

ICNARC report on COVID-19 in critical care: England, Wales and Northern Ireland 27 November 2020

This report presents analyses of data on patients critically ill with confirmed COVID-19, reported to ICNARC up to 4pm on 26 November 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) and increasing numbers of surge/other areas providing critical care.

Data are reported separately for patients critically ill with confirmed COVID-19 either at or after the start of critical care:

- admitted from 1 September 2020 to date; and
- admitted up to 31 August 2020.

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/areas participating in the Case Mix Programme are asked to:

- log a case with ICNARC by submitting a record, with minimal data, as soon as they have an admission with confirmed COVID-19;
- resubmit data, including 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.

Contents

Reporting process	1
Admissions to critical care – COVID-19	5
Admissions to critical care – COVID-19 and non-COVID-19	14
Admissions to critical care – pneumonia (not COVID-19)	15
Patient characteristics	17
Patient characteristics – invasively ventilated first 24 hours	25
Patient characteristics – advanced respiratory support	28
Patient characteristics – basic respiratory support only	31
Outcomes, duration of critical care and organ support	34
Outcomes, duration of critical care and organ support – invasively ventilated first 24 hours	37
Outcomes, duration of critical care and organ support – advanced respiratory support	39
Outcomes, duration of critical care and organ support – basic respiratory support only	41
28-day in-hospital outcome - overall	43
28-day in-hospital outcome - by patient characteristics	44
28-day in-hospital outcome - by patient characteristics and invasive ventilation first 24 hours	48
Monthly trends – COVID-19	51
Additional analyses for patients admitted up to 31 August 2020	53
Definitions	55
Publications	57
Acknowledgement	57

List of Figures

1	Numbers of critically ill patients with confirmed COVID-19 admitted from 1 September 2020 with data included in this report and outstanding *	5
2	Geographical distribution of patients critically ill with confirmed COVID-19	6
3	Geographical distribution of patients critically ill with confirmed COVID-19 admitted during the past 14 days	6
4	Number of new patients critically ill with confirmed COVID-19 by date of start of critical care over the entire epidemic	7
5	Number of new patients critically ill with confirmed COVID-19 admitted from 1 September 2020 by date of start of critical care	7
6	Comparison of the number of new patients critically ill with confirmed COVID-19 by date of start of critical care from 1 March 2020 to 31 August 2020 versus 1 September 2020 to date *	8
7	Number of new patients critically ill with confirmed COVID-19 by date of start of critical care from 1 March 2020 to 31 August 2020 versus 1 September 2020 to date by region *	9
8	Cumulative number of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 by date of start of critical care	10
9	Cumulative number of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 per 100,000 adult population by region	10
10	Number of patients with confirmed COVID-19 in critical care from 1 September 2020 by date *	11
11	Number of patients with confirmed COVID-19 in critical care by date * from 1 March 2020 to 31 August 2020 versus 1 September 2020 to date	12
12	Number of patients with confirmed COVID-19 in critical care by date * from 1 March 2020 to 31 August 2020 versus 1 September 2020 to date by region	13
13	Average daily number of patients in critical care by month, 2016-2020 *	14
14	Number of admissions with pneumonia (not COVID-19) by month, 2016-2020 *, compared with confirmed COVID-19 during 2020	15
15	Number of admissions with viral pneumonia (influenza) by month, 2016-2020 *	16
16	Age and sex distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020	20
17	Ethnicity distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 compared with the local population (linked to 2011 census ward)	21
18	Index of Multiple Deprivation (IMD) * distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 compared with the general population	22
19	Urban/rural * distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 compared with the age-matched general population	23
20	Body mass index (BMI) * distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 compared with the age- and sex-matched general population (Health Survey for England 2018)	24
21	Critical care and acute hospital outcomes for patients admitted from 1 September 2020	34
22	Cumulative outcomes for patients admitted from 1 September 2020 by date of start of critical care *	35
23	In-hospital survival to 28 days following admission to critical care	43
24	28-day in-hospital mortality by patient characteristics (demographics)	44
25	28-day in-hospital mortality by patient characteristics (demographics continued)	45
26	28-day in-hospital mortality by patient characteristics (demographics and medical history)	46
27	28-day in-hospital mortality by patient characteristics (indicators of acute severity *)	47
28	28-day in-hospital mortality by patient characteristics and invasive ventilation (demographics)	48
29	28-day in-hospital mortality by patient characteristics and invasive ventilation (demographics continued)	49
30	28-day in-hospital mortality by patient characteristics and invasive ventilation (acute severity)	50
31	Monthly number of admissions critically ill with confirmed COVID-19	51
32	28-day in-hospital mortality for patients critically ill with confirmed COVID-19 by month	52
33	Critical care and acute hospital outcomes for patients admitted up to 31 August 2020	53
34	In-hospital survival to 90 days following admission to critical care for patients admitted up to 31 August 2020	54

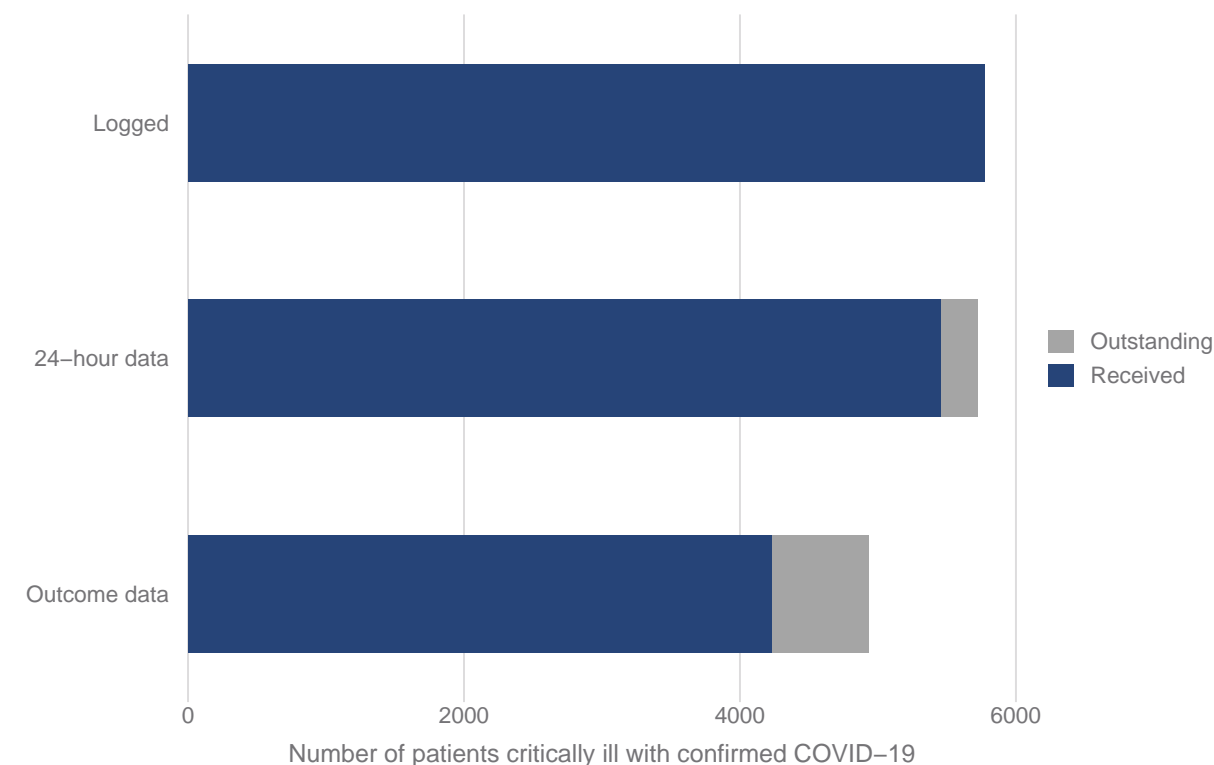
List of Tables

1	Patient characteristics: demographics	17
2	Patient characteristics: medical history	18
3	Patient characteristics: indicators of acute severity	19
4	Patient characteristics: demographics (invasively ventilated first 24 hours)	25
5	Patient characteristics: medical history (invasively ventilated first 24 hours)	26
6	Patient characteristics: indicators of acute severity (invasively ventilated first 24 hours)	27
7	Patient characteristics: demographics (any advanced respiratory support and known outcomes)	28
8	Patient characteristics: medical history (any advanced respiratory support and known outcomes)	29
9	Patient characteristics: indicators of acute severity (any advanced respiratory support and known outcomes)	30
10	Patient characteristics: demographics (basic respiratory support only and known outcomes)	31
11	Patient characteristics: medical history (basic respiratory support only and known outcomes)	32
12	Patient characteristics: indicators of acute severity (basic respiratory support only and known outcomes)	33
13	Critical care outcome, duration of critical care and organ support	36
14	Critical care outcome, duration of critical care and organ support (invasively ventilated first 24 hours)	38
15	Critical care outcome, duration of critical care and organ support (any advanced respiratory support and known outcomes)	40
16	Critical care outcome, duration of critical care and organ support (basic respiratory support only and known outcomes)	42

* Please see individual notes for Tables/Figures.

Admissions to critical care – COVID-19

ICNARC have logged data for 6474 admissions of 5773 patients critically ill with confirmed COVID-19, either at or after the start of critical care, admitted from 1 September 2020 to date in England, Wales and Northern Ireland. Of these, data covering the first 24 hours of critical care have been submitted to ICNARC for 5456 patients (Figure 1). Of the 5773 total patients, 4227 have outcomes reported and 1546 patients were last reported as still receiving critical care. These patients are compared with a cohort of 10,916 patients with confirmed COVID-19 admitted up to 31 August 2020.



© ICNARC 2020

Figure 1. Numbers of critically ill patients with confirmed COVID-19 admitted from 1 September 2020 with data included in this report and outstanding *

* Please note that 24-hour data are considered outstanding when a case was logged at least 48 hours previously and outcome data are considered outstanding when 24-hour data have been received and at least 10 days have elapsed since the start of critical care.

Of the 5773 patients critically ill with confirmed COVID-19 admitted from 1 September 2020 to date, the largest numbers were admitted in the North West, North East And Yorkshire, and Midlands regions (Figure 2). Of the patients included in this week’s report, 1520 patients were admitted to critical care within the past 14 days (12 Nov 2020 to 25 Nov 2020). The geographical spread of these patients was similar to that for all patients admitted from 1 September 2020 to date, with perhaps some reduction being seen in the North West (Figure 3).

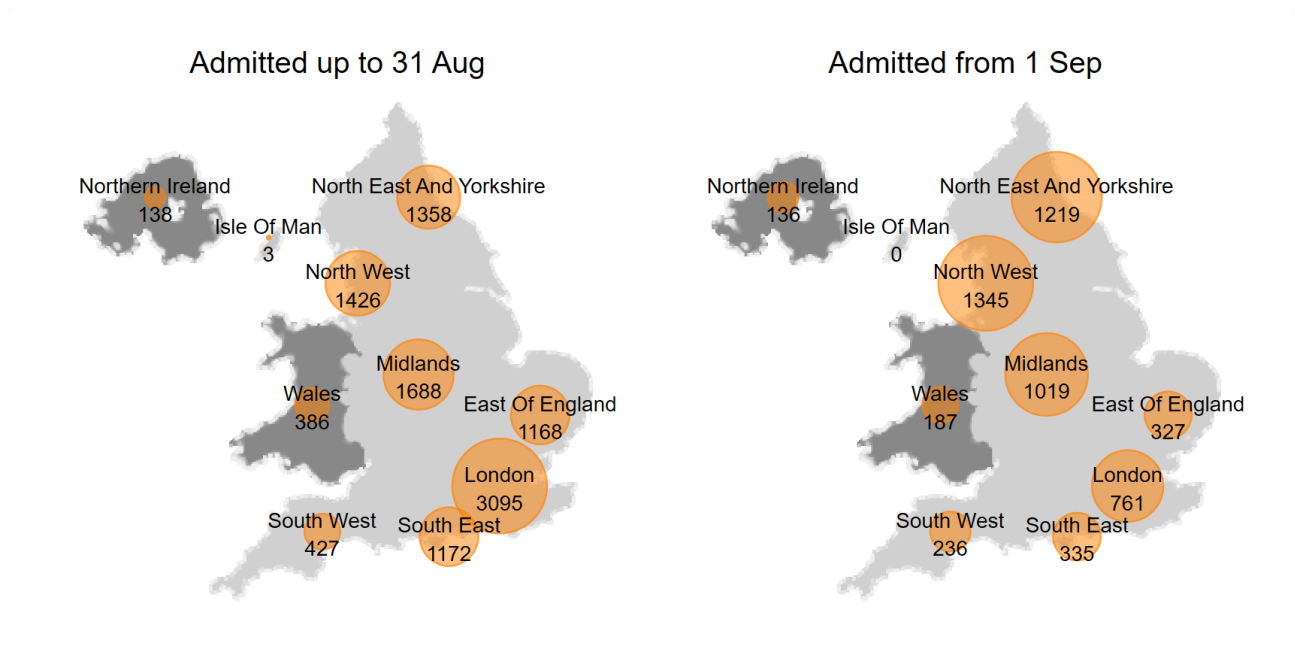


Figure 2. Geographical distribution of patients critically ill with confirmed COVID-19

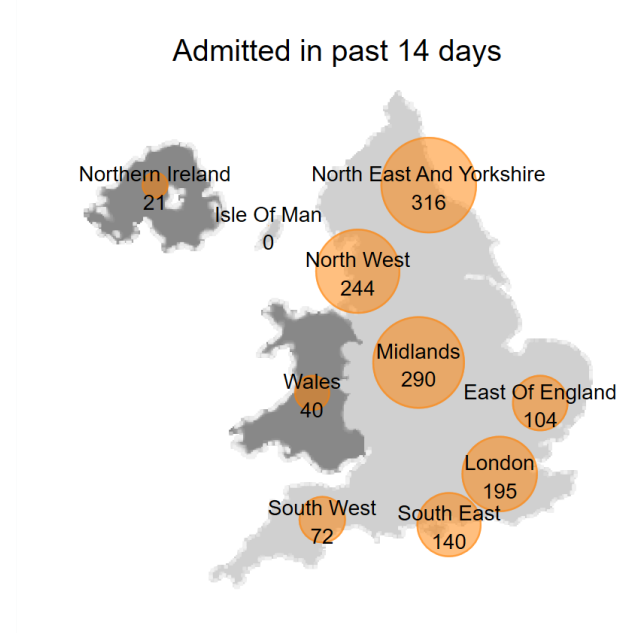
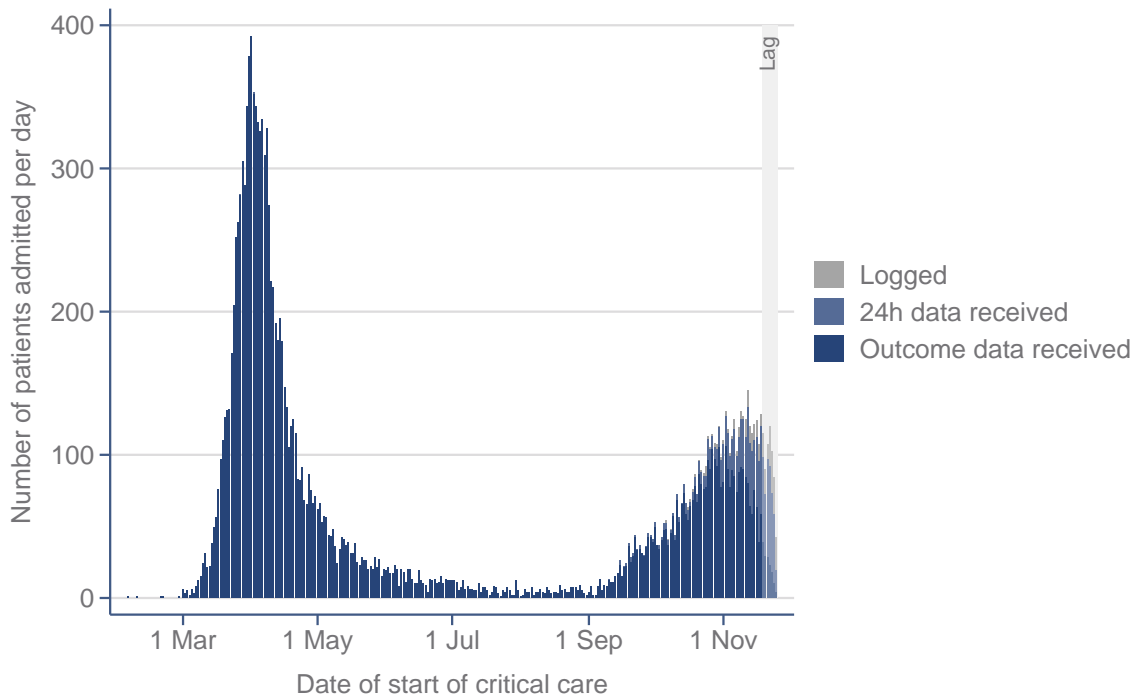


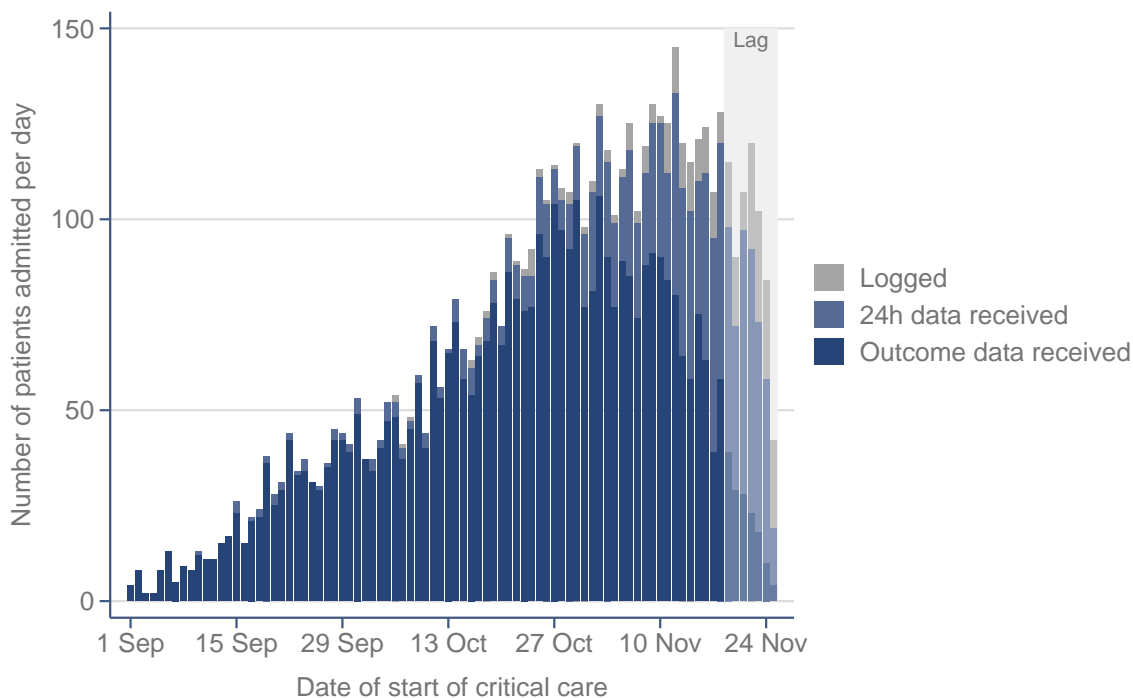
Figure 3. Geographical distribution of patients critically ill with confirmed COVID-19 admitted during the past 14 days

The numbers of new patients, cumulative numbers of patients and numbers of patients in critical care by date are shown in Figures 4-12. Please note that these figures are affected by a variable lag time for submission of data.



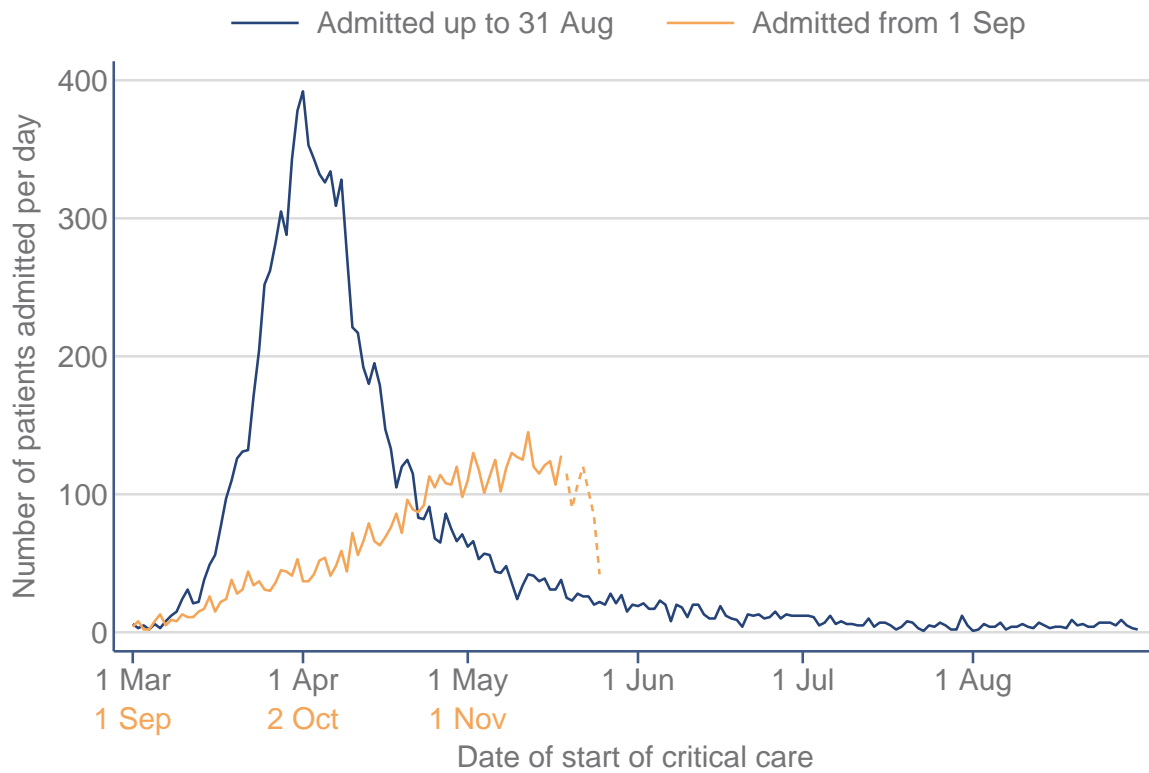
© ICNARC 2020

Figure 4. Number of new patients critically ill with confirmed COVID-19 by date of start of critical care over the entire epidemic



© ICNARC 2020

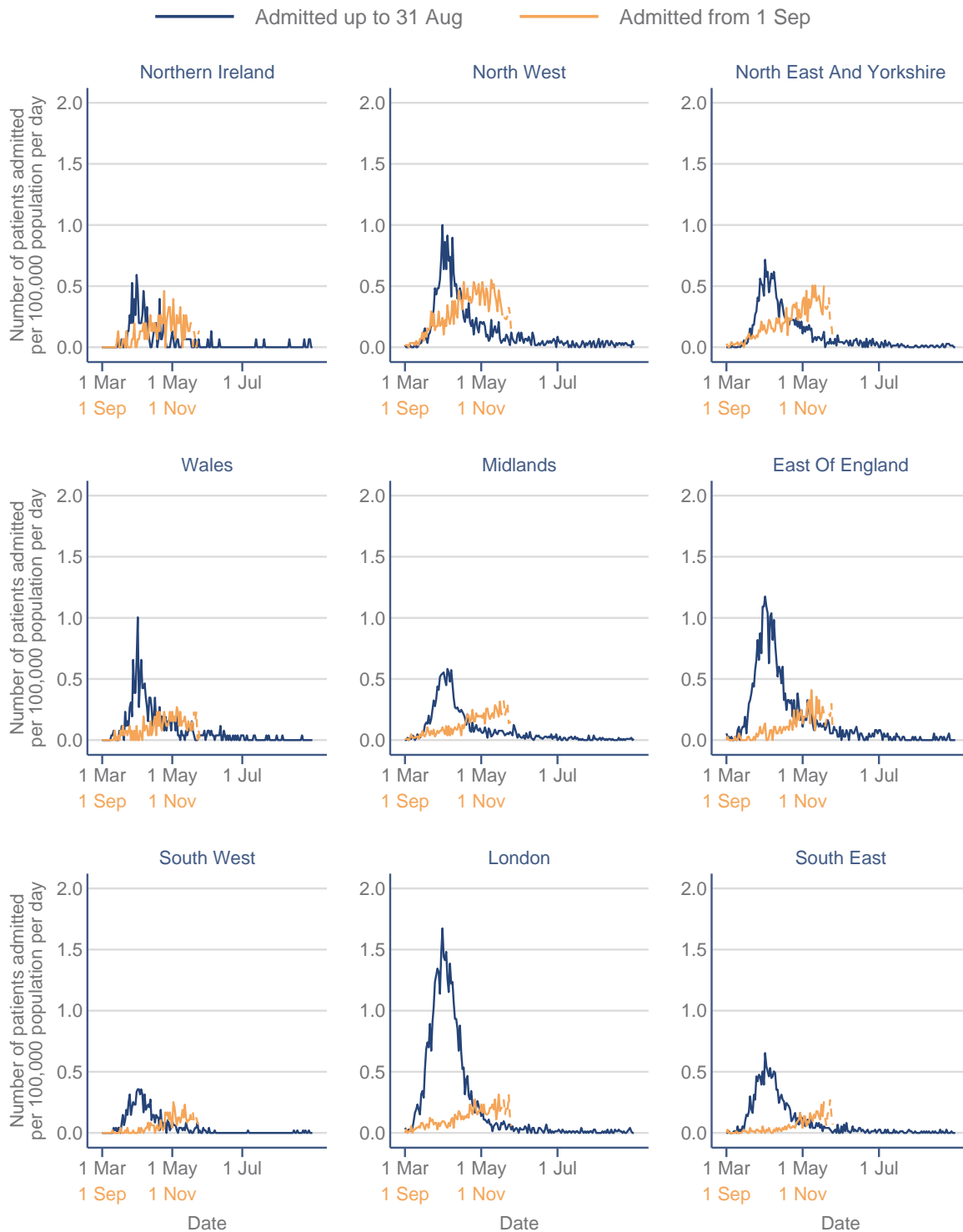
Figure 5. Number of new patients critically ill with confirmed COVID-19 admitted from 1 September 2020 by date of start of critical care



© ICNARC 2020

Figure 6. Comparison of the number of new patients critically ill with confirmed COVID-19 by date of start of critical care from 1 March 2020 to 31 August 2020 versus 1 September 2020 to date *

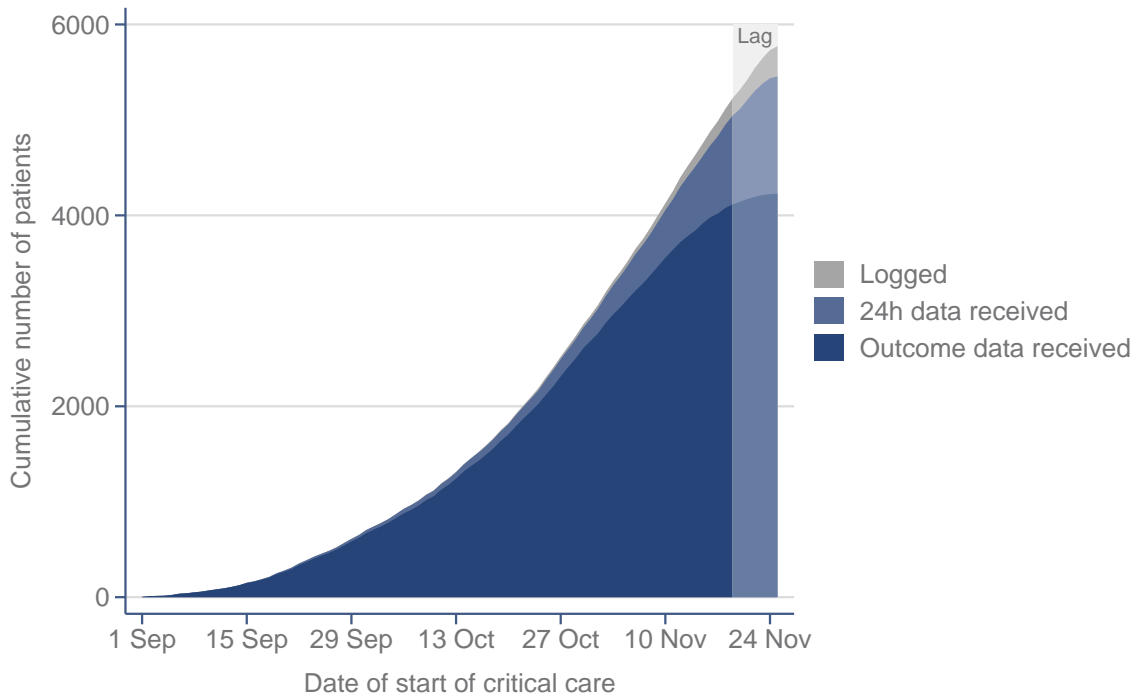
* Dashed line indicates potential lag in data submission.



© ICNARC 2020

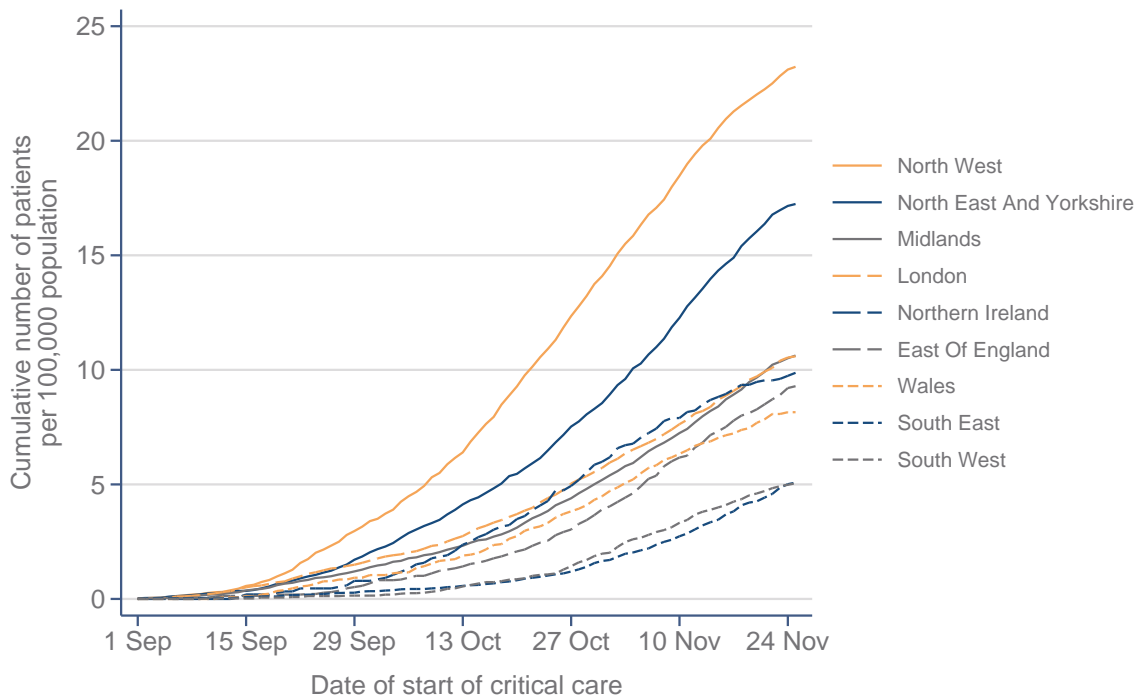
Figure 7. Number of new patients critically ill with confirmed COVID-19 by date of start of critical care from 1 March 2020 to 31 August 2020 versus 1 September 2020 to date by region *

* Dashed line indicates potential lag in data submission.



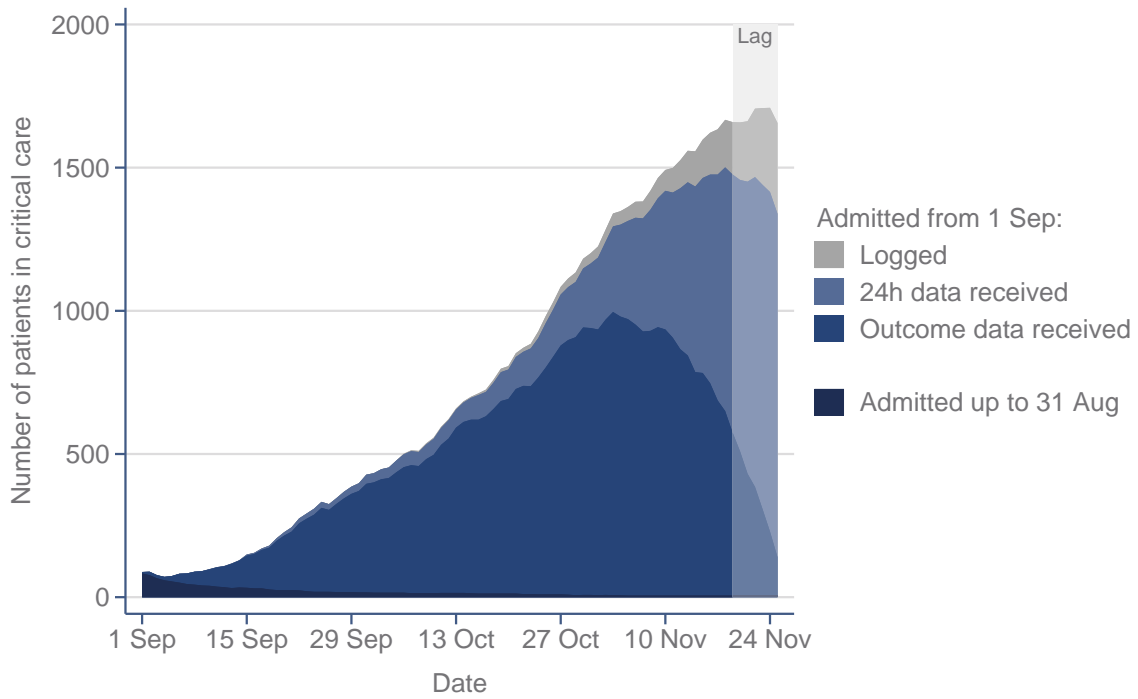
© ICNARC 2020

Figure 8. Cumulative number of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 by date of start of critical care



© ICNARC 2020

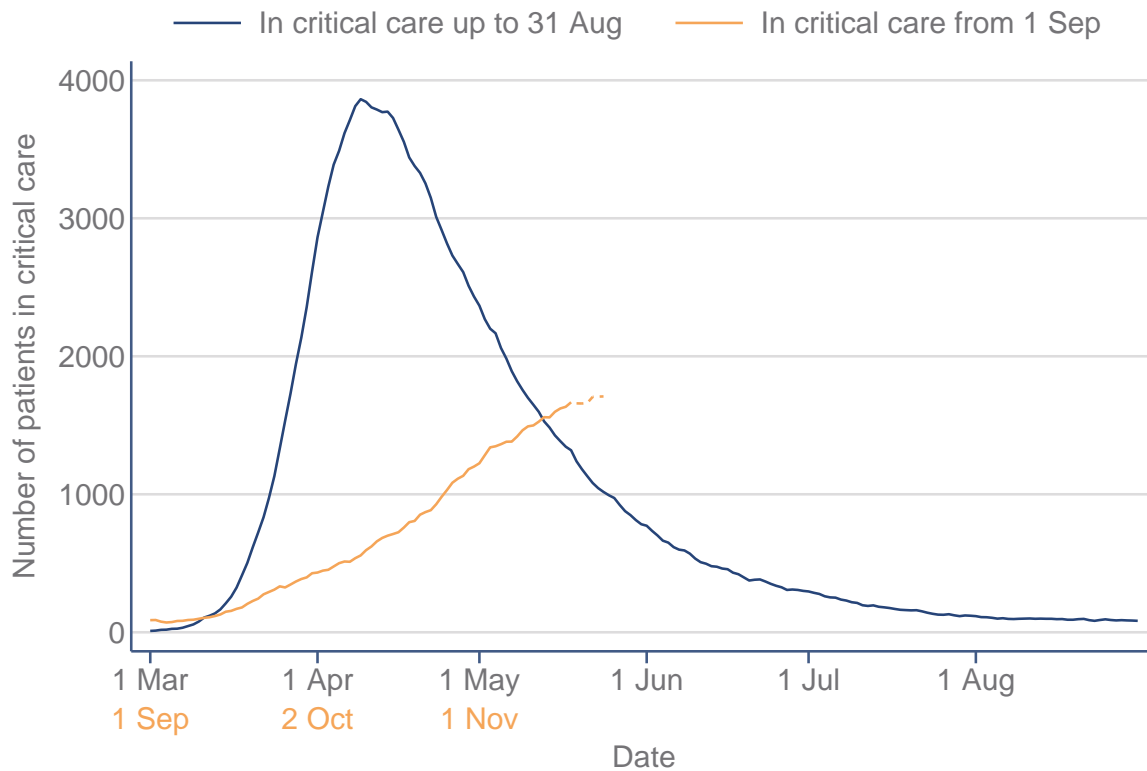
Figure 9. Cumulative number of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 per 100,000 adult population by region



© ICNARC 2020

Figure 10. Number of patients with confirmed COVID-19 in critical care from 1 September 2020 by date *

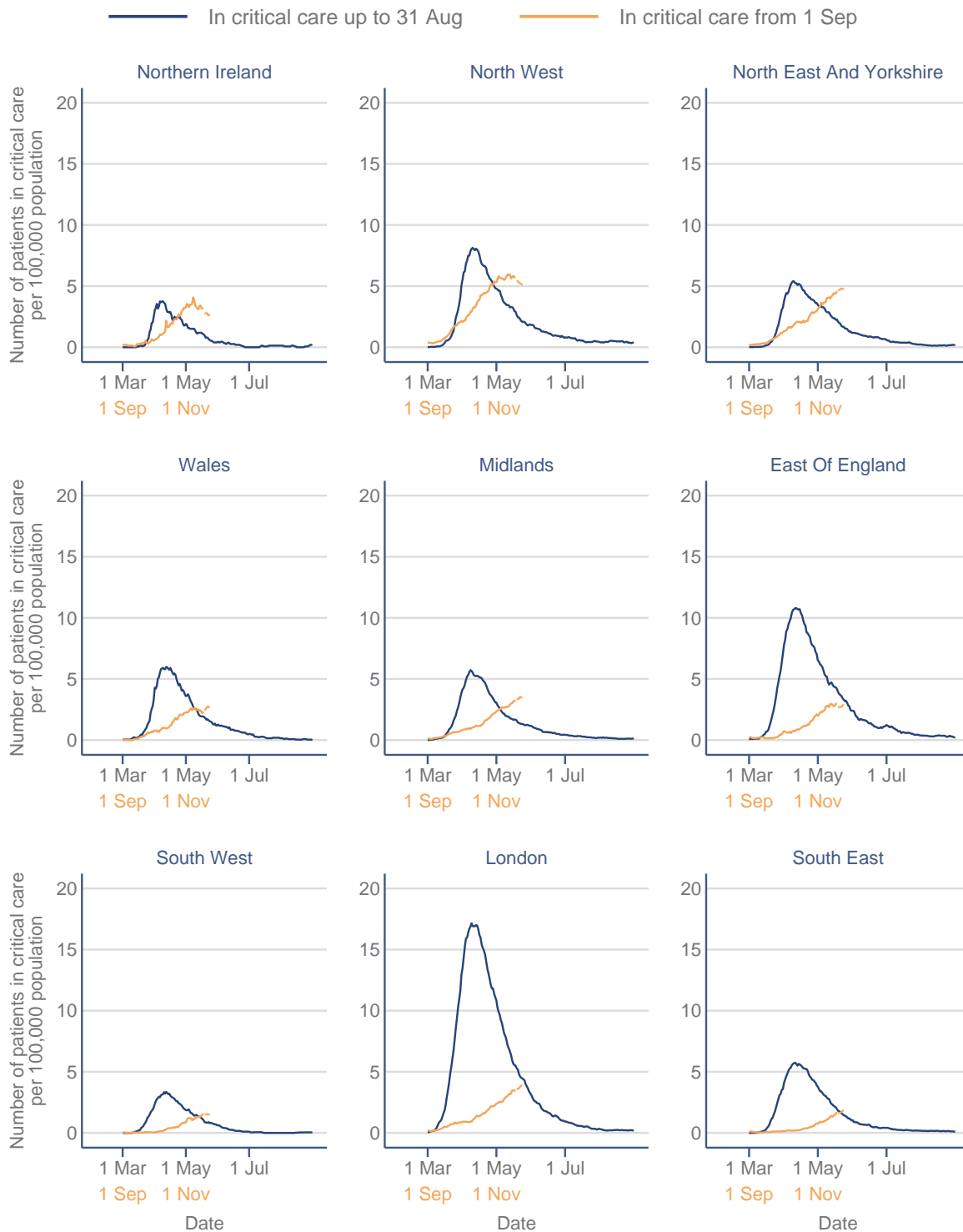
* Please note patients whose outcome data have not been received are assumed to remain in critical care as of 26 November 2020.



© ICNARC 2020

Figure 11. Number of patients with confirmed COVID-19 in critical care by date * from 1 March 2020 to 31 August 2020 versus 1 September 2020 to date

* Please note patients whose outcome data have not been received are assumed to remain in critical care as of 26 November 2020. Dashed line indicates potential lag in data submission.



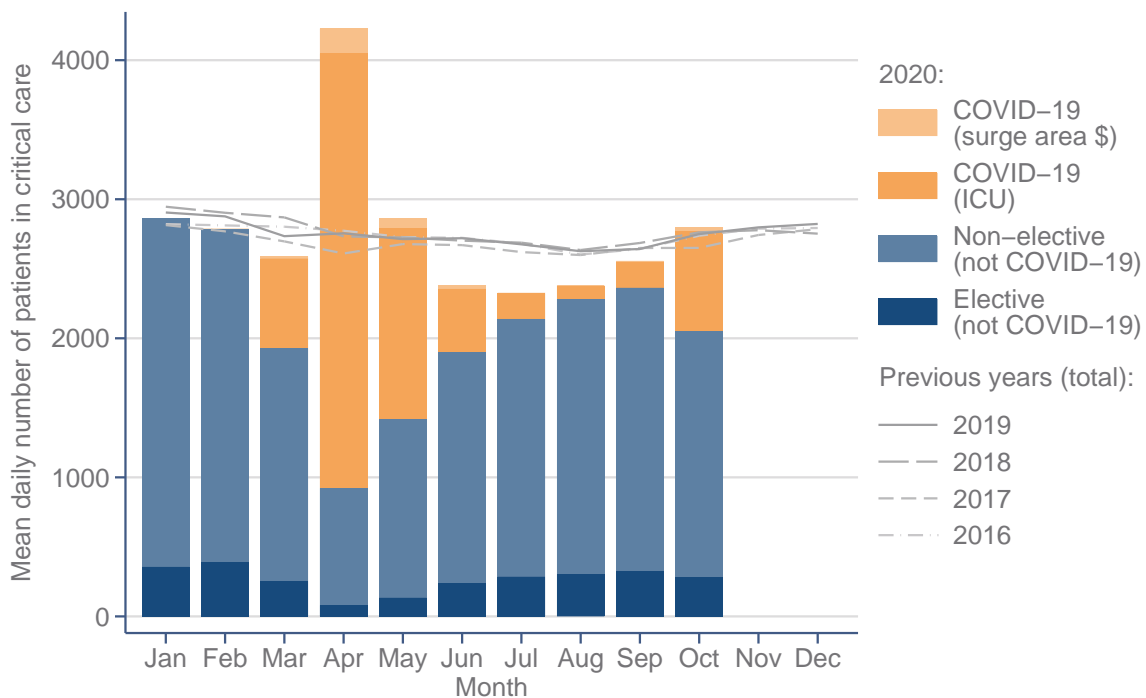
© ICNARC 2020

Figure 12. Number of patients with confirmed COVID-19 in critical care by date * from 1 March 2020 to 31 August 2020 versus 1 September 2020 to date by region

* Please note patients whose outcome data have not been received are assumed to remain in critical care as of 26 November 2020. Dashed line indicates potential lag in data submission.

Admissions to critical care – COVID-19 and non-COVID-19

Figure 13 shows the average daily number of patients in critical care for each month over the past five years. For 2020, this is broken down into the numbers of: elective admissions (not COVID-19) – those admitted directly following elective or scheduled surgery or for a planned medical procedure; non-elective admissions (not COVID-19); confirmed COVID-19 admitted to an ICU; and confirmed COVID-19 managed in a surge area outside of ICU.



© ICNARC 2020

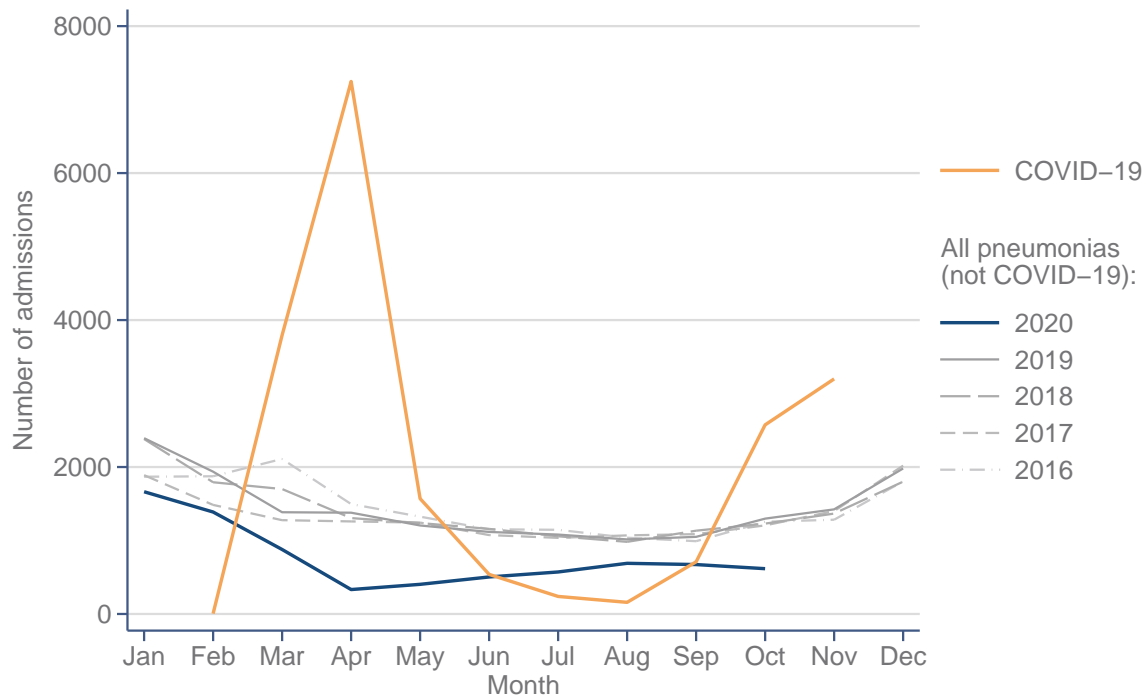
Figure 13. Average daily number of patients in critical care by month, 2016-2020 *

* Please note that data for patients without COVID-19 are submitted by participating critical care units either monthly or quarterly. Values have been adjusted for coverage.

\$ Not all surge patients are identifiable from ICU data and not all surge areas are covered.

Admissions to critical care – pneumonia (not COVID-19)

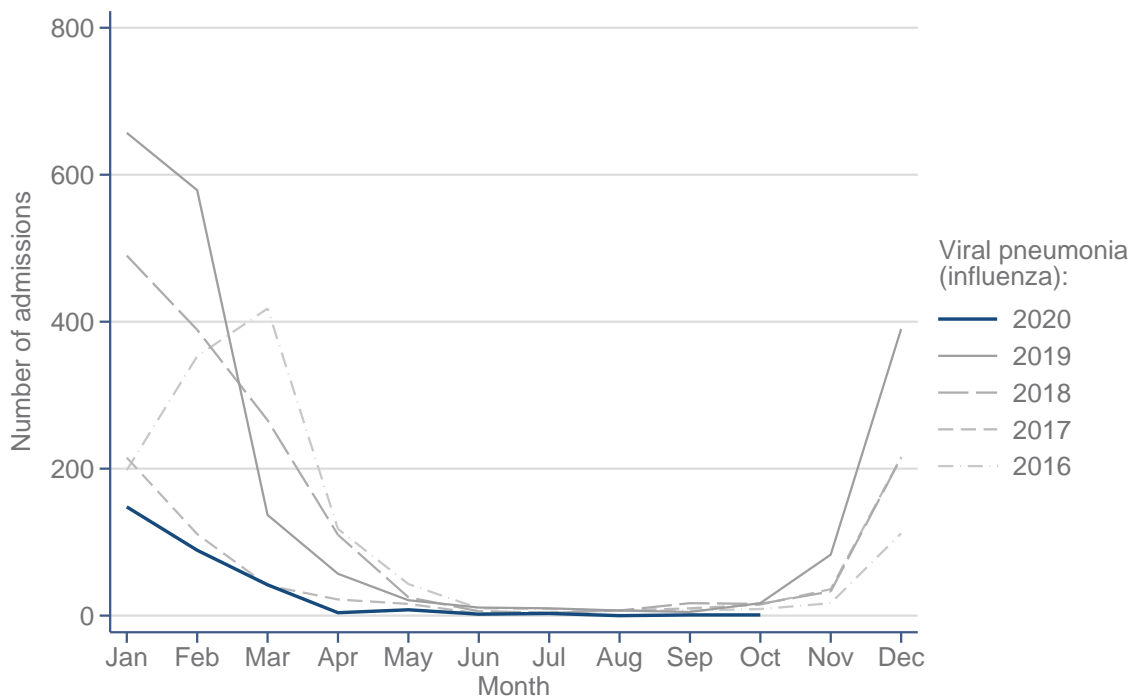
Figure 14 shows the total numbers of admissions to critical care over the past five years by month of admission reported as due to pneumonia (not COVID-19), compared with the numbers with confirmed COVID-19. Figure 15 shows the number of these pneumonia admissions that were specifically coded as due to influenza. Note that not all admissions due to influenza will be coded as viral pneumonia (influenza) as if the organism has not yet been identified, then these will likely be coded under pneumonia (no organism isolated).



© ICNARC 2020

Figure 14. Number of admissions with pneumonia (not COVID-19) by month, 2016-2020 *, compared with confirmed COVID-19 during 2020

* Please note that data for patients without COVID-19 are submitted by participating critical care units either monthly or quarterly. Values have been adjusted for coverage.



© ICNARC 2020

Figure 15. Number of admissions with viral pneumonia (influenza) by month, 2016-2020 *

* Please note that data for patients without COVID-19 are submitted by participating critical care units either monthly or quarterly. Values have been adjusted for coverage.

Patient characteristics

Characteristics of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 to date are summarised in Tables 1-3 and compared with patients admitted up to 31 August 2020.

Table 1. Patient characteristics: demographics

Demographics	Patients with confirmed COVID-19	
	Admitted from 1 Sep (N=5773)	Admitted up to 31 Aug (N=10,916)
Age at admission (years) [N=5768]		
Mean (SD)	61.0 (13.7)	58.8 (12.7)
Median (IQR)	62 (53, 71)	60 (51, 68)
Sex, n (%) [N=5768]		
Female	1772 (30.7)	3268 (30.0)
Male	3996 (69.3)	7642 (70.0)
Ethnicity, n (%) [N=5400]		
White	4051 (75.0)	6934 (66.0)
Mixed	57 (1.1)	190 (1.8)
Asian	872 (16.1)	1677 (16.0)
Black	212 (3.9)	1004 (9.6)
Other	208 (3.9)	696 (6.6)
Index of Multiple Deprivation (IMD) quintile *, n (%) [N=5682]		
1 (least deprived)	663 (11.7)	1544 (14.3)
2	794 (14.0)	1734 (16.1)
3	933 (16.4)	2077 (19.3)
4	1312 (23.1)	2606 (24.2)
5 (most deprived)	1980 (34.8)	2802 (26.0)
Urban/rural classification *, n (%) [N=5567]		
Major conurbation	2511 (45.1)	5211 (48.8)
Minor conurbation	326 (5.9)	337 (3.2)
City and town	2177 (39.1)	3980 (37.2)
Rural	552 (9.9)	1152 (10.8)

* Please see Definitions on page 55.

Table 2. Patient characteristics: medical history

Medical history	Patients with confirmed COVID-19	
	Admitted from 1 Sep (N=5773)	Admitted up to 31 Aug (N=10,916)
Dependency prior to admission to acute hospital, n (%) [N=5211]		
Able to live without assistance in daily activities	4599 (88.3)	9667 (89.4)
Some assistance with daily activities	597 (11.5)	1111 (10.3)
Total assistance with all daily activities	15 (0.3)	40 (0.4)
Very severe comorbidities *, n (%) [N=5320]		
Cardiovascular	43 (0.8)	68 (0.6)
Respiratory	60 (1.1)	122 (1.1)
Renal	103 (1.9)	185 (1.7)
Liver	37 (0.7)	51 (0.5)
Metastatic disease	36 (0.7)	59 (0.5)
Haematological malignancy	91 (1.7)	213 (2.0)
Immunocompromised	220 (4.1)	386 (3.6)
Body mass index *, n (%) [N=5122]		
<18.5	39 (0.8)	79 (0.8)
18.5-<25	1023 (20.0)	2639 (25.4)
25-<30	1707 (33.3)	3567 (34.4)
30-<40	1798 (35.1)	3260 (31.4)
≥40	555 (10.8)	828 (8.0)
CPR within previous 24h, n (%) [N=5415]		
In the community	33 (0.6)	50 (0.5)
In hospital	43 (0.8)	76 (0.7)
Prior hospital length of stay [N=5689]		
Mean (SD)	2.8 (6.3)	2.5 (6.2)
Median (IQR)	1 (0, 3)	1 (0, 3)
Currently or recently pregnant, n (% of females aged 16-49) [N=403]		
Currently pregnant	36 (8.9)	29 (3.7)
Recently pregnant (within 6 weeks)	19 (4.7)	41 (5.2)
Not known to be pregnant	348 (86.4)	718 (91.1)

* Please see Definitions on page 55.

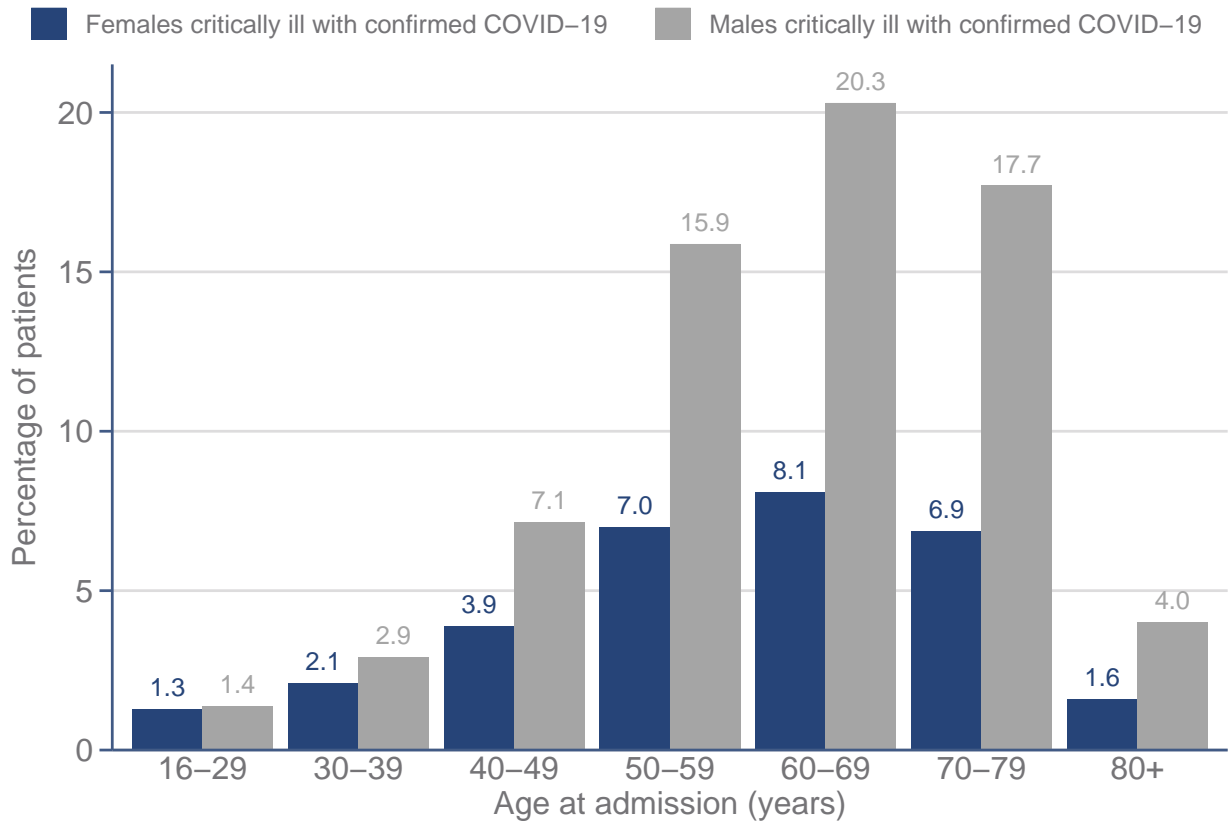
Table 3. Patient characteristics: indicators of acute severity

Indicators of acute severity	Patients with confirmed COVID-19 and 24h data received	
	Admitted from 1 Sep (N=5456)	Admitted up to 31 Aug (N=10,916)
Invasively ventilated within first 24h *, n (%) [N=5120]	1187 (23.2)	5856 (54.3)
APACHE II Score [N=5289]		
Mean (SD)	14.5 (5.3)	15.1 (5.3)
Median (IQR)	14 (11, 17)	15 (11, 18)
PaO ₂ /FiO ₂ ratio † (kPa), median (IQR) [N=4936]	13.5 (10.0, 18.8)	15.8 (11.3, 22.0)
PaO ₂ /FiO ₂ ratio †, n (%) [N=4936]		
< 13.3 kPa (< 100 mmHg)	2415 (48.9)	3802 (37.0)
13.3-26.6 kPa (100-200 mmHg)	1991 (40.3)	4928 (47.9)
≥ 26.7 kPa (≥ 200 mmHg)	530 (10.7)	1553 (15.1)

* Please see Definitions on page 55. 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.

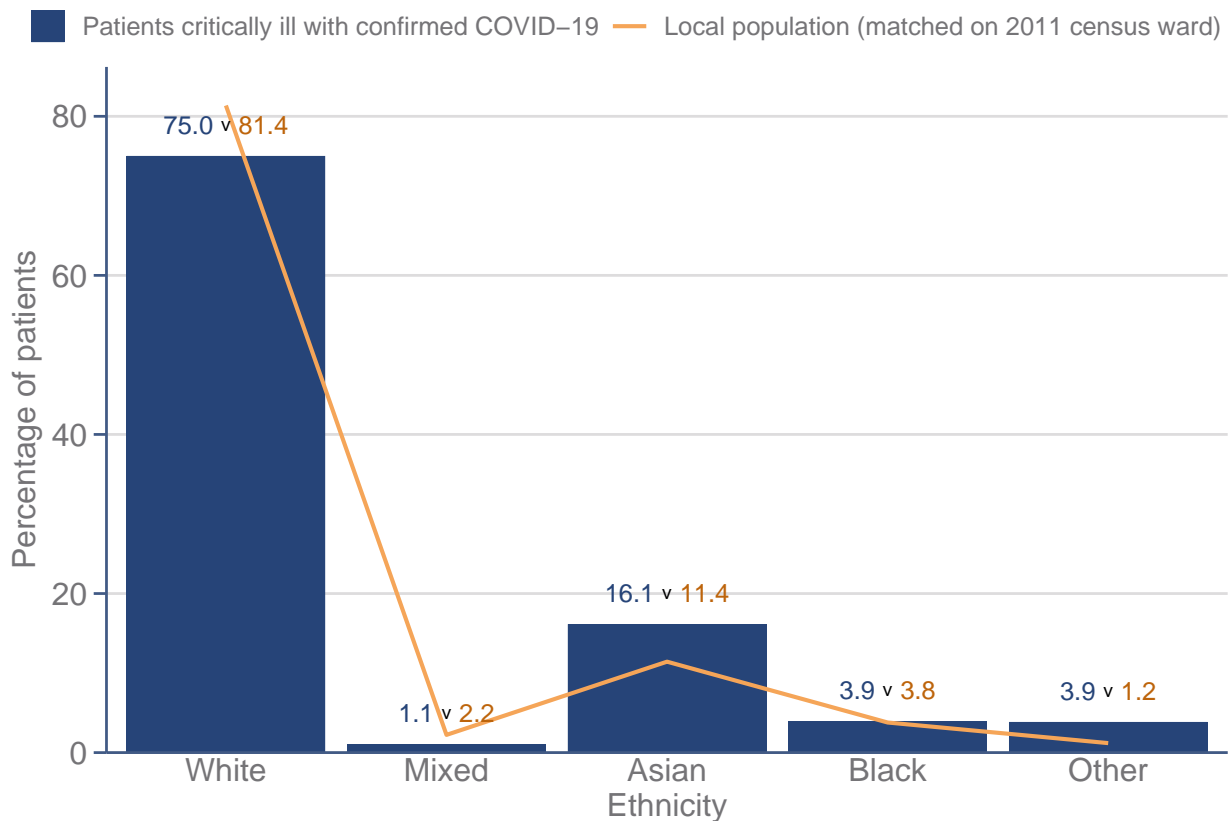
The distribution of age and sex is presented in Figure 16.



© ICNARC 2020

Figure 16. Age and sex distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020

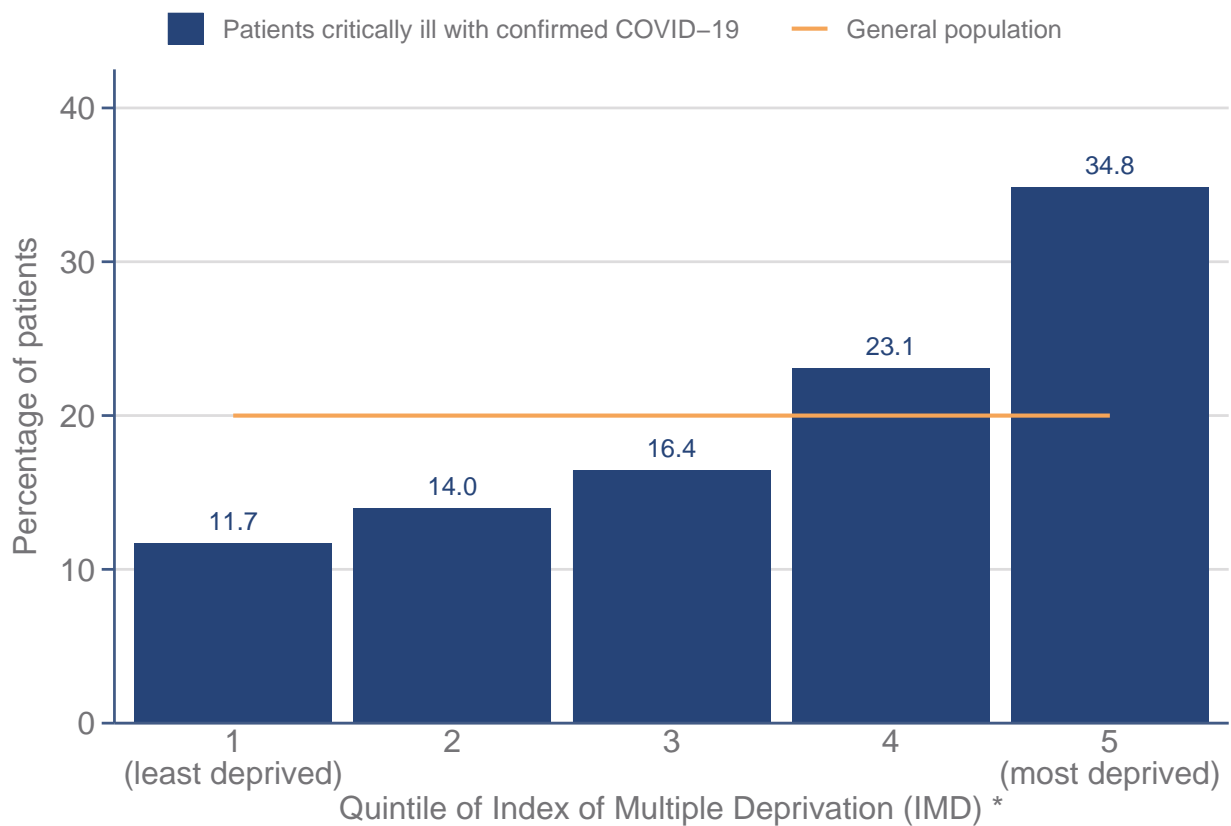
The distribution of ethnicity, matched on 2011 census ward for location of patients critically ill with COVID-19, is presented in Figure 17.



© ICNARC 2020

Figure 17. Ethnicity distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 compared with the local population (linked to 2011 census ward)

The distribution of Index of Multiple Deprivation (IMD) is presented in Figure 18.

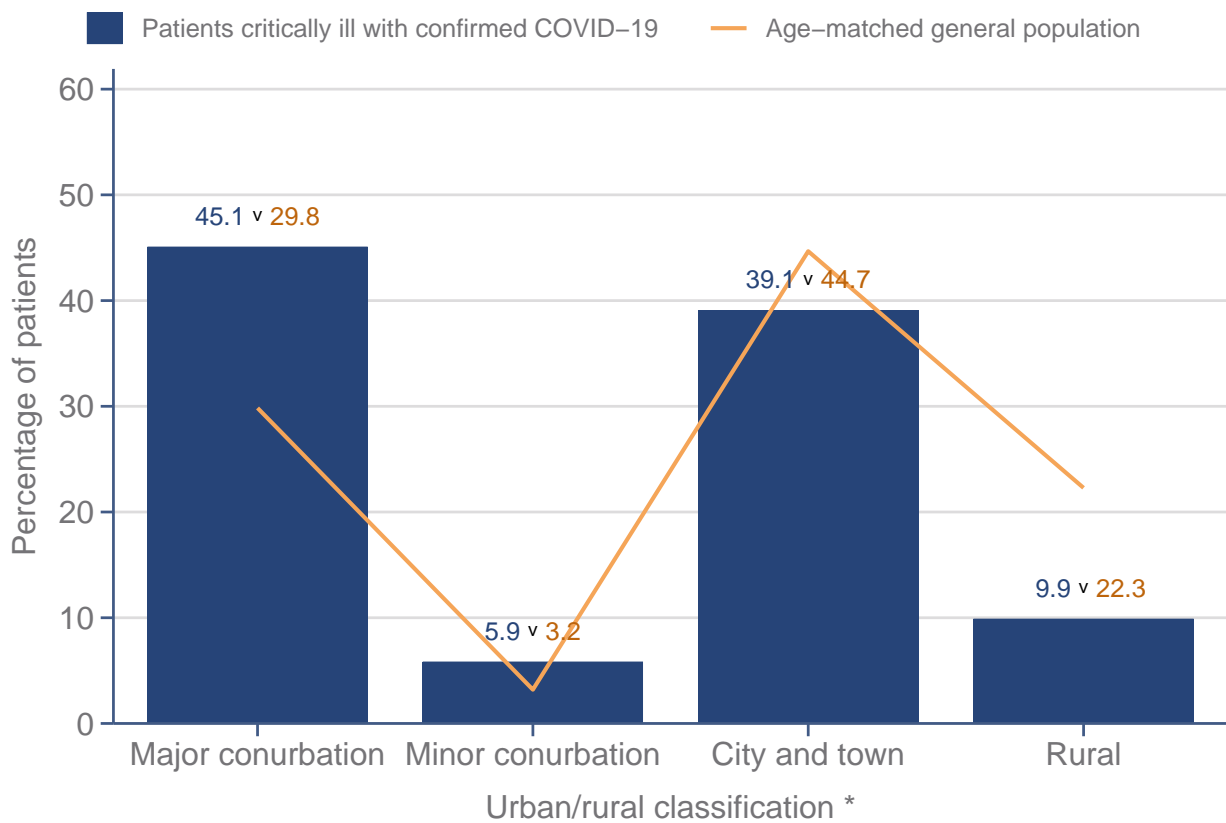


© ICNARC 2020

Figure 18. Index of Multiple Deprivation (IMD) * distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 compared with the general population

* Please see Definitions on page 55.

The distribution of patients by the urban/rural classification of their usual residence, compared with the age-matched general population (Office for National Statistics 2020), is presented in Figure 19.

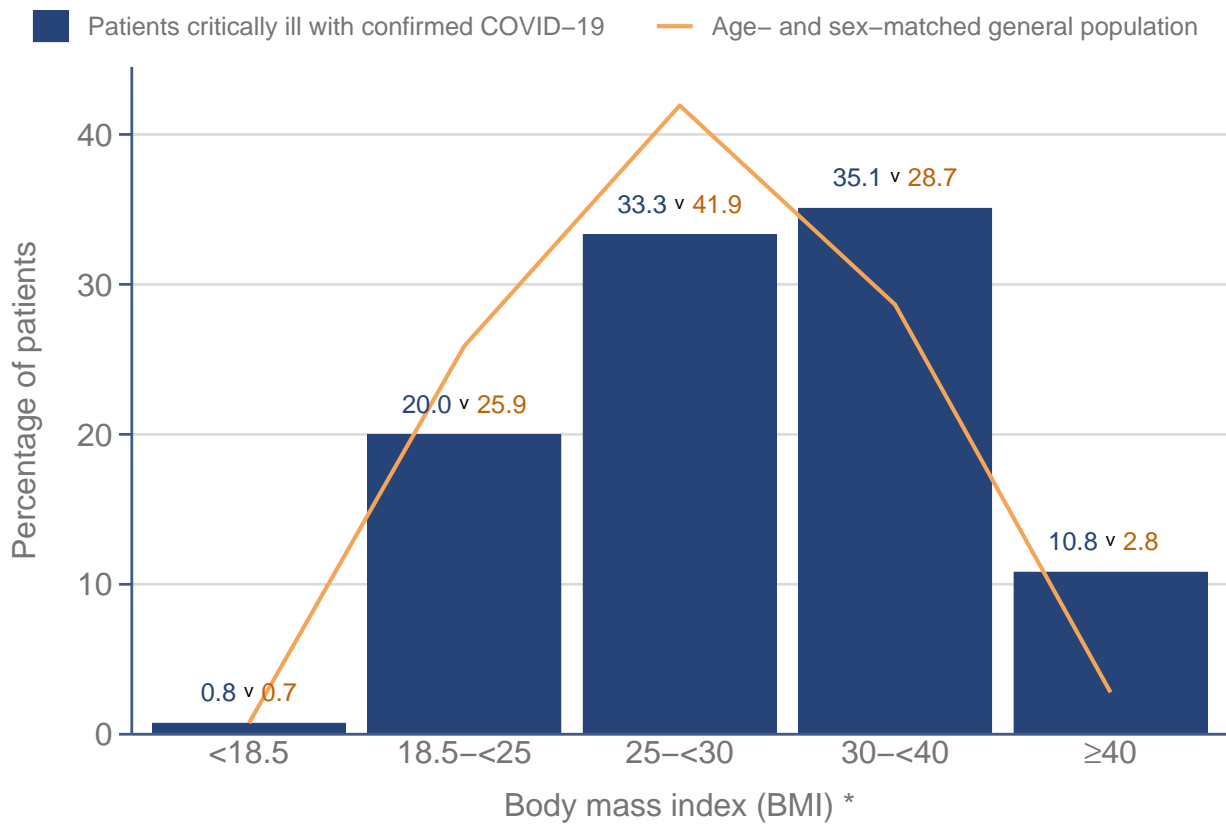


© ICNARC 2020

Figure 19. Urban/rural * distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 compared with the age-matched general population

* Please see Definitions on page 55.

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 20.



© ICNARC 2020

Figure 20. Body mass index (BMI) * distribution of patients critically ill with confirmed COVID-19 admitted from 1 September 2020 compared with the age- and sex-matched general population (Health Survey for England 2018)

* Please see Definitions on page 55.

Patient characteristics – invasively ventilated first 24 hours

Characteristics of patients critically ill with confirmed COVID-19 and receiving invasive ventilation during the first 24 hours in critical care admitted from 1 September 2020 to date are summarised in Tables 4-6 and compared with patients admitted up to 31 August 2020.

Table 4. Patient characteristics: demographics (invasively ventilated first 24 hours)

Patients with confirmed COVID-19 invasively ventilated first 24 hours *		
Demographics	Admitted from 1 Sep (N=1187)	Admitted up to 31 Aug (N=5856)
Age at admission (years) [N=1187]		
Mean (SD)	60.3 (13.7)	58.5 (12.0)
Median (IQR)	63 (53, 70)	59 (51, 67)
Sex, n (%) [N=1187]		
Female	374 (31.5)	1605 (27.4)
Male	813 (68.5)	4246 (72.6)
Ethnicity, n (%) [N=1132]		
White	837 (73.9)	3460 (61.5)
Mixed	9 (0.8)	114 (2.0)
Asian	191 (16.9)	962 (17.1)
Black	46 (4.1)	647 (11.5)
Other	49 (4.3)	443 (7.9)
Index of Multiple Deprivation (IMD) quintile *, n (%) [N=1169]		
1 (least deprived)	133 (11.4)	785 (13.6)
2	156 (13.3)	924 (16.0)
3	199 (17.0)	1151 (19.9)
4	279 (23.9)	1482 (25.6)
5 (most deprived)	402 (34.4)	1443 (24.9)
Urban/rural classification *, n (%) [N=1101]		
Major conurbation	580 (52.7)	3117 (54.6)
Minor conurbation	48 (4.4)	119 (2.1)
City and town	376 (34.2)	1908 (33.4)
Rural	97 (8.8)	567 (9.9)

* Please see Definitions on page 55.

Table 5. Patient characteristics: medical history (invasively ventilated first 24 hours)

Patients with confirmed COVID-19 invasively ventilated first 24 hours *		
Medical history	Admitted from 1 Sep (N=1187)	Admitted up to 31 Aug (N=5856)
Dependency prior to admission to acute hospital, n (%) [N=1127]		
Able to live without assistance in daily activities	992 (88.0)	5354 (92.3)
Some assistance with daily activities	134 (11.9)	437 (7.5)
Total assistance with all daily activities	1 (0.1)	10 (0.2)
Very severe comorbidities *, n (%) [N=1134]		
Cardiovascular	15 (1.3)	19 (0.3)
Respiratory	5 (0.4)	32 (0.6)
Renal	17 (1.5)	79 (1.4)
Liver	11 (1.0)	23 (0.4)
Metastatic disease	2 (0.2)	20 (0.3)
Haematological malignancy	18 (1.6)	75 (1.3)
Immunocompromised	45 (4.0)	162 (2.8)
Body mass index *, n (%) [N=1116]		
<18.5	13 (1.2)	30 (0.5)
18.5-<25	224 (20.1)	1414 (24.9)
25-<30	363 (32.5)	1977 (34.8)
30-<40	383 (34.3)	1846 (32.4)
≥40	133 (11.9)	422 (7.4)
CPR within previous 24h, n (%) [N=1160]		
In the community	21 (1.8)	39 (0.7)
In hospital	33 (2.8)	58 (1.0)
Prior hospital length of stay [N=1181]		
Mean (SD)	3.2 (5.5)	2.2 (5.3)
Median (IQR)	1 (0, 4)	1 (0, 3)
Currently or recently pregnant, n (% of females aged 16-49) [N=101]		
Currently pregnant	7 (6.9)	9 (2.4)
Recently pregnant (within 6 weeks)	8 (7.9)	22 (5.9)
Not known to be pregnant	86 (85.1)	343 (91.7)

* Please see Definitions on page 55.

Table 6. Patient characteristics: indicators of acute severity (invasively ventilated first 24 hours)

Patients with confirmed COVID-19 invasively ventilated first 24 hours *		
Indicators of acute severity	Admitted from 1 Sep (N=1187)	Admitted up to 31 Aug (N=5856)
APACHE II Score [N=1187]		
Mean (SD)	16.8 (5.5)	15.6 (5.2)
Median (IQR)	16 (13, 20)	15 (12, 19)
PaO ₂ /FiO ₂ ratio † (kPa), median (IQR) [N=1184]	12.4 (8.6, 19.6)	15.5 (10.8, 21.5)
PaO ₂ /FiO ₂ ratio †, n (%) [N=1184]		
< 13.3 kPa (< 100 mmHg)	643 (54.3)	2277 (39.0)
13.3-26.6 kPa (100-200 mmHg)	381 (32.2)	2779 (47.6)
≥ 26.7 kPa (≥ 200 mmHg)	160 (13.5)	780 (13.4)

* Please see Definitions on page 55. 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.

Patient characteristics – advanced respiratory support

Characteristics of patients critically ill with confirmed COVID-19 that received advanced respiratory support at any time during their critical care stay admitted from 1 September 2020 to date are summarised in Tables 7-9 and compared with patients admitted up to 31 August 2020.

Table 7. Patient characteristics: demographics (any advanced respiratory support and known outcomes)

Patients with confirmed COVID-19 and advanced respiratory support *		
Demographics	Admitted from 1 Sep (N=1631)	Admitted up to 31 Aug (N=7866)
Age at admission (years) [N=1630]		
Mean (SD)	61.8 (13.3)	58.6 (11.9)
Median (IQR)	64 (55, 72)	60 (51, 67)
Sex, n (%) [N=1630]		
Female	468 (28.7)	2201 (28.0)
Male	1162 (71.3)	5660 (72.0)
Ethnicity, n (%) [N=1547]		
White	1164 (75.2)	4746 (62.7)
Mixed	9 (0.6)	147 (1.9)
Asian	270 (17.5)	1293 (17.1)
Black	55 (3.6)	820 (10.8)
Other	49 (3.2)	563 (7.4)
Index of Multiple Deprivation (IMD) quintile *, n (%) [N=1613]		
1 (least deprived)	177 (11.0)	1062 (13.7)
2	207 (12.8)	1228 (15.8)
3	256 (15.9)	1550 (19.9)
4	375 (23.2)	1938 (24.9)
5 (most deprived)	598 (37.1)	1992 (25.6)
Urban/rural classification *, n (%) [N=1548]		
Major conurbation	781 (50.5)	4010 (52.1)
Minor conurbation	77 (5.0)	205 (2.7)
City and town	538 (34.8)	2671 (34.7)
Rural	152 (9.8)	802 (10.4)

* Please see Definitions on page 55.

Table 8. Patient characteristics: medical history (any advanced respiratory support and known outcomes)

Patients with confirmed COVID-19 and advanced respiratory support *		
Medical history	Admitted from 1 Sep (N=1631)	Admitted up to 31 Aug (N=7866)
Dependency prior to admission to acute hospital, n (%) [N=1558]		
Able to live without assistance in daily activities	1383 (88.8)	7171 (92.0)
Some assistance with daily activities	173 (11.1)	611 (7.8)
Total assistance with all daily activities	2 (0.1)	11 (0.1)
Very severe comorbidities *, n (%) [N=1566]		
Cardiovascular	15 (1.0)	25 (0.3)
Respiratory	12 (0.8)	47 (0.6)
Renal	26 (1.7)	94 (1.2)
Liver	14 (0.9)	31 (0.4)
Metastatic disease	4 (0.3)	24 (0.3)
Haematological malignancy	31 (2.0)	128 (1.6)
Immunocompromised	73 (4.7)	234 (3.0)
Body mass index *, n (%) [N=1529]		
<18.5	11 (0.7)	41 (0.5)
18.5-<25	322 (21.1)	1887 (24.9)
25-<30	507 (33.2)	2633 (34.7)
30-<40	527 (34.5)	2460 (32.4)
≥40	162 (10.6)	565 (7.4)
CPR within previous 24h, n (%) [N=1595]		
In the community	17 (1.1)	45 (0.6)
In hospital	37 (2.3)	70 (0.9)
Prior hospital length of stay [N=1612]		
Mean (SD)	3.2 (8.0)	2.2 (5.3)
Median (IQR)	1 (0, 4)	1 (0, 3)
Currently or recently pregnant, n (% of females aged 16-49) [N=116]		
Currently pregnant	11 (9.5)	15 (2.9)
Recently pregnant (within 6 weeks)	8 (6.9)	27 (5.2)
Not known to be pregnant	97 (83.6)	480 (92.0)

* Please see Definitions on page 55.

Table 9. Patient characteristics: indicators of acute severity (any advanced respiratory support and known outcomes)

Patients with confirmed COVID-19 and advanced respiratory support *		
Indicators of acute severity	Admitted from 1 Sep (N=1631)	Admitted up to 31 Aug (N=7866)
APACHE II Score [N=1595]		
Mean (SD)	16.0 (5.3)	15.4 (5.1)
Median (IQR)	15 (13, 19)	15 (12, 18)
PaO ₂ /FiO ₂ ratio † (kPa), median (IQR) [N=1550]	12.3 (9.1, 17.2)	15.0 (10.8, 21.0)
PaO ₂ /FiO ₂ ratio †, n (%) [N=1550]		
< 13.3 kPa (< 100 mmHg)	898 (57.9)	3099 (40.4)
13.3-26.6 kPa (100-200 mmHg)	486 (31.4)	3620 (47.1)
≥ 26.7 kPa (≥ 200 mmHg)	166 (10.7)	960 (12.5)

* Please see Definitions on page 55. 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.

Patient characteristics – basic respiratory support only

Characteristics of patients critically ill with confirmed COVID-19 that received basic respiratory support only during their critical care stay admitted from 1 September 2020 to date are summarised in Tables 10-12 and compared with patients admitted up to 31 August 2020.

Table 10. Patient characteristics: demographics (basic respiratory support only and known outcomes)

Patients with confirmed COVID-19 and basic respiratory support only *		
Demographics	Admitted from 1 Sep (N=2368)	Admitted up to 31 Aug (N=2779)
Age at admission (years) [N=2368]		
Mean (SD)	60.6 (14.4)	59.4 (14.4)
Median (IQR)	62 (52, 72)	60 (50, 70)
Sex, n (%) [N=2367]		
Female	761 (32.2)	953 (34.3)
Male	1606 (67.8)	1825 (65.7)
Ethnicity, n (%) [N=2258]		
White	1720 (76.2)	2008 (74.9)
Mixed	23 (1.0)	41 (1.5)
Asian	345 (15.3)	351 (13.1)
Black	87 (3.9)	164 (6.1)
Other	83 (3.7)	116 (4.3)
Index of Multiple Deprivation (IMD) quintile *, n (%) [N=2330]		
1 (least deprived)	261 (11.2)	439 (16.1)
2	343 (14.7)	462 (16.9)
3	375 (16.1)	484 (17.7)
4	543 (23.3)	598 (21.9)
5 (most deprived)	808 (34.7)	748 (27.4)
Urban/rural classification *, n (%) [N=2321]		
Major conurbation	978 (42.1)	1046 (38.3)
Minor conurbation	145 (6.2)	128 (4.7)
City and town	968 (41.7)	1232 (45.1)
Rural	230 (9.9)	324 (11.9)

* Please see Definitions on page 55.

Table 11. Patient characteristics: medical history (basic respiratory support only and known outcomes)

Patients with confirmed COVID-19 and basic respiratory support only *		
Medical history	Admitted from 1 Sep (N=2368)	Admitted up to 31 Aug (N=2779)
Dependency prior to admission to acute hospital, n (%) [N=2293]		
Able to live without assistance in daily activities	1986 (86.6)	2287 (83.0)
Some assistance with daily activities	300 (13.1)	445 (16.1)
Total assistance with all daily activities	7 (0.3)	24 (0.9)
Very severe comorbidities *, n (%) [N=2305]		
Cardiovascular	24 (1.0)	39 (1.4)
Respiratory	41 (1.8)	72 (2.6)
Renal	40 (1.7)	74 (2.7)
Liver	8 (0.3)	17 (0.6)
Metastatic disease	25 (1.1)	26 (0.9)
Haematological malignancy	40 (1.7)	77 (2.8)
Immunocompromised	91 (3.9)	136 (4.9)
Body mass index *, n (%) [N=2214]		
<18.5	18 (0.8)	28 (1.1)
18.5-<25	431 (19.5)	663 (26.3)
25-<30	736 (33.2)	853 (33.8)
30-<40	772 (34.9)	733 (29.0)
≥40	257 (11.6)	248 (9.8)
CPR within previous 24h, n (%) [N=2325]		
In the community	5 (0.2)	5 (0.2)
In hospital	0 (0.0)	3 (0.1)
Prior hospital length of stay [N=2342]		
Mean (SD)	2.4 (5.7)	3.0 (7.3)
Median (IQR)	1 (0, 3)	1 (0, 3)
Currently or recently pregnant, n (% of females aged 16-49) [N=183]		
Currently pregnant	16 (8.7)	11 (4.6)
Recently pregnant (within 6 weeks)	7 (3.8)	11 (4.6)
Not known to be pregnant	160 (87.4)	215 (90.7)

* Please see Definitions on page 55.

Table 12. Patient characteristics: indicators of acute severity (basic respiratory support only and known outcomes)

Patients with confirmed COVID-19 and basic respiratory support only *		
Indicators of acute severity	Admitted from 1 Sep (N=2368)	Admitted up to 31 Aug (N=2779)
APACHE II Score [N=2302]		
Mean (SD)	13.7 (5.2)	14.2 (5.5)
Median (IQR)	13 (10, 16)	14 (10, 17)
PaO ₂ /FiO ₂ ratio † (kPa), median (IQR) [N=2119]	14.7 (11.3, 19.7)	17.5 (12.5, 24.0)
PaO ₂ /FiO ₂ ratio †, n (%) [N=2119]		
< 13.3 kPa (< 100 mmHg)	845 (39.9)	697 (29.0)
13.3-26.6 kPa (100-200 mmHg)	1073 (50.6)	1269 (52.9)
≥ 26.7 kPa (≥ 200 mmHg)	201 (9.5)	434 (18.1)

* Please see Definitions on page 55. 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.

Outcomes, duration of critical care and organ support

Critical care outcomes have been received for 4227 (of 5773) patients. Of these, 1527 have died and 2700 have been discharged from critical care (Figures 21 and 22). The remaining 1546 were last reported to still be receiving critical care.

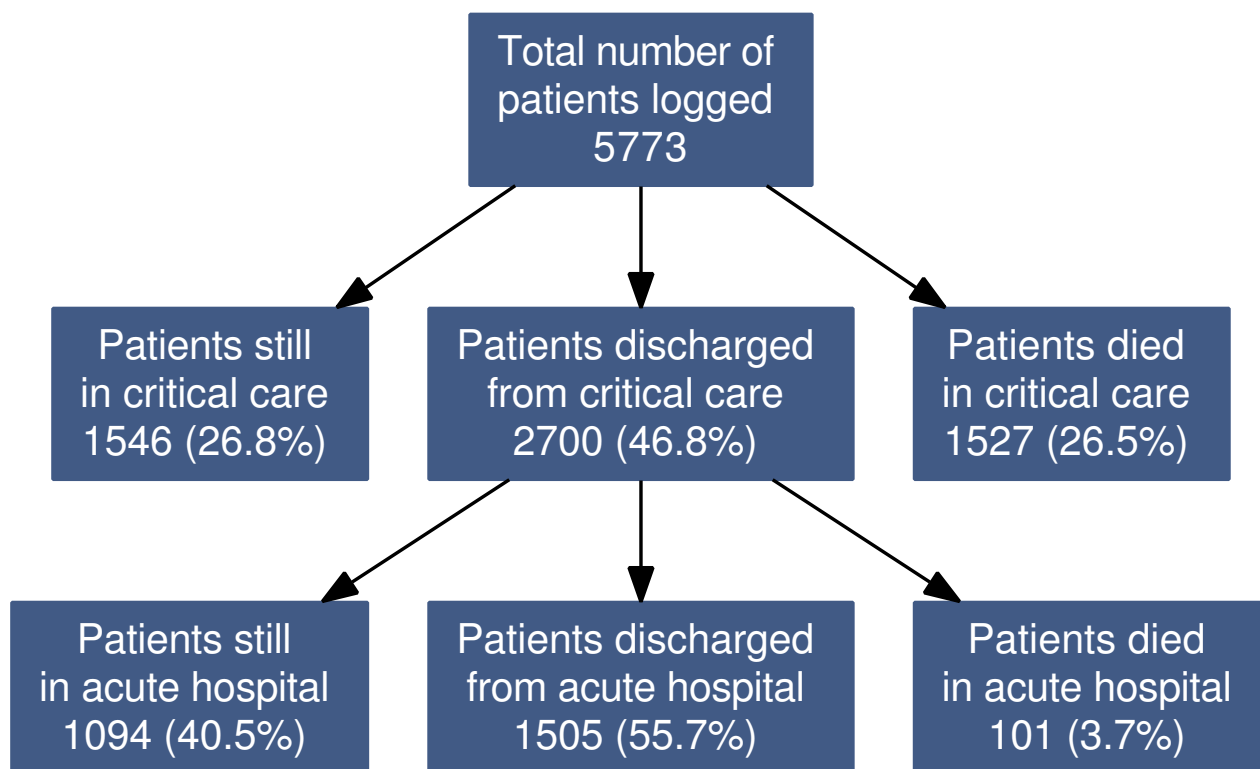
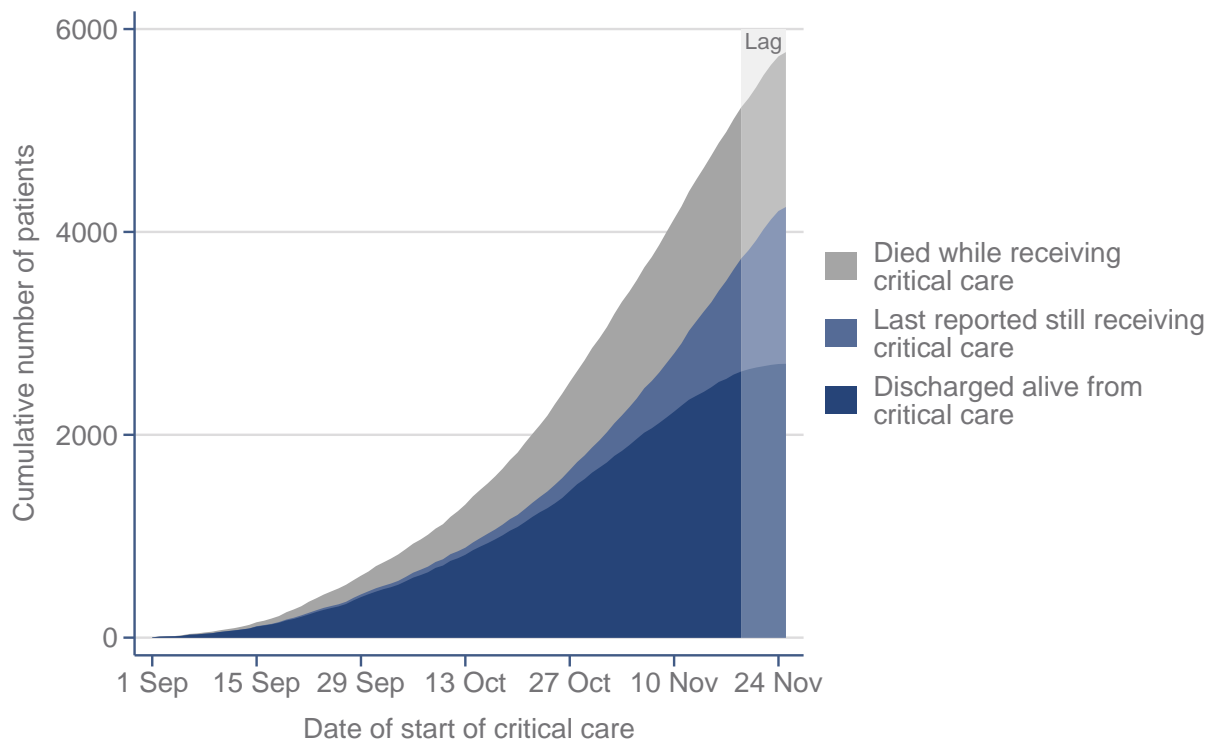


Figure 21. Critical care and acute hospital outcomes for patients admitted from 1 September 2020



© ICNARC 2020

Figure 22. Cumulative outcomes for patients admitted from 1 September 2020 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 26 November 2020.

Critical care outcome, duration of critical care and organ support for patients critically ill with confirmed COVID-19 admitted from 1 September 2020 to date for whom outcomes have been received are summarised in Table 13 and compared with patients admitted up to 31 August 2020.

Table 13. Critical care outcome, duration of critical care and organ support

Critical care outcome	Patients with confirmed COVID-19 and outcome received	
	Admitted from 1 Sep (N=5773)	Admitted up to 31 Aug (N=10,916)
Outcome at end of critical care, n (%)		
Discharged	2700 (46.8)	6610 (60.6)
Died	1527 (26.5)	4304 (39.4)
Still receiving critical care	1546 (26.8)	2 (0.0)
Duration of critical care	(N=4220)	(N=10,908)
Duration of critical care (days) †, median (IQR)		
Survivors	5 (3, 9)	12 (5, 28)
Non-survivors	10 (4, 15)	9 (5, 16)
Organ support (Critical Care Minimum Dataset) *	(N=4176)	(N=10,910)
Receipt of organ support, at any point, n (%)		
Advanced respiratory support	1631 (39.1)	7866 (72.1)
Basic respiratory support only	2368 (56.7)	2779 (25.5)
No respiratory support	177 (4.2)	265 (2.4)
Advanced cardiovascular support	676 (16.2)	3359 (30.8)
Basic cardiovascular support only	3260 (78.1)	7089 (65.0)
No cardiovascular support	240 (5.7)	462 (4.2)
Renal support	513 (12.3)	2920 (26.8)
Liver support	25 (0.6)	114 (1.0)
Neurological support	212 (5.1)	993 (9.1)
Duration of organ support (calendar days), median (IQR)		
Advanced respiratory support	9 (4, 14)	14 (7, 24)
Total (advanced + basic) respiratory support	7 (4, 12)	11 (5, 22)
Advanced cardiovascular support	2 (1, 4.5)	3 (2, 6)
Total (advanced + basic) cardiovascular support	7 (4, 12)	11 (5, 22)
Renal support	4 (2, 8)	8 (3, 15)

Please note that the results for patients admitted from 1 September 2020 are 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 55.

† Duration of critical care is the total over all critical care admissions for the the same patient and excludes any time spent outside critical care areas (e.g. prior to any readmissions).

Outcomes, duration of critical care and organ support – invasively ventilated first 24 hours

Critical care outcome, duration of critical care and organ support for patients critically ill with confirmed COVID-19 and receiving invasive ventilation during the first 24 hours in critical care admitted from 1 September 2020 to date for whom outcomes have been received are summarised in Table 14 and compared with patients admitted up to 31 August 2020.

Table 14. Critical care outcome, duration of critical care and organ support (invasively ventilated first 24 hours)

Patients with confirmed COVID-19 invasively ventilated first 24 hours *		
Critical care outcome	Admitted from 1 Sep (N=1187)	Admitted up to 31 Aug (N=5856)
Outcome at end of critical care, n (%)		
Discharged	354 (29.8)	3128 (53.4)
Died	470 (39.6)	2727 (46.6)
Still receiving critical care	363 (30.6)	1 (0.0)
Duration of critical care	(N=823)	(N=5852)
Duration of critical care (days) †, median (IQR)		
Survivors	11 (6, 17)	22 (12, 35)
Non-survivors	10 (4, 16)	10 (5, 17)
Organ support (Critical Care Minimum Dataset) *	(N=814)	(N=5853)
Receipt of organ support, at any point, n (%)		
Advanced cardiovascular support	308 (37.8)	2388 (40.8)
Basic cardiovascular support only	505 (62.0)	3452 (59.0)
No cardiovascular support	1 (0.1)	13 (0.2)
Renal support	207 (25.4)	2116 (36.2)
Liver support	12 (1.5)	80 (1.4)
Neurological support	111 (13.6)	716 (12.2)
Duration of organ support (calendar days), median (IQR)		
Advanced respiratory support	9 (4, 15)	14 (7, 24)
Total (advanced + basic) respiratory support	10 (5, 16)	15 (8, 26)
Advanced cardiovascular support	2 (1, 4)	3 (2, 6)
Total (advanced + basic) cardiovascular support	10 (6, 17)	15 (8, 26)
Renal support	4 (2, 10)	8 (4, 16)

Please note that the results for patients admitted from 1 September 2020 are 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 55.

† Duration of critical care is the total over all critical care admissions for the the same patient and excludes any time spent outside critical care areas (e.g. prior to any readmissions).

Outcomes, duration of critical care and organ support – advanced respiratory support

Critical care outcome, duration of critical care and organ support for patients critically ill with confirmed COVID-19 that received advanced respiratory support at any time during their critical care stay admitted from 1 September 2020 to date for whom outcomes have been received are summarised in Table 15 and compared with patients admitted up to 31 August 2020.

Table 15. Critical care outcome, duration of critical care and organ support (any advanced respiratory support and known outcomes)

Patients with confirmed COVID-19 and advanced respiratory support *		
Critical care outcome	Admitted from 1 Sep (N=1631)	Admitted up to 31 Aug (N=7866)
Outcome at end of critical care, n (%)		
Discharged	578 (35.4)	4118 (52.4)
Died	1053 (64.6)	3748 (47.6)
Duration of critical care	(N=1628)	(N=7861)
Duration of critical care (days) †, median (IQR)		
Survivors	12 (7, 21)	23 (12, 37)
Non-survivors	12 (7, 17)	10 (6, 17)
Organ support (Critical Care Minimum Dataset) *	(N=1631)	(N=7866)
Receipt of organ support, at any point, n (%)		
Advanced cardiovascular support	627 (38.4)	3290 (41.8)
Basic cardiovascular support only	1002 (61.4)	4559 (58.0)
No cardiovascular support	2 (0.1)	17 (0.2)
Renal support	429 (26.3)	2772 (35.2)
Liver support	21 (1.3)	110 (1.4)
Neurological support	192 (11.8)	967 (12.3)
Duration of organ support (calendar days), median (IQR)		
Advanced respiratory support	9 (4, 14)	14 (7, 24)
Total (advanced + basic) respiratory support	12 (7, 18)	16 (8, 27)
Advanced cardiovascular support	3 (1, 5)	3 (2, 6)
Total (advanced + basic) cardiovascular support	12 (7, 18)	16 (9, 27)
Renal support	4 (2, 9)	8 (4, 16)

Please note that the results for patients admitted from 1 September 2020 are 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 55.

† Duration of critical care is the total over all critical care admissions for the the same patient and excludes any time spent outside critical care areas (e.g. prior to any readmissions).

Outcomes, duration of critical care and organ support – basic respiratory support only

Critical care outcome, duration of critical care and organ support for patients critically ill with confirmed COVID-19 that received basic respiratory support only during their critical care stay admitted from 1 September 2020 to date for whom outcomes have been received are summarised in Table 16 and compared with patients admitted up to 31 August 2020.

Table 16. Critical care outcome, duration of critical care and organ support (basic respiratory support only and known outcomes)

Patients with confirmed COVID-19 and basic respiratory support only *		
Critical care outcome	Admitted from 1 Sep (N=2368)	Admitted up to 31 Aug (N=2779)
Outcome at end of critical care, n (%)		
Discharged	1925 (81.3)	2240 (80.6)
Died	443 (18.7)	539 (19.4)
Duration of critical care		
(N=2366)		
(N=2778)		
Duration of critical care (days) †, median (IQR)		
Survivors	5 (3, 7)	4 (2, 7)
Non-survivors	5 (2, 9)	4 (2, 7)
Organ support (Critical Care Minimum Dataset) *		
(N=2368)		
(N=2779)		
Receipt of organ support, at any point, n (%)		
Advanced cardiovascular support	42 (1.8)	52 (1.9)
Basic cardiovascular support only	2151 (90.8)	2316 (83.3)
No cardiovascular support	175 (7.4)	411 (14.8)
Renal support	68 (2.9)	113 (4.1)
Liver support	2 (0.1)	3 (0.1)
Neurological support	17 (0.7)	22 (0.8)
Duration of organ support (calendar days), median (IQR)		
Total (advanced + basic) respiratory support	5 (3, 8)	4 (3, 7)
Advanced cardiovascular support	1.5 (1, 3)	2 (1, 3.5)
Total (advanced + basic) cardiovascular support	5 (4, 8)	5 (3, 7)
Renal support	3 (2, 6)	3 (2, 5)

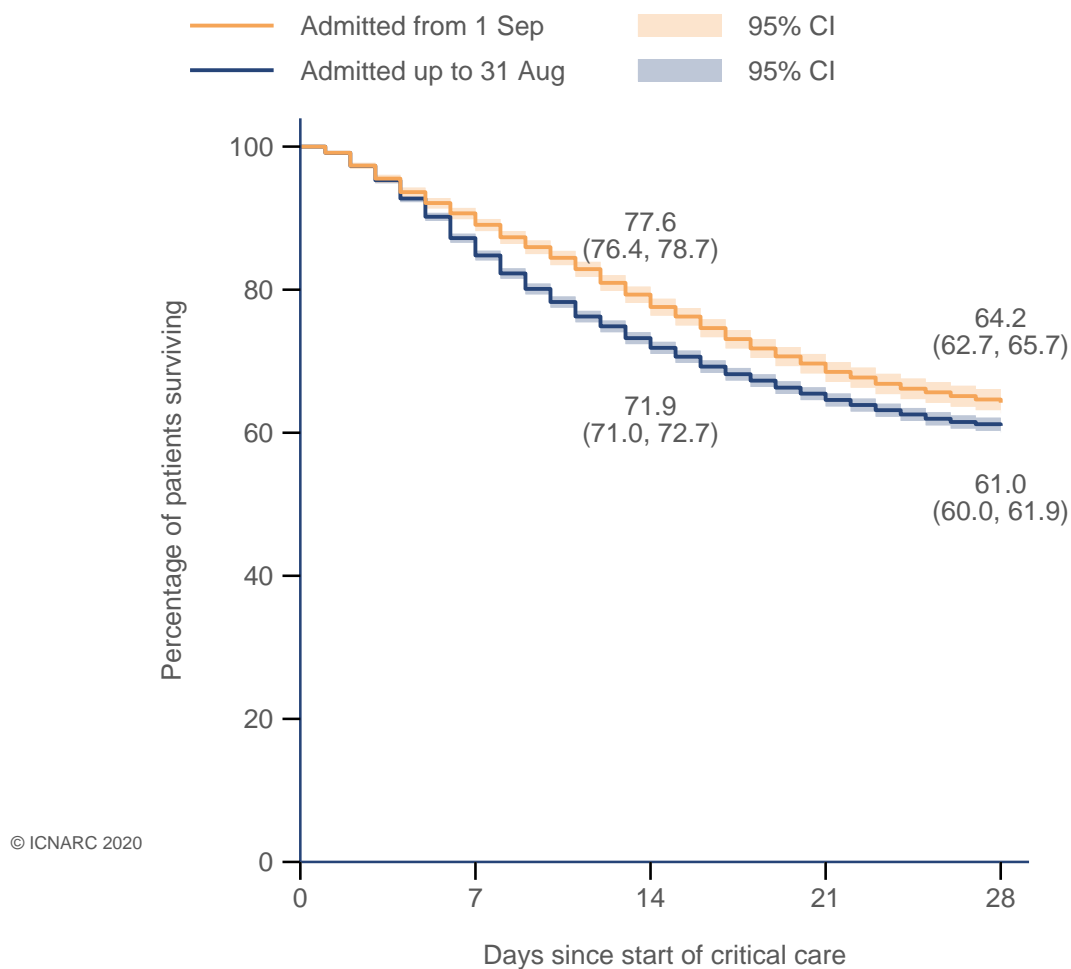
Please note that the results for patients admitted from 1 September 2020 are biased towards patients with shorter lengths of stay in critical care prior to discharge or death, i.e. those who died or recovered quickly.

* Please see Definitions on page 55.

† Duration of critical care is the total over all critical care admissions for the the same patient and excludes any time spent outside critical care areas (e.g. prior to any readmissions).

28-day in-hospital outcome - overall

A Kaplan-Meier plot of in-hospital survival to 28 days following admission to critical care for patients critically ill with confirmed COVID-19 admitted from 1 September 2020 to date is shown in Figure 23 and compared with patients admitted up to 31 August 2020.



Admitted from 1 Sep

At risk	5451	4398	3189	2268	1640
Died (in hospital)	0	579	1102	1444	1574
Censored	0	474	1160	1739	2237

Admitted up to 31 Aug

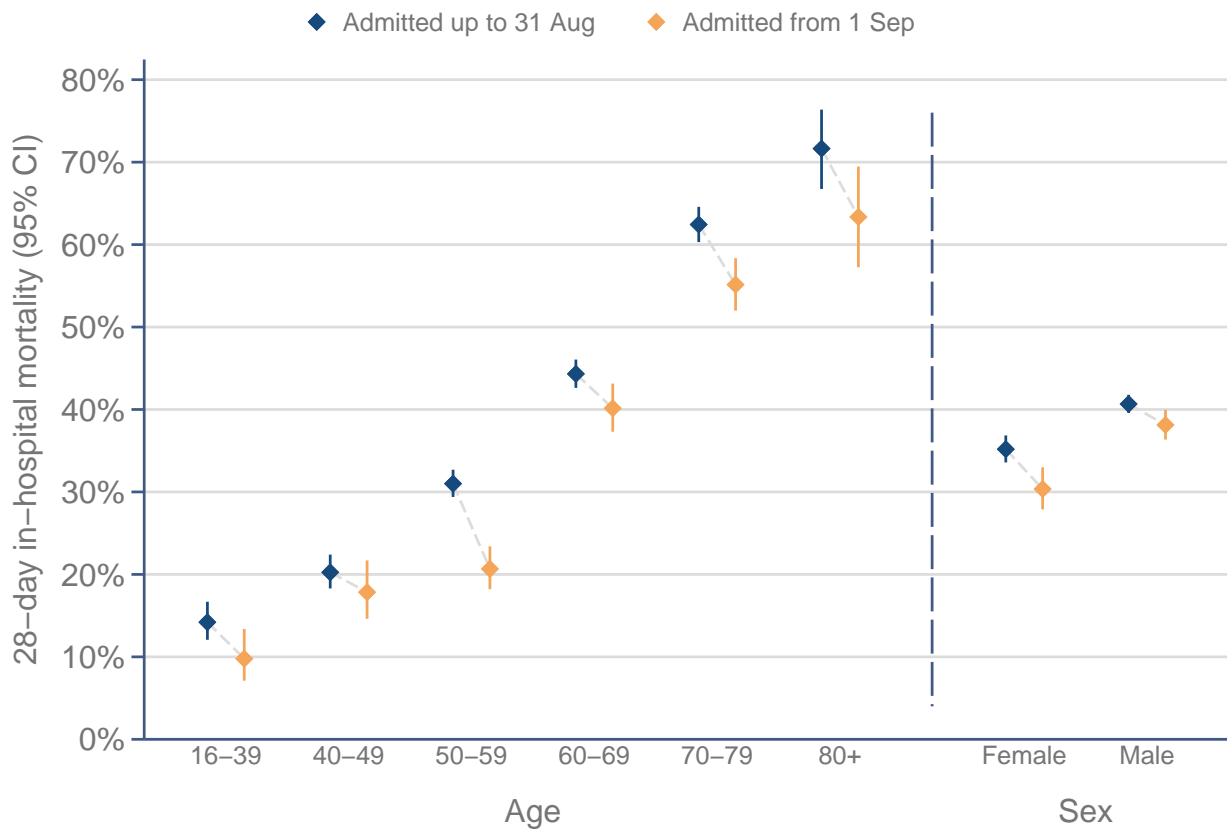
At risk	10916	9253	7843	7047	6650
Died (in hospital)	0	1661	3070	3865	4260
Censored	0	2	3	4	6

Figure 23. In-hospital survival to 28 days following admission to critical care

Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these survival curves are not adjusted for differences in patient characteristics (see Tables 1-3).

28-day in-hospital outcome - by patient characteristics

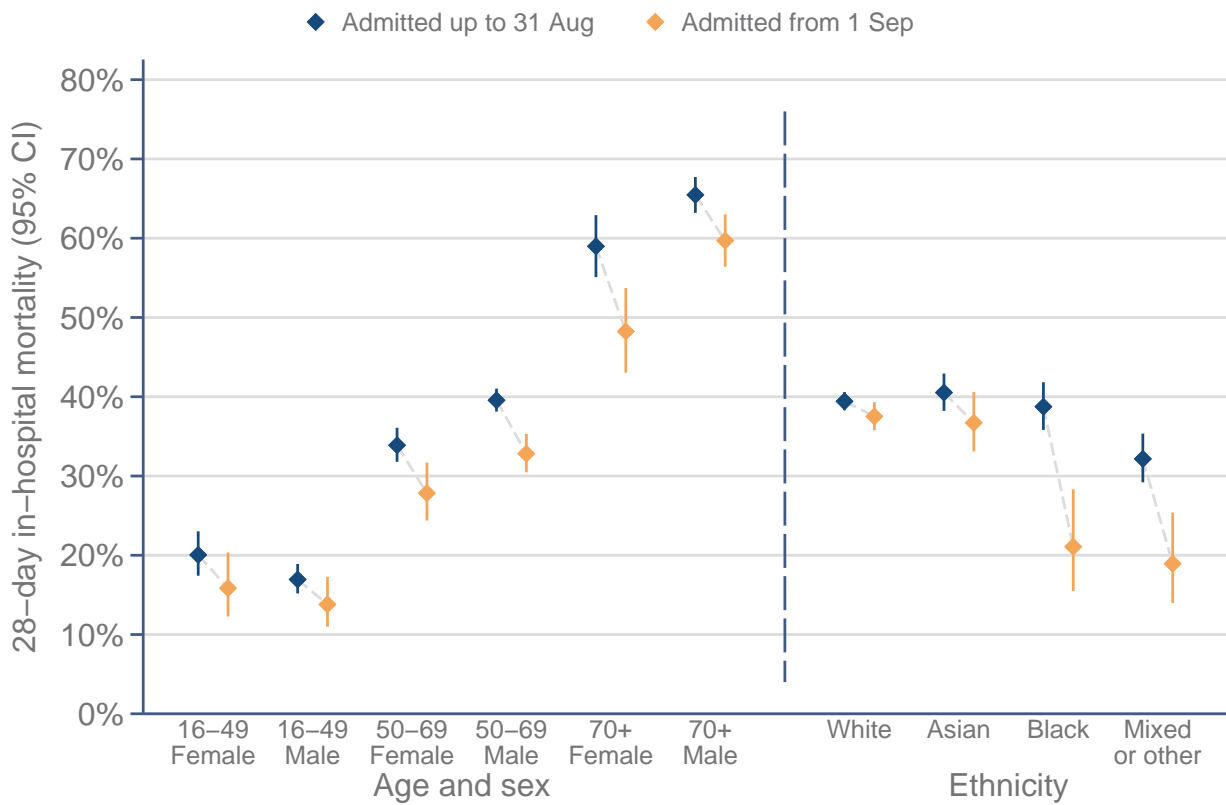
28-day in-hospital mortality for patients critically ill with confirmed COVID-19 admitted from 1 September 2020 to date by patient characteristics (demographics, medical history and indicators of acute severity) is presented in Figures 24-27 and compared with patients admitted up to 31 August 2020.



© ICNARC 2020

Figure 24. 28-day in-hospital mortality by patient characteristics (demographics)

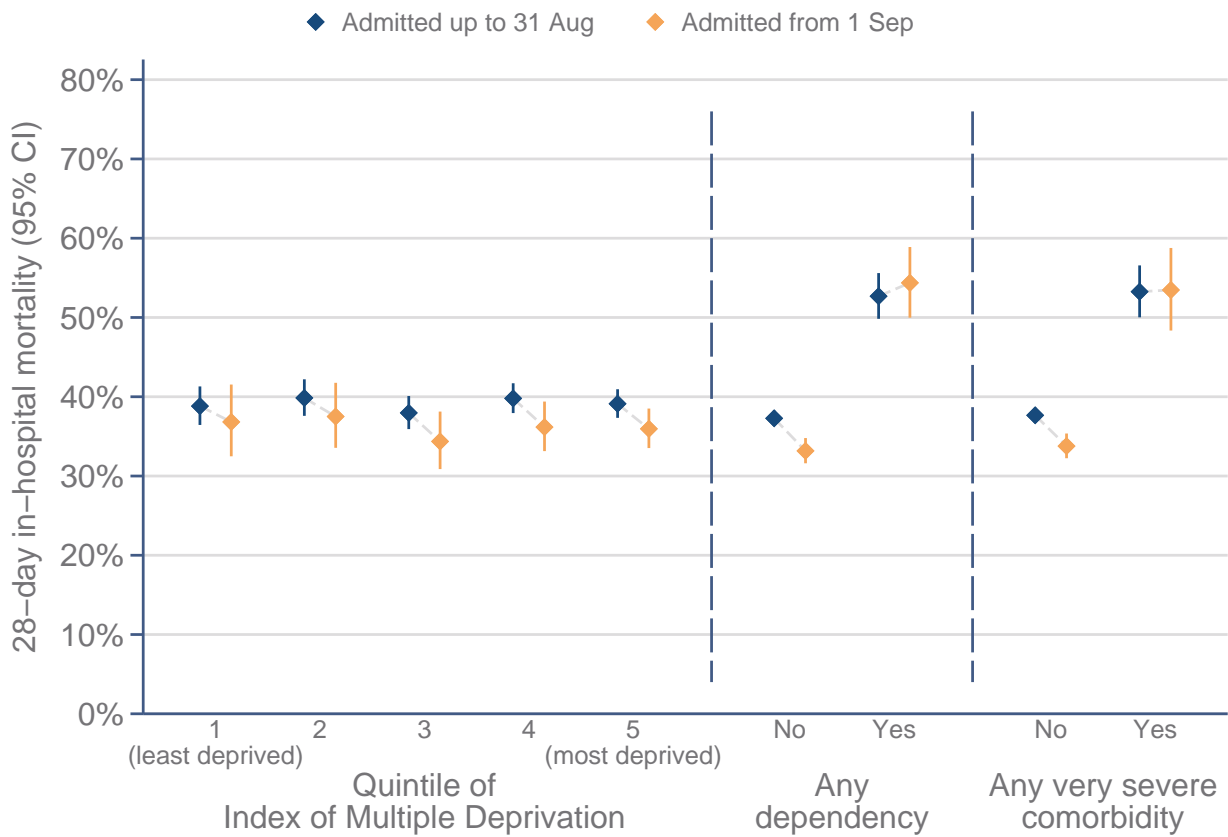
Estimates of 28-day in-hospital mortality based on Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these estimates are not adjusted for differences in other patient characteristics (see Tables 1-3).



© ICNARC 2020

Figure 25. 28-day in-hospital mortality by patient characteristics (demographics continued)

Estimates of 28-day in-hospital mortality based on Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these estimates are not adjusted for differences in other patient characteristics (see Tables 1-3).



© ICNARC 2020

Figure 26. 28-day in-hospital mortality by patient characteristics (demographics and medical history)

Estimates of 28-day in-hospital mortality based on Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these estimates are not adjusted for differences in other patient characteristics (see Tables 1-3).

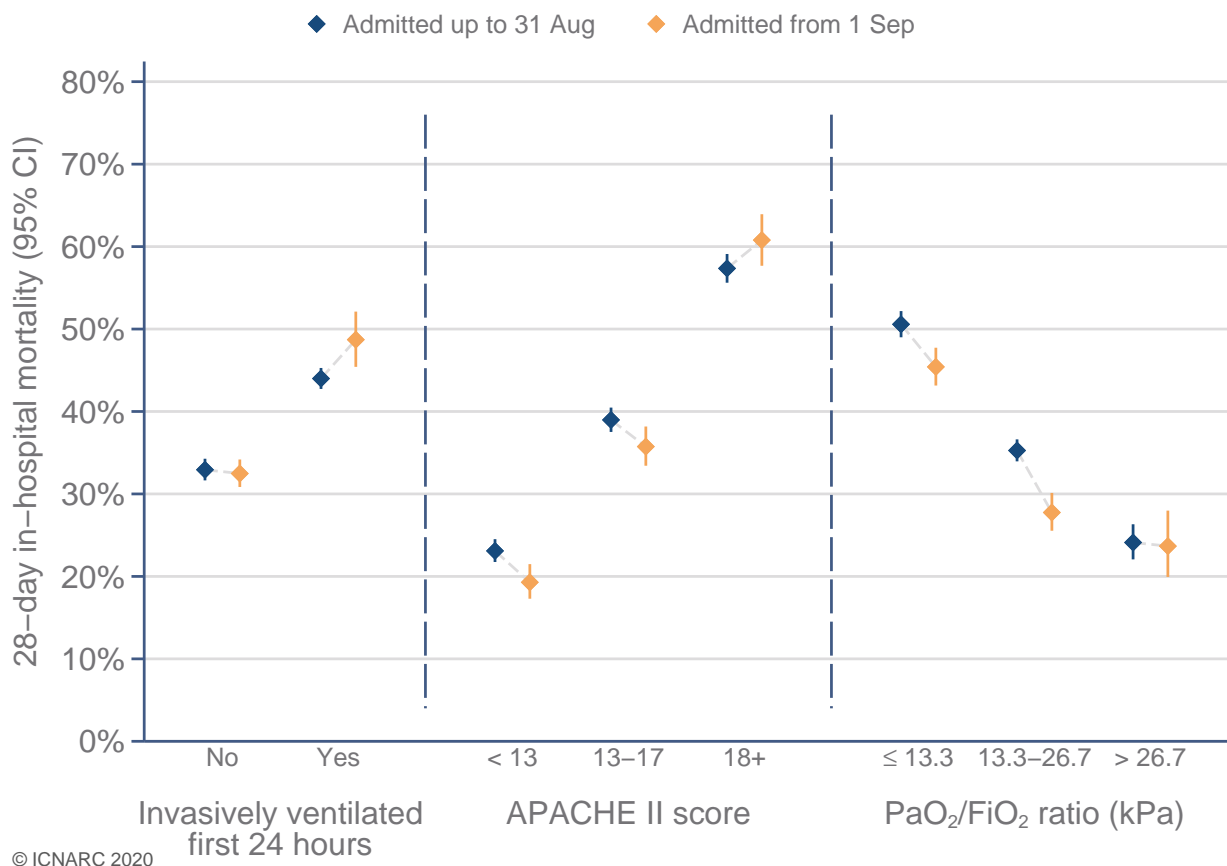


Figure 27. 28-day in-hospital mortality by patient characteristics (indicators of acute severity *)

Estimates of 28-day in-hospital mortality based on Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these estimates are not adjusted for differences in other patient characteristics (see Tables 1-3).

* Please see Definitions on page 55. Indicators of acute severity are based on data from the first 24 hours of critical care.

28-day in-hospital outcome - by patient characteristics and invasive ventilation first 24 hours

28-day in-hospital mortality for patients critically ill with confirmed COVID-19 admitted from 1 September 2020 to date by patient characteristics (demographics and indicators of acute severity) separately for those invasively ventilated and not invasively ventilated during the first 24 hours of critical care is presented in Figures 28-30 and compared with patients admitted up to 31 August 2020.

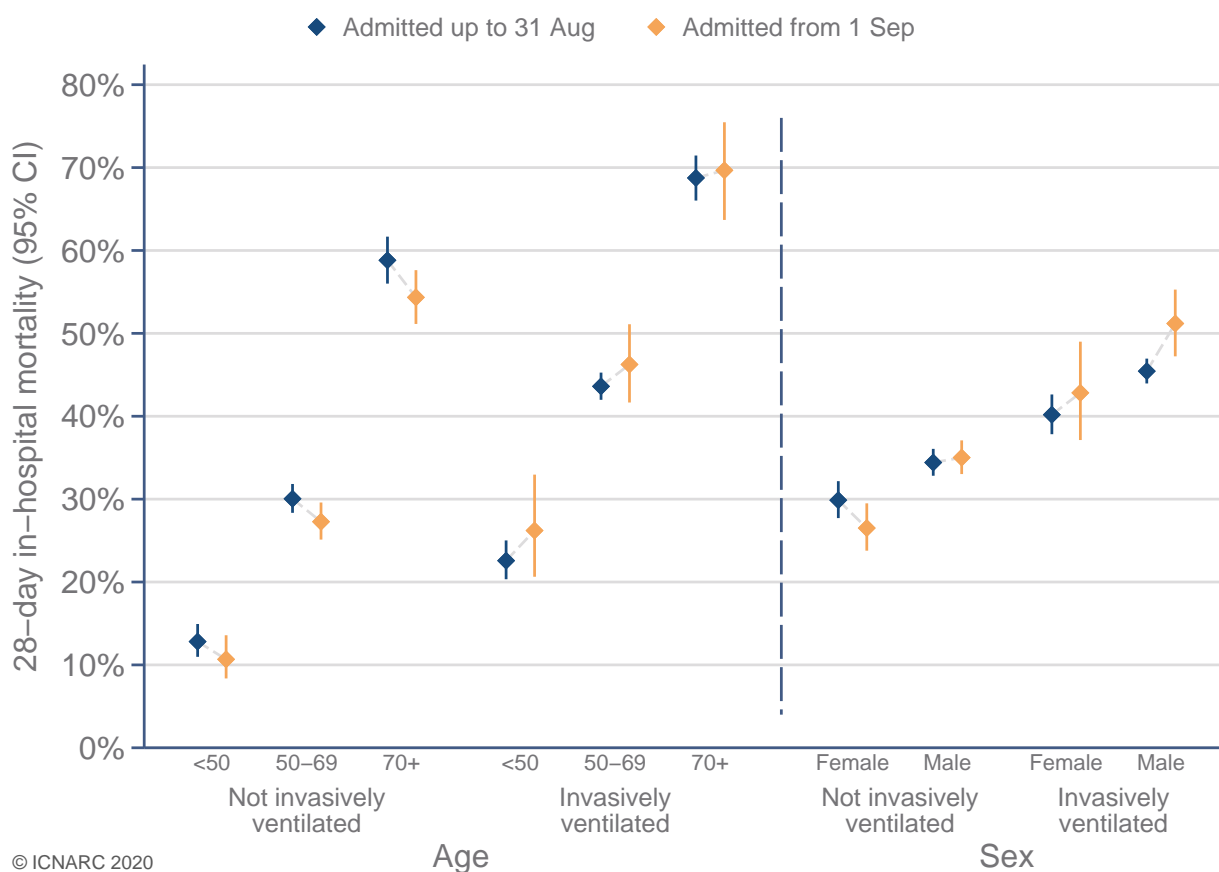
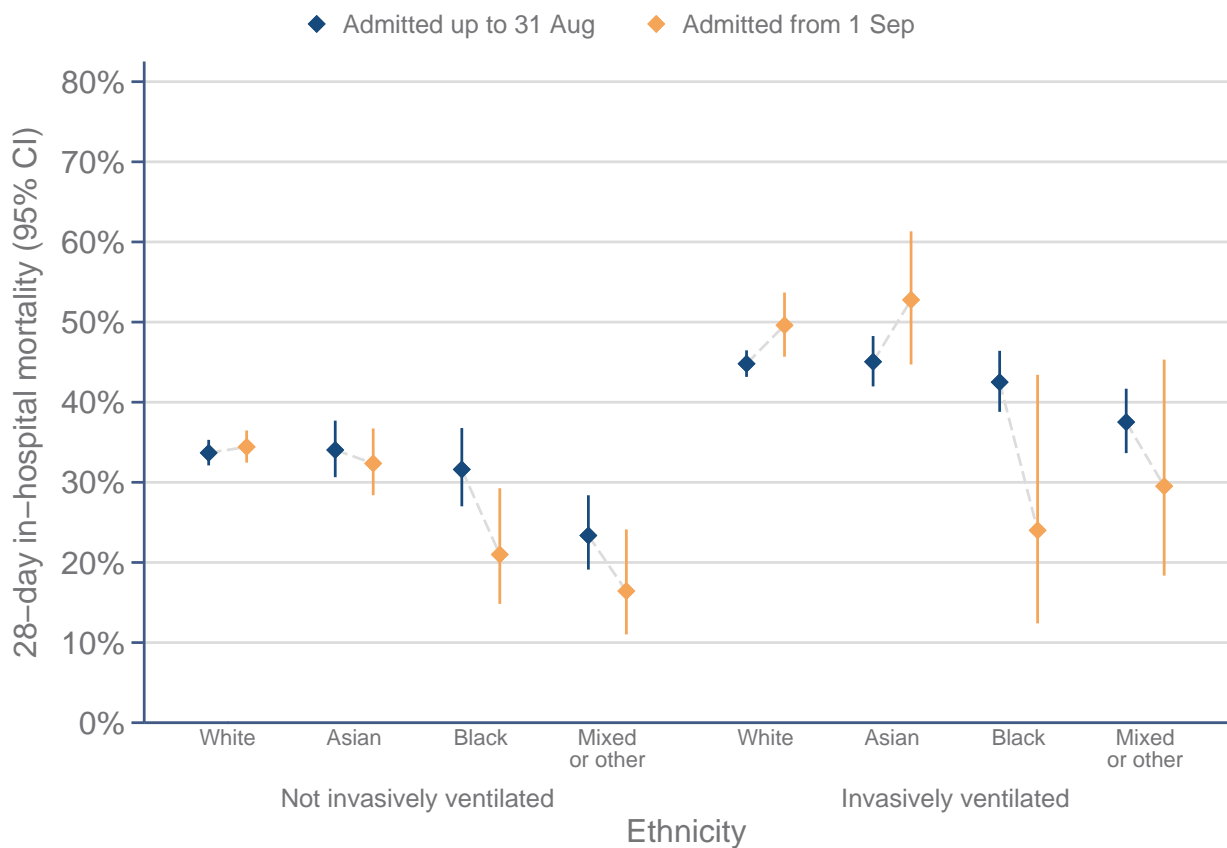


Figure 28. 28-day in-hospital mortality by patient characteristics and invasive ventilation (demographics)

Estimates of 28-day in-hospital mortality based on Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these estimates are not adjusted for differences in other patient characteristics (see Tables 1-3).



© ICNARC 2020

Figure 29. 28-day in-hospital mortality by patient characteristics and invasive ventilation (demographics continued)

Estimates of 28-day in-hospital mortality based on Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these estimates are not adjusted for differences in other patient characteristics (see Tables 1-3).

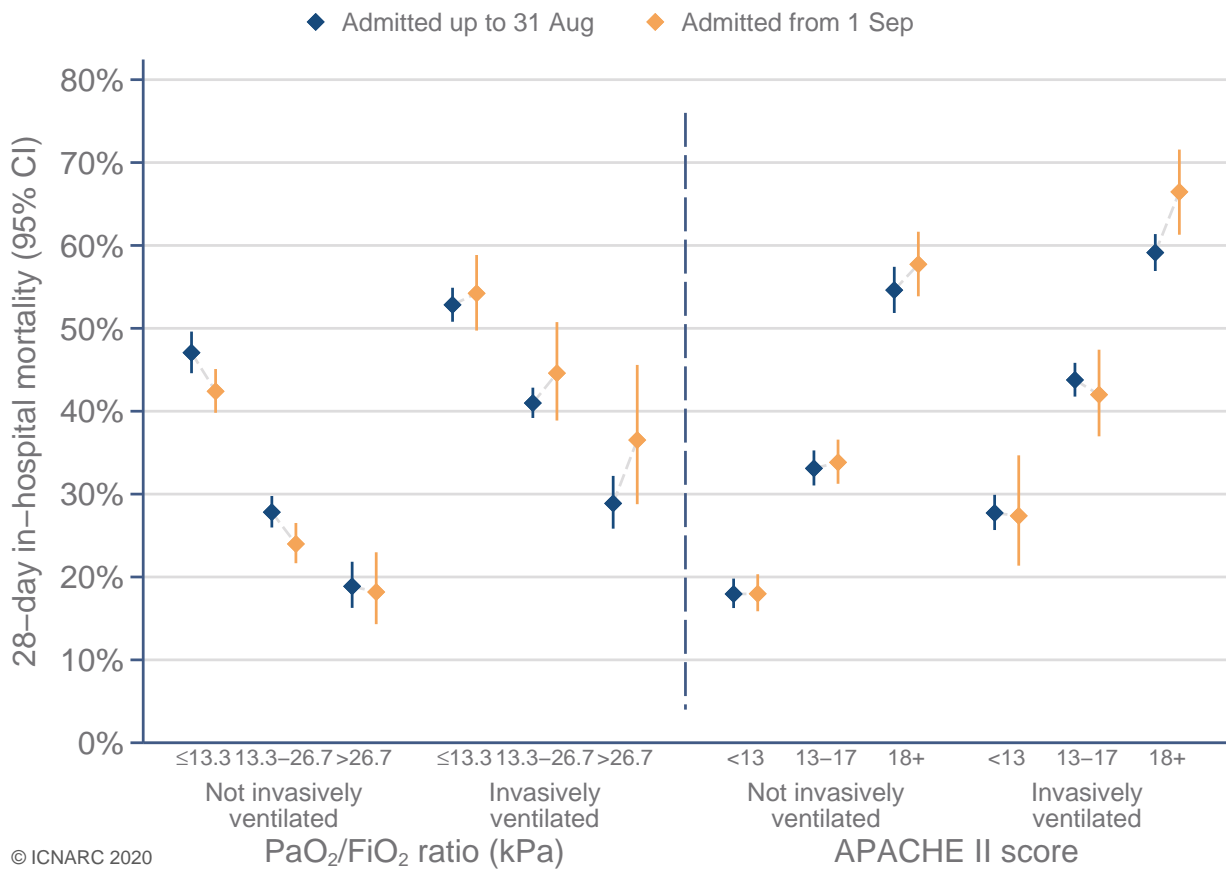


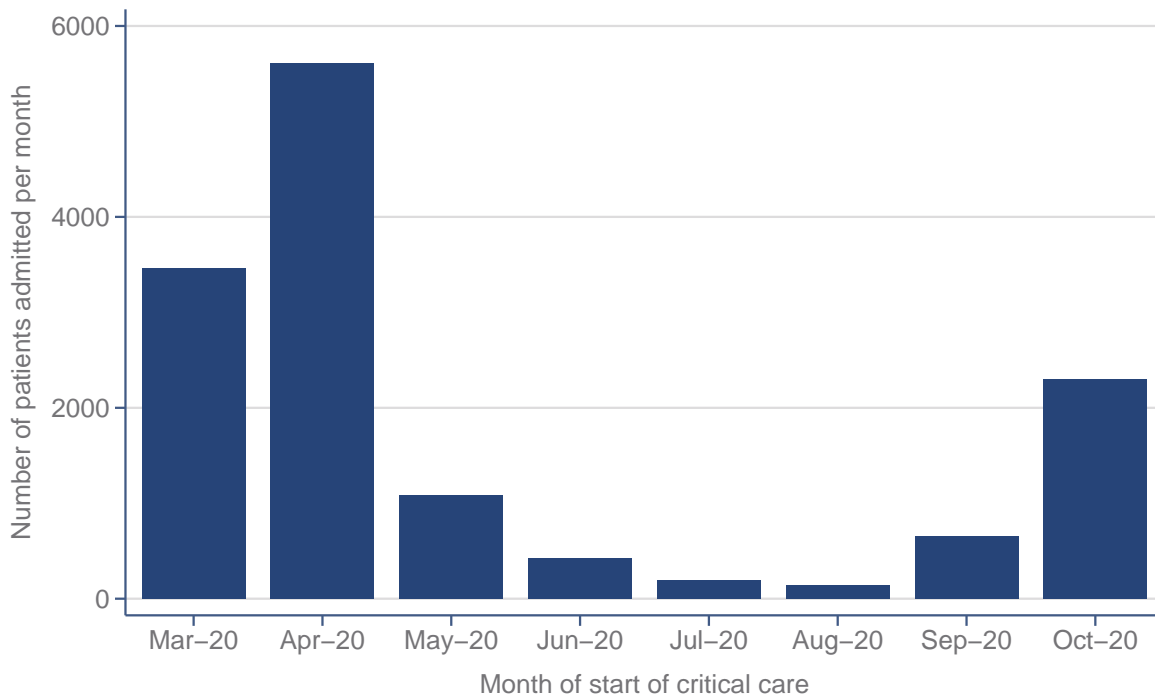
Figure 30. 28-day in-hospital mortality by patient characteristics and invasive ventilation (acute severity)

Estimates of 28-day in-hospital mortality based on Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these estimates are not adjusted for differences in other patient characteristics (see Tables 1-3).

* Please see Definitions on page 55. Indicators of acute severity are based on data from the first 24 hours of critical care.

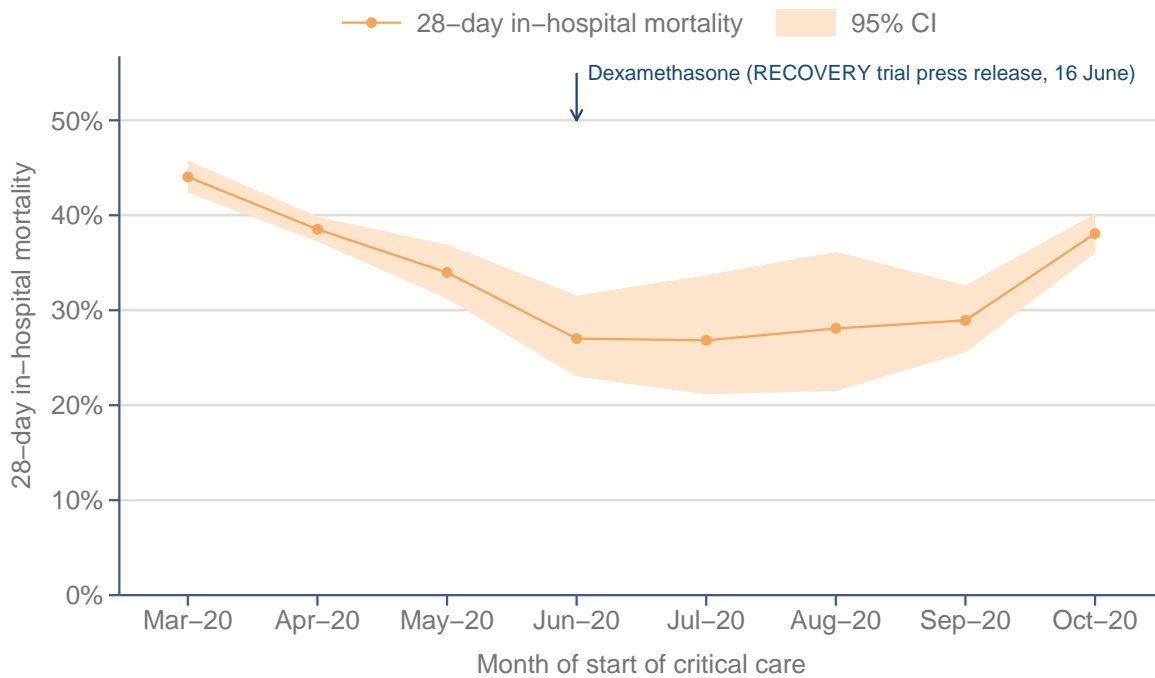
Monthly trends – COVID-19

Figure 31 shows the monthly number of new patients critically ill with confirmed COVID-19 from March 2020 until the last complete month. Figure 32 shows the corresponding 28-day in-hospital mortality, indicating the month on which information became available identifying steroids (Dexamethasone) as an effective treatment for critically ill patients.



© ICNARC 2020

Figure 31. Monthly number of admissions critically ill with confirmed COVID-19



© ICNARC 2020

Figure 32. 28-day in-hospital mortality for patients critically ill with confirmed COVID-19 by month

Estimates of 28-day in-hospital mortality based on Kaplan-Meier survival analysis. Patients last reported to be still receiving critical care censored on the most recent date of data submission by the treating unit. Patients discharged from acute hospital within 28 days assumed to survive to 28 days. Please note that these estimates are not adjusted for changes in patient characteristics (see Tables 1-3).

Additional analyses for patients admitted up to 31 August 2020

Updated outcomes up to discharge from acute hospital for patients critically ill with confirmed COVID-19 admitted up to 31 August 2020 are shown in Figure 33.

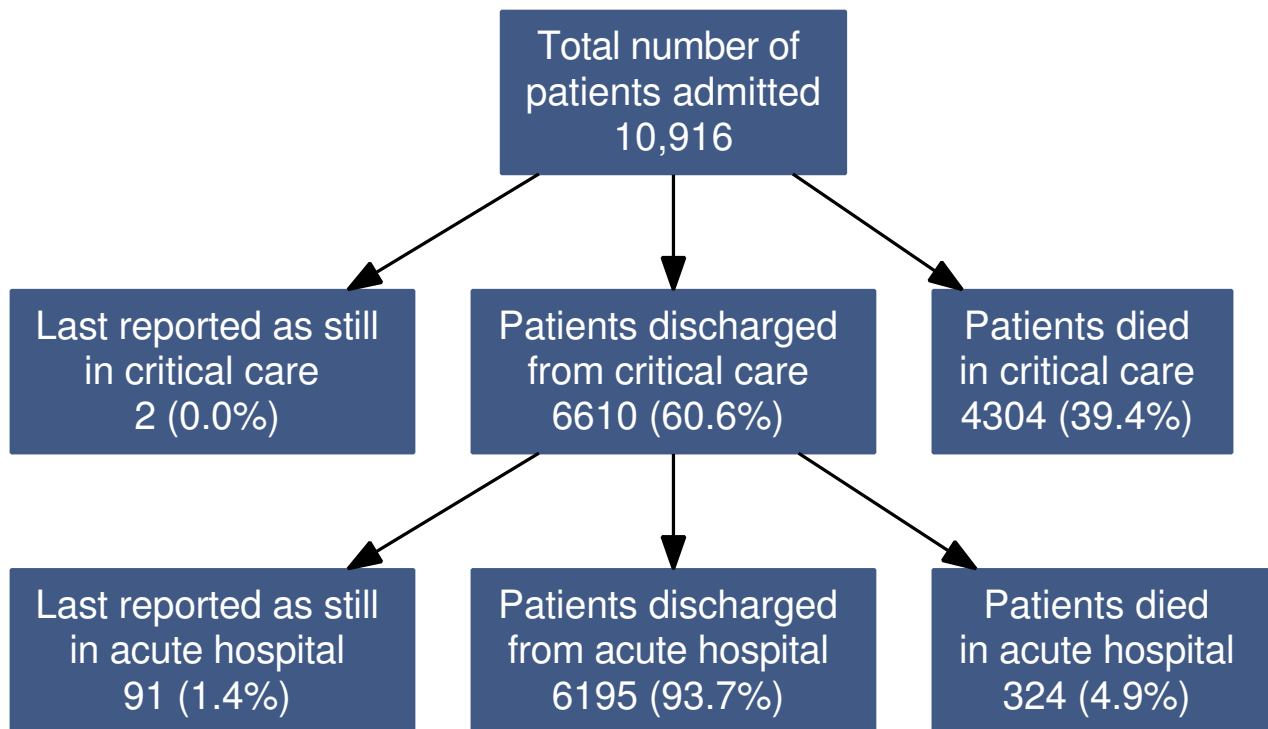
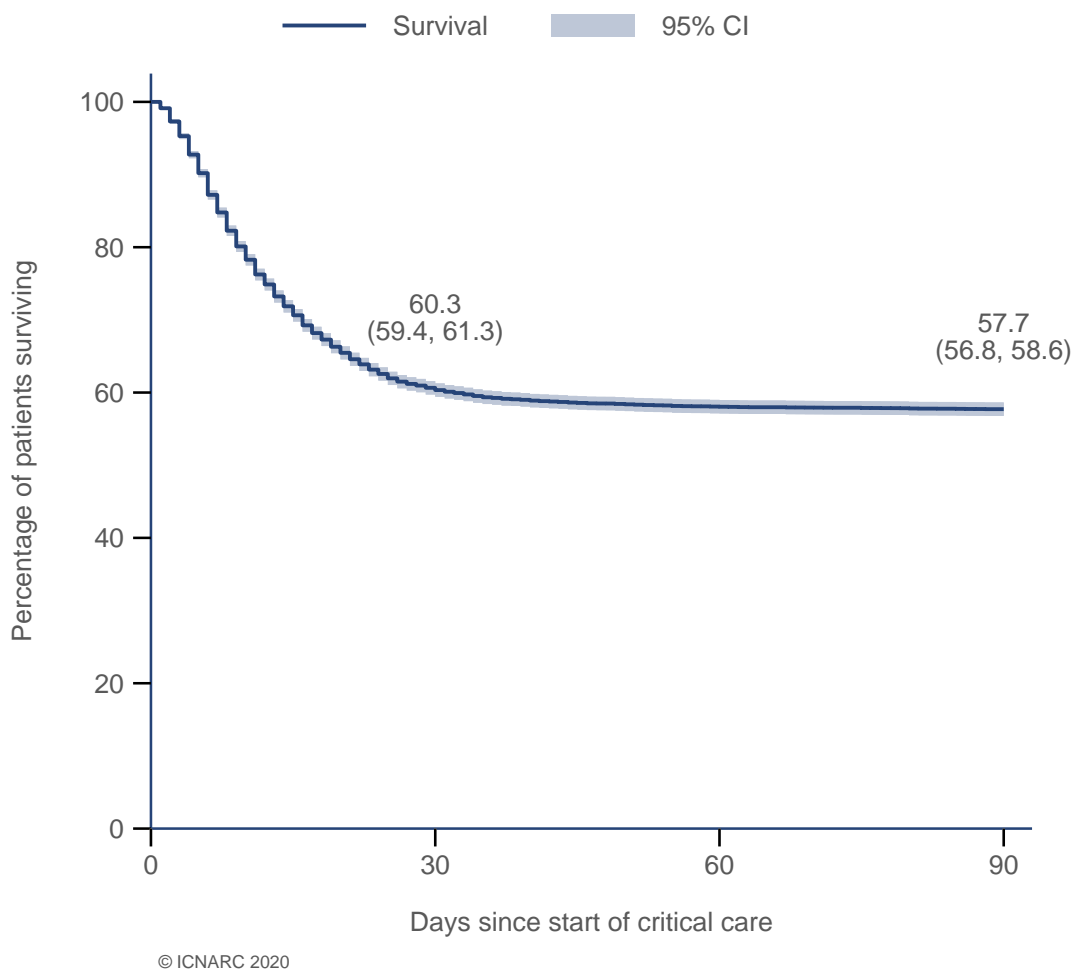


Figure 33. Critical care and acute hospital outcomes for patients admitted up to 31 August 2020

A Kaplan-Meier plot of in-hospital survival to 90 days following admission to critical care for patients critically ill with confirmed COVID-19 admitted up to 31 August 2020 is shown in Figure 34.



At risk	10916	6582	6304	6250
Died (in hospital)	0	4328	4578	4614
Censored	0	6	34	52

Figure 34. In-hospital survival to 90 days following admission to critical care for patients admitted up to 31 August 2020

Definitions

Ethnicity is recorded using the ethnic category codes from the 2001 census and grouped as:

- White: White – British; White – Irish; White – any other
- Mixed: Mixed – white and black Caribbean; Mixed – white and black African; Mixed – white and Asian; Mixed – any other
- Asian: Asian or Asian British – Indian; Asian or Asian British – Pakistani; Asian or Asian British – Bangladeshi; Asian or Asian British – any other
- Black: Black or black British – Caribbean; Black or black British – African; Black or black British – any other
- Other: Other ethnic group – Chinese; Any other ethnic group
- Not stated or not recorded

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

Urban/rural classification is based on the patient’s usual residential postcode (assigned at the level of Output Area) and categorised according to 2011 census categories as:

- Urban: the majority of the population lives within settlements with a population of more than 10,000 people, subcategorised according to dwelling densities for every 100m x 100m square and the density in squares at varying distances around each square as either Major conurbation, Minor conurbation, or City or town
- Rural: the majority of the population lives within settlements with a population of less than 10,000 people (combining the categories Town and fringe, Village, and Hamlet or isolated dwellings)

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

Invasive ventilation during the first 24 hours was defined as mechanical ventilation (identified by the recording of a ventilated respiratory rate, indicating that all or some of the breaths or a portion of the breaths were delivered by a mechanical device) and sedation (receiving continuous or intermittent doses of agents to produce and maintain a continuous decreased level of consciousness with or without paralysing agents) at any time during the first 24 hours and not reported as having zero days of advanced respiratory support.

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

Publications

The following publications, based on Case Mix Programme data for patients critically ill with confirmed COVID-19, are published, in press or in preprint:

- Richards-Belle A, Orzechowska I, Doidge J, Thomas K, Harrison DA, Koelewyn A, Christian MD, Shankar-Hari M, Rowan KM, Gould DW. Critical care outcomes, for the first 200 patients with confirmed COVID-19, in England, Wales and Northern Ireland: a report from the ICNARC Case Mix Programme. *J Intensive Care Soc* 2020; doi:[10.1177/1751143720961672](https://doi.org/10.1177/1751143720961672)
- Richards-Belle A, Orzechowska I, Gould DW, Thomas K, Doidge JC, Mouncey PR, Christian MD, Shankar-Hari M, Harrison DA, Rowan KM. COVID-19 in critical care: epidemiology of the first epidemic wave across England, Wales and Northern Ireland. *Intensive Care Med* 2020; doi:[10.1007/s00134-020-06267-0](https://doi.org/10.1007/s00134-020-06267-0)
- Ferrando-Vivas P, Doidge J, Thomas K, Gould DW, Mouncey P, Shankar-Hari M, Young JD, Rowan KM, Harrison DA. Prognostic Factors for 30-day Mortality in Critically Ill Patients with Coronavirus Disease 2019: An Observational Cohort Study. *Crit Care Med* 2020; doi:[10.1097/CCM.0000000000004740](https://doi.org/10.1097/CCM.0000000000004740)
- Doidge JC, Mouncey PR, Thomas K, Gould DW, Ferrando-Vivas P, Shankar-Hari M, Harrison DA, Rowan KM. Trends in intensive care for patients with COVID-19 in England, Wales and Northern Ireland. *Preprints* 2020; 2020080267; doi:[10.20944/preprints202008.0267.v2](https://doi.org/10.20944/preprints202008.0267.v2)

The following publications, based on external data sources linked with Case Mix Programme data for patients critically ill with confirmed COVID-19, are published, in press or in preprint:

- Hippisley-Cox J, Young D, Coupland C, Channon KM, Tan PS, Harrison DA, Rowan K, Aveyard P, Pavord ID, Watkinson PJ. Risk of severe COVID-19 disease with ACE inhibitors and angiotensin receptor blockers: cohort study including 8.3 million people. *Heart* 2020; doi:[10.1136/heartjnl-2020-317393](https://doi.org/10.1136/heartjnl-2020-317393)
- Mathur R, Rentsch CT, Morton C, Hulme WJ, Schultze A, MacKenna B, Eggo RM, Bhaskaran K, Wong AYS, Williamson EJ, Forbes H, Wing K, McDonald HI, Bates C, Bacon S, Walker AJ, Evans D, Inglesby P, Mehrkar A, Curtis HJ, DeVito NJ, Croker R, Drysdale H, Cockburn J, Parry J, Hester F, Harper S, Douglas IJ, Tomlinson L, Evans S, Grieve R, Harrison D, Rowan K, Khunti K, Chaturvedi N, Smeeth L, Goldacre B. Ethnic differences in COVID-19 infection, hospitalisation, and mortality: an OpenSAFELY analysis of 17 million adults in England. *medRxiv* 2020; doi:[10.1101/2020.09.22.20198754](https://doi.org/10.1101/2020.09.22.20198754)

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.”