critical care but has not yet been notified of the patient's critical care outcome
- Outcome data received: ICNARC has received submission of data relating to the patient's critical care outcome (e.g. survival, length of stay, duration of organ support)
- Hospital outcome data received: Data have been updated with outcomes at ultimate discharge from hospital (Please note that these data are currently limited for patients with COVID-19 and not included in this report)

Index of Multiple Deprivation (IMD) is based on the patient's usual residential postcode (assigned at the level of Lower Layer Super Output Area) according to:

- English Index of Multiple Deprivation 2019 for postcodes in England
- Welsh Index of Multiple Deprivation 2019 for postcodes in Wales
- Northern Ireland Multiple Deprivation Measure 2017 for postcodes in Northern Ireland

Body mass index is calculated as the weight in kilograms divided by the height in metres squared. Weight and height values may have been measured or estimated.

Dependency prior to admission to acute hospital is assessed as the best description for the dependency of the patient in the two weeks prior to admission to acute hospital and prior to the onset of the acute illness, i.e. "usual" dependency. It is assessed according to the amount of personal assistance they receive with daily activities (bathing, dressing, going to the toilet, moving in/out of bed/chair, continence and eating).

Very severe comorbidities must have been evident within the six months prior to critical care and documented at or prior to critical care:

- Cardiovascular: symptoms at rest
- Respiratory: shortness of breath with light activity or home ventilation
- Renal: renal replacement therapy 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 six months, HIV/AIDS or congenital immune deficiency

Mechanical ventilation during the first 24 hours was identified by the recording of a ventilated respiratory rate, indicating that all or some of the breaths or a portion of the breaths (pressure support) were delivered by a mechanical device. This usually indicates invasive ventilation; BPAP (bilevel positive airway pressure) would meet this definition but CPAP (continuous positive airway pressure) does not.

Organ support is recorded as the number of calendar days (00:00-23:59) on which the support was received at any time, defined as:

- Advanced respiratory: invasive ventilation, BPAP via trans-laryngeal tube or tracheostomy, CPAP via trans-laryngeal 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: central nervous system depression sufficient to prejudice airway, invasive neurological monitoring, continuous IV medication to control seizures, therapeutic hypothermia

Acknowledgement

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

“These data derive from the ICNARC 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.”