Supplementary material

Contents

1. Supplemental methods

a. Approvals

The study was reviewed by the Yorkshire & The Humber - Bradford Leeds Research Ethics Committee and approved as anonymised analysis of routinely collected patient data without need for consent by NHS England Health Research Authority (IRAS Project ID 283512).

b. COVID-19 testing

COVID-19 testing was performed by RdRp gene assay test on upper respiratory swab samples (nasopharyngeal, oral or endotracheal aspirate) sent to Barts Health NHS Trust Diagnostic Virology Laboratories and analysed either on-site or at Public Health England (PHE) Colindale facility.

c. Definition of key varaibles

Ethnicity
We defined ethnic groups using the 16+1 categories defined in the 2001 census which form the UK national mandatory standard for the collection and analysis of ethnicity in the NHS data dictionary. Importantly, in the UK 'Asian' ethnic category refers predominantly to those of a South Asian background (including Indian, Pakistani and Bangladeshi), while patients of a Chinese background are placed in the 'Other Ethnic Groups' category.

White	A British B Irish C Any other White background
Mixed	D White and Black Caribbean E White and Black African F White and Asian G Any other mixed background
Asian or Asian British	H Indian J Pakistani K Bangladeshi L Any other Asian background
Black or Black British	M Caribbean N African P Any other Black background
Other Ethnic Groups	R Chinese S Any other ethnic group
+1 category	Z Not stated (Reserved for cases where patients declined to provide information)

In order to preserve statistical power to detect differences between groups, pre-specified analysis was carried out between ethnicity defined by the 5-high level groups White, Mixed, Asian or Asian British, Black or Black British and Other with merging of the "Mixed" and "Other" categories. Category Z was excluded from our primary analysis as were cases where no ethnicity data was recorded (Unknown).

Index of Multiple Deprivation
Index of Multiple Deprivation (IMD) was defined from patient home address postcode using UK government statistics (https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019). Matching of Lower-layer Super Output Areas (LSOAs) was undertaken against the Office of National Statistics Postcode Directory (ONSPD) February 2020 datafile (https://geoportal.statistics.gov.uk/datasets/ons-postcode-directory-february-2020: accessed on 1st May 2020). IMD was presented as quintiles within England using raw scores for descriptive results and quintiles within the study cohort in multivariable analysis.

Smoking
History of tobacco use was defined by presence of the WHO ICD-10 codes F17·1-F17·2, Z72·0, Z87·8, Z71·6 and T65·2.

Ischaemic heart disease
Ischaemic heart disease (IHD) was defined by the presence of the ICD-10 codes I23·4-I23·5, I24, I24·8-I24·9, I25, I25·3-I25·6, I25·8-I25·9, I34·1, I46·1, I51·8-I51·9, and I52.
Wu et al Mapping ICD-10 and ICD-10-CM Codes to Phecodes: Workflow Development and Initial Evaluation JMIR Med Inform 2019;7(4):e14325

End stage Renal disease
End stage Renal disease (ESRD) was defined by the presence of the ICD10 codes I77·0, N16·5, N18·5, T82·4, T86·1, Y60·2, Y61·2, and Y62·2, Y84·1, Z49·0-Z49·2, Z94·0, Z99·2.
Crellin E, et al. Clinical Code List - ICD-10 - End-Stage Renal Disease. [Data Collection]. London School of Hygiene & Tropical Medicine. 2017: https://doi.org/10.17037/DATA.241.

Comorbidity
Diagnosis of co-morbidities and assignment of Charlson Comorbidity Index was based on mapping from ICD-10 coding from previous admissions using the mapping of Quan H, et al.
Quan H, et al. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. Med Care 2005;43(11):1130-9.
Diagnosis of Hypertension was based on mapping ICD-10 codes to the Elixhauser comorbidity index.
Elixhauser A, et al. Comorbidity measures for use with administrative data. Med Care 1998;36:8-27.

Hospital frailty risk score
Hospital frailty risk score was calculated from mapping ICD-10 coding of hospital attendances.
Gilbert T, et al. Development and validation of a Hospital Frailty Risk Score focusing on older people in acute care settings using electronic hospital records: an observational study. Lancet 2018;391(10132):1775-1782.

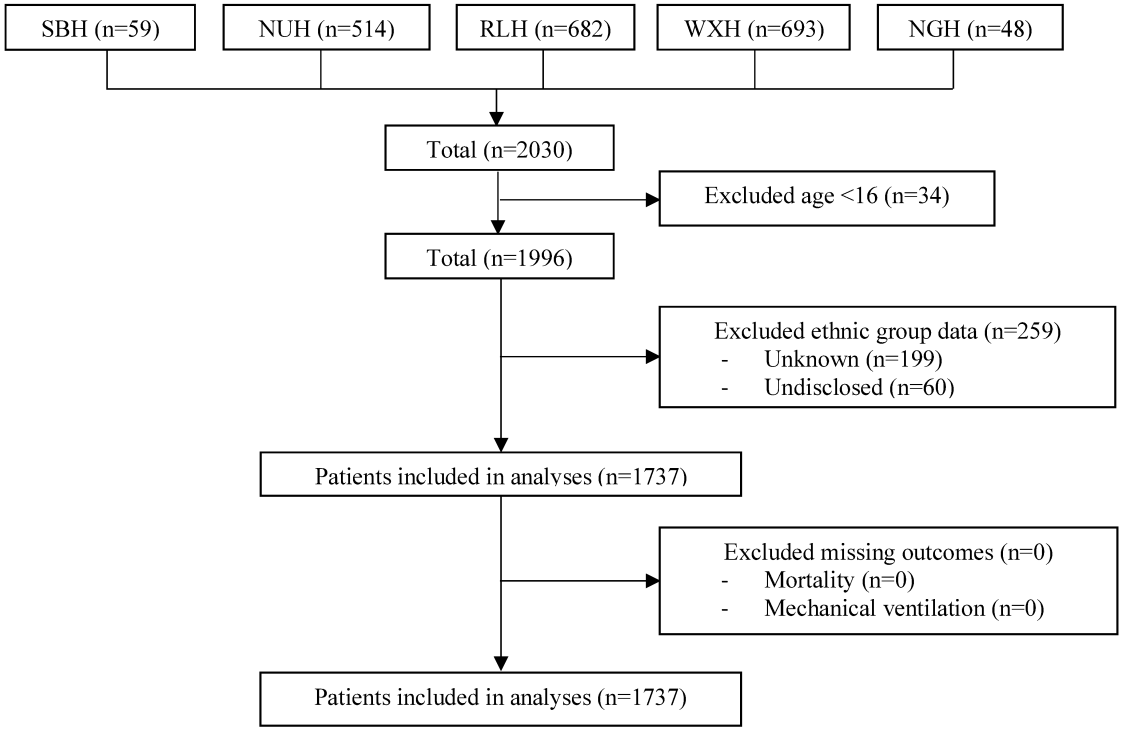
Acute Kidney injury
Acute kidney injury (AKI) within first 7 days of admission was defined using the KDIGO 2012 creatinine criteria either a 1·5-fold rise over baseline within 7 days or 26 μmol rise within 48 hours. Baseline creatinine will be the median value in the 7 to 365 days before hospitalisation. Absent baseline creatinine was determined based on an eGFR of 75 ml/min/1·72m^2 using the CKDepi formula or the admission value whichever was lower.

Chronic kidney disease
History of chronic kidney disease (CKD) using baseline eGFR was calculated using last creatinine value available from results earlier than 7 days before hospitalisation. CKD was defined as baseline eGFR below 60 ml/min/1·72m^2.

Secondary haemophagocytic lymphohistiocytosis
Secondary haemophagocytic lymphohistiocytosis (sHLH) risk scores were calculated using highest values during admission of temperature, haemoglobin, white cell count, platelet count, triglycerides, fibrinogen, ferritin, and aspartate aminotransferase (AST). Total scores did not include haemophagocytosis on bone marrow aspirate or known immunosuppression due to lack of available data leaving a maximum score of 284.
Mehta P, et al. COVID-19: consider cytokine storm syndromes and immunosuppression. Lancet 2020;395(10229):1033-1034.

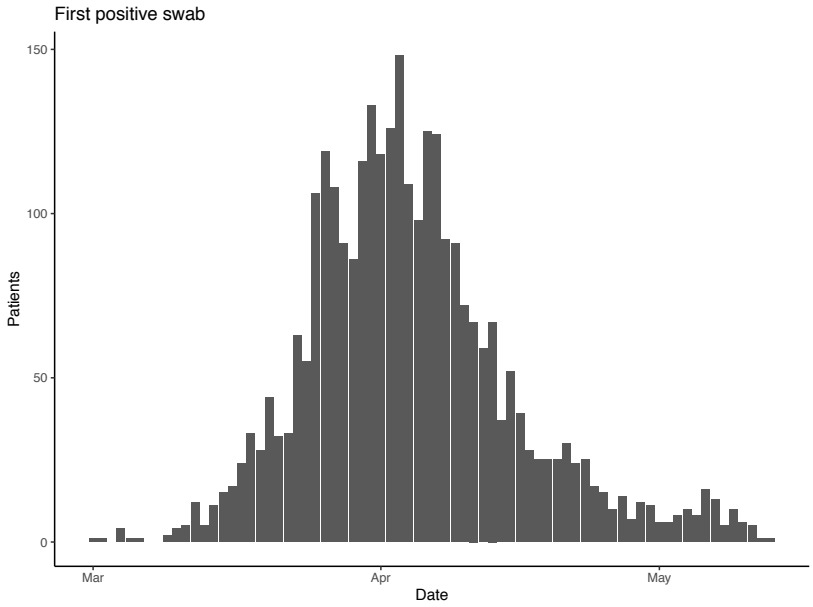
2. STROBE diagram

Figure S1. STROBE flow diagram of study populations. Hospital indicates first admission site and patients admitted to Nightingale hospital who had not been previously admitted to Barts Health hospital: St. Barts Hospital (SBH), Newham University Hospital (NUH), Royal London Hospital (RLH), Whipps Cross Hospital (WXH), Nightingale Hospital (NGH).



3. Inclusion time period by SARS-CoV-2 cases

Figure S2. Timeline of patients with positive SARS-CoV-2 swab tests at Barts Health.



4. Distribution of ethnicity categories within study cohort

Table S1. Distribution of study cohort by 16+1 ethnic data categories.

High-level group	Ethnic data category	n
White	A British	526
	B Irish	11
	C Any other White background	166
Mixed	D White and Black Caribbean	3
	E White and Black African	4
	F White and Asian	1
	G Any other mixed background	8
Asian or Asian British	H Indian	104
	J Pakistani	116
	K Bangladeshi	191
	L Any other Asian background	127
Black or Black British	M Caribbean	118
	N African	168
	P Any other Black background	54
Other Ethnic Groups	R Chinese	23
	S Any other ethnic group	117
	Z Not stated	60
No ethnicity data recorded		199

5. Baseline characteristics comparing died or survived at 30 days

Table S2. Study population baseline characteristics stratified by died or survived at 30 days, n (%) unless otherwise stated. Total n=1996 unless otherwise stated. P values based on Chi-square (for categorical) or Kruskal-Wallis test (for continuous). SD: standard deviation, IQR: interquartile range, IMD: index of multiple deprivation, BMI: body mass index, TIA: transient ischaemic accident, HTN: hypertension, CKD: chronic kidney disease, sHLH: secondary haemophagocytic lymphohistiocytosis (without known underlying immunosuppression and bone marrow aspirate data), CRP: C-reactive protein, NEWS: national early warning score, ICU: intensive care unit, RRT: renal replacement therapy.

	Stratified by survival at 30 days		
	Died	**Survived**	p value
n	536	1460	
Ethnicity			0·05
Asian or Asian British	138 (25·7)	400 (27·4)	
Black or Black British	97 (18·1)	243 (16·6)	
Mixed and Other Ethnic Groups	33 (6·2)	123 (8·4)	
White	210 (39·2)	493 (33·8)	
Unknown and Undsisclosed	58 (10·8)	201 (13·8)	
Age (years)			
Mean (SD)	74·8 (12·6)	59·2 (18·2)	<0·001
Median (IQR)	77·0 (66·0-84·0)	59·0 (46·0-73·0)	<0·001
Male	351 (65·5)	859 (58·8)	0·01
IMD quintile [n=1980]			0·003
1 (most deprived)	155 (29·1)	407 (28·1)	
2	223 (41·9)	698 (48·2)	
3	62 (11·7)	184 (12·7)	
4	56 (10·5)	99 (6·8)	
5 (least deprived)	36 (6·8)	60 (4·1)	
Smoking [n=1700]	57 (11·8)	116 (9·5)	0·19
BMI [n=1248]			
Median (IQR)	26·5 (22·7-31·6)	26·9 (23·6-31·2)	0·43
By category			0·80
<18·5 kg/m^2	20 (6·4)	43 (4·6)	
18·5 - <25 kg/m^2	97 (31·0)	295 (31·6)	
25 - <30 kg/m^2	100 (31·9)	309 (33·0)	
30 - <40 kg/m^2	80 (25·6)	243 (26·0)	
≥40 kg/m^2	16 (5·1)	45 (4·8)	
Co-morbidity using ICD-10 [n=1700]			
Obesity	123 (25·5)	286 (23·5)	0·411
Ischaemic heart disease	149 (30·9)	197 (16·2)	<0·001
Myocardial infarction	73 (15·1)	108 (8·9)	<0·001
Congestive heart failure	120 (24·9)	140 (11·5)	<0·001
Peripheral vascular disease	74 (15·4)	84 (6·9)	<0·001
Cerebral vascular accident or TIA	133 (27·6)	159 (13·1)	<0·001
Dementia	89 (18·5)	78 (6·4)	<0·001
Chronic obstructive pulmonary disease	145 (30·1)	252 (20·7)	<0·001
Diabetes	242 (50·2)	422 (32·6)	<0·001
HTN	372 (77·2)	637 (52·3)	<0·001
Moderate to severe CKD	159 (33·0)	204 (16·7)	<0·001
End-stage renal disease	39 (8·1)	74 (6·1)	0·163

Liver disease	45 (8·4)	110 (7·5)	0·587
Cancer	62 (12·9)	82 (6·7)	<0·001
Cancer with metastases	18 (3·7)	24 (2·0)	0·053
Acquired immunodeficiency syndrome	1 (0·2)	5 (0·4)	0·855
Charlson comorbidity index [n=1700]			<0·001
0	45 (9·3)	428 (35·1)	
1-2	170 (35·3)	449 (36·9)	
3-4	130 (27·0)	174 (14·3)	
≥5	137 (28·4)	167 (13·7)	
Rockwood frailty score [n=831]			<0·001
1-2 (very fit, well)	20 (6·3)	75 (14·5)	
3-4 (managing well, vulnerable)	106 (33·7)	199 (38·6)	
5-6 (mildly to severely frail)	144 (45·7)	215 (41·7)	
8-9 (very severely frail, terminally ill)	45 (14·3)	27 (5·2)	
Hospital frailty risk score [n=1700]			<0·001
<5 (low risk)	88 (18·3)	655 (53·8)	
5-15 (intermediate risk)	187 (38·8)	293 (24·1)	
≥15 (high risk)	207 (42·9)	270 (22·2)	
Baseline eGFR ml/min/1·72m2 [n=1525]			
Median (IQR)	57·3 (38·7-76·2)	72·4 (51·2-90·8)	<0·001
eGFR <60	236 (52·2)	323 (30·1)	<0·001
Acute kidney injury first 7 days [n=1673]	204 (47·0)	226 (18·2)	<0·001
Blood results during admission			
Highest creatinine µmol/L [n=1691]			<0·001
Median (IQR)	168·0 (102·0-326·0)	87·0 (71·0-120·0)	
Highest CRP [n=1761]			<0·001
Median (IQR)	241·5 (149·8-344·0)	120·0 (59·0-218·0)	
Highest D-dimer mg/L [n=968]			<0·001
Median (IQR)	3·1 (1·2-17·7)	1·1 (0·6-3·3)	
Highest sHLH score [n=1881]			
Mean (SD)	34·6 (27·9)	26·9 (25·7)	<0·001
Blood Group [n=875]			0·004
A	109 (36·0)	196 (34·3)	
AB	11 (3·6)	32 (5·6)	
B	49 (16·2)	119 (20·8)	
O	134 (44·2)	225 (39·3)	
NEWS on admission [n=1443]	4·7 (2·9)	3·5 (2.2)	<0·001
Intensive care unit (ICU)			
ICU admission	151 (28·2)	210 (14·4)	<0·001
ICU length of stay			
Median (IQR)	9·0 (5·9-15·0)	8·0 (3·0-15·0)	0·06
Mechanical ventilation within ICU admissions	135 (89·4)	146 (69·5)	<0·001
Days on organ support			
Advanced respiratory Mean (SD)	9·3 (6·2)	9·9 (10·6)	0·49
Total respiratory Mean (SD)	10·4 (6·2)	12·5 (10·2)	0·03
Cardiovascular system Mean (SD)	10·3 (6·3)	12·6 (10·5)	0·02
Renal Mean (SD)	2·5 (4·1)	2·7 (6·2)	0·76
Total number of organ systems			<0·001
0	0 (0·0)	3 (1·4)	

1	1 (0·7)	12 (5·7)	
2	93 (61·6)	154 (73·3)	
3	57 (37·7)	41 (19·5)	
Hospital length of stay			
Median (IQR)	7·0 (4·0-13·0)	7·0 (3·0-12·0)	0·98

6. Completeness of follow-up

Table S3. Numbers at risk and number of deaths (in parenthesis) over five day intervals up to 30 days by ethnic group in primary survival analysis.

Ethnic group	Days from hospital admission						
	0	**5**	**10**	**15**	**20**	**25**	**30**
Asian or Asian British	538 (3)	488 (60)	446 (96)	421 (115)	402 (124)	389 (131)	365 (138)
Black or Black British	340 (4)	301 (50)	273 (70)	258 (80)	248 (88)	240 (94)	229 (97)
Mixed and Other ethnic groups	156 (1)	147 (12)	140 (17)	127 (26)	122 (32)	117 (33)	113 (33)
White	703 (3)	644 (71)	583 (120)	534 (162)	502 (188)	472 (197)	436 (210)

7. Sensitivity analyses

a. Multivariable imputation

Missing data for baseline risk variables included in the multivariable Cox model was imputed using Multivariate Imputation by Chained Equations based on age, sex, and comorbidity. Five separate imputed datasets were simulated, and a pooled result of multivariable Cox models presented.
Van Buuren S, Groothuis-Oudshoorn K. mice: Multivariate Imputation by Chained Equations in R. J Stat Softw 2011;45(3): https://www.jstatsoft.org/v045/i03.

Figure S3. Patterns of missingness in baseline risk variables. ID: patient identifier, IMD: index of multiple deprivation, DM: diabetes mellitus, HTN: hypertension, CKD: chronic kidney disease, BMI: body mass index. Blue indicate complete and pink indicate missing data. Numbers on the left side of the grid represent n records with this pattern, numbers on the right side represent n missing variables, numbers on the bottom represent n records missing this variable. For example, n=1006 records were complete, n=470 were missing 1 variable (BMI), n=14 records were missing IMD data.

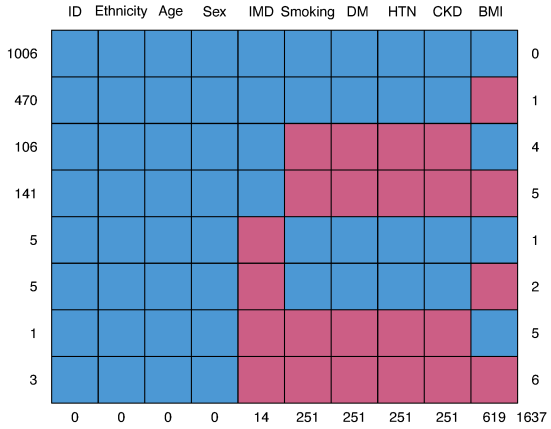
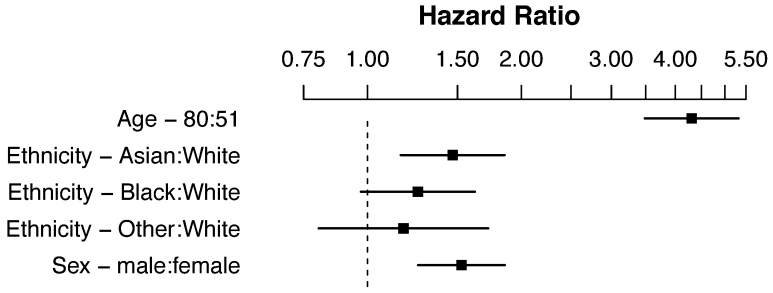


Table S4. Multivariable analysis using imputed dataset of mortality to 30 days using Cox proportional hazards modelling. Missing data imputed for smoking, BMI ≥30 kg/m^2, diabetes, HTN, CKD. Censored to 30 days follow up, observation 1737, events 478.

	n		Unadjusted	
	Total	**Events**	**Hazard ratio (95% CI)**	**P value**
Age (25th vs 75th centile)	-	-	4·31 (3·49-5·32)	<0·0001
Sex (Male)	-	-	1·53 (1·26-1·86)	<0·0001
Ethnic group				
Asian or Asian British	521	134	1·47 (1·16-1·85)	0·001
Black or Black British	331	94	1·25 (0·97-1·62)	0·083
Mixed and Other ethnic groups	150	34	1·18 (0·80-1·72)	0·406
White	674	206	Reference	-

Figure S4. Forest plot showing hazards ratios of mortality to 30 days using the imputed dataset, on log scale.



b. Charlson comorbidity index

Table S5. Multivariable analysis of mortality to 30 days using cox proportional hazards modelling. Variables included age, sex, IMD quintile, smoking, BMI ≥30 kg/m^2, and Charlson comorbidity index. Censored to 30 days follow up, observations 1006, events 281.

	Adjusted	
	Hazard ratio (95% CI)	**P value**
Age (25th vs 75th centile)	2·90 (2·22-3·79)	<0·0001
Sex (Male)	1·48 (1·16-1·90)	0·002
Ethnic group		
Asian or Asian British	1·54 (1·15-2·08)	0·004
Black or Black British	1·39 (1·01-1·92)	0·044
Mixed and Other ethnic groups	1·02 (0·56-1·88)	0·939
White	Reference	-
IMD quintile		
1 (most deprived)	0·83 (0·57-1·20)	0·316
2	0·81 (0·55-1·18)	0·268
3	0·94 (0·66-1·36)	0·759
4	0·82 (0·57-1·20)	0·311
5 (least deprived)	Reference	-
Smoking	1·36 (0·98-1·89)	0·067
BMI ≥30 kg/m^2	1·48 (1·14-1·92)	0·003
Charlson comorbidity index		
0	Reference	-
1-2	2·00 (1·17-3·41)	0·012
3-4	3·43 (2·00-5·89)	<0·0001
≥5	4·10 (2·42-6·94)	<0·0001

Figure S5. Forest plot showing hazards ratios of mortality to 30 days comparing multiple variables including CCI: Charlson comorbidity index. IMD: index of multiple deprivation, Obesity defined as BMI ≥30 kg/m^2, on log scale.

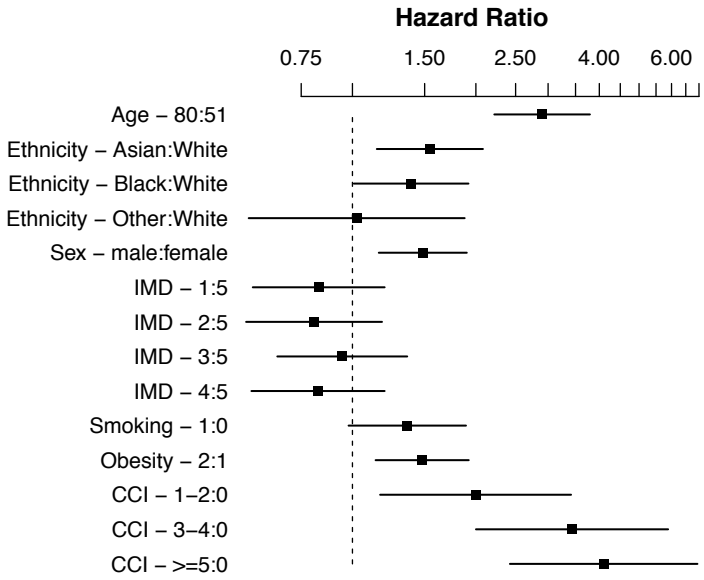
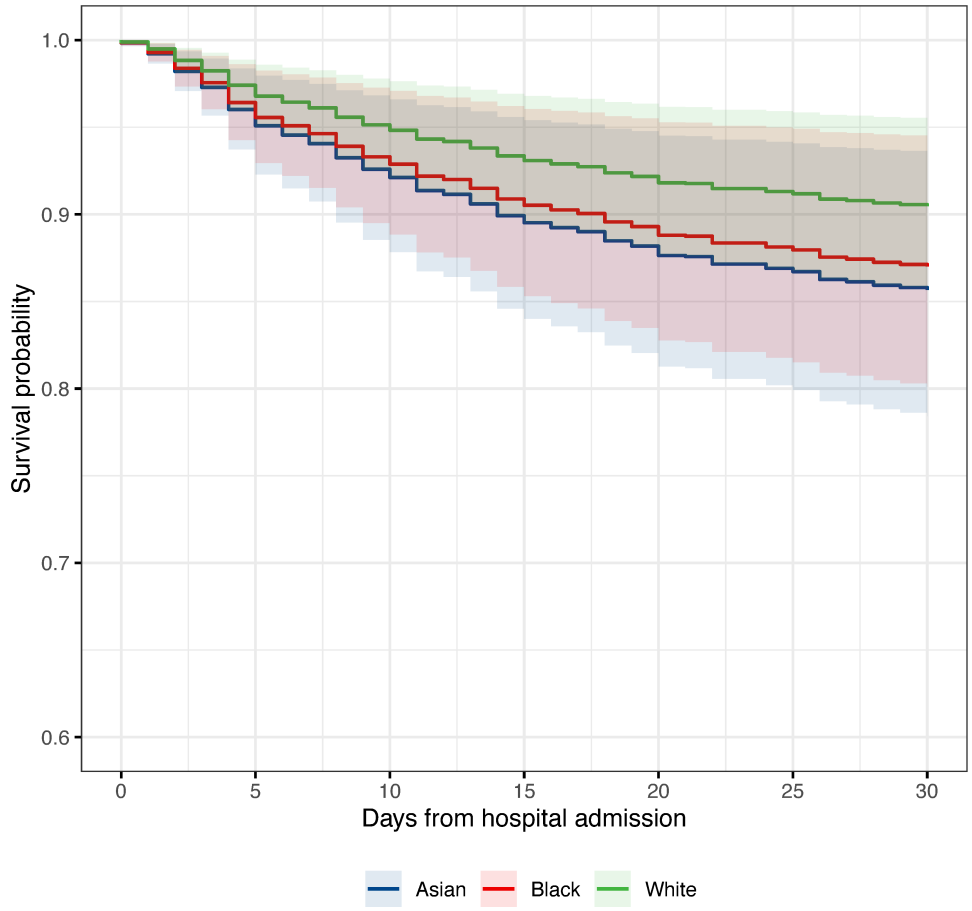


Figure S6. Survival curve to 30 days from multivariable analysis comparing Asian, Black, and White ethnic groups. Survival modelled for median age 65 years and male sex, index of multiple deprivation (IMD) least deprived quintile, no baseline risk factors defined as non-smoking, BMI <30 kg/m^2 and Charlson comorbidity index 0.



c. Rockwood frailty score

Table S6. Multivariable analysis of mortality to 30 days using cox proportional hazards modelling. Variables included age, sex, index of multiple deprivation (IMD) quintile, smoking, BMI ≥30 kg/m^2, and Rockwood frailty score (RFS). Censored to 30 days follow up, observations observations 552, events 199.

	Adjusted	
	Hazard ratio (95% CI)	**P value**
Age (25th vs 75th centile)	2·42 (1·56-3·75)	<0·0001
Sex (Male)	1·61 (1·19-2·16)	0·002
Ethnic group		
Asian or Asian British	1·98 (1·37-2·86)	<0·001
Black or Black British	1·67 (1·14-2·45)	0·009
Mixed and Other ethnic groups	1·27 (0·62-2·56)	0·513
White	Reference	-
IMD quintile		
1 (most deprived)	0·61 (0·38-0·98)	0·040
2	0·79 (0·50-1·22)	0·283
3	0·82 (0·53-1·25)	0·348
4	0·77 (0·51-1·18)	0·234
5 (least deprived)	Reference	-
Smoking	1·38 (0·94-2·03)	0·102
BMI ≥30 kg/m^2	1·39 (1·01-1·91)	0·045
Rockwood frailty score		
1-2 (very fit, well)	Reference	-
3-4 (managing well, vulnerable)	1·61 (0·82-3·16)	0·164
5-6 (mildly to severely frail)	1·84 (0·93-3·64)	0·078
8-9 (very severely frail, terminally ill)	3·25 (1·49-7·06)	0·003

Figure S7. Forest plot showing hazards ratios of mortality to 30 days comparing multiple variables including RFS: Rockwood frailty score. IMD: index of multiple deprivation, Obesity defined as BMI ≥30 kg/m^2, on log scale.

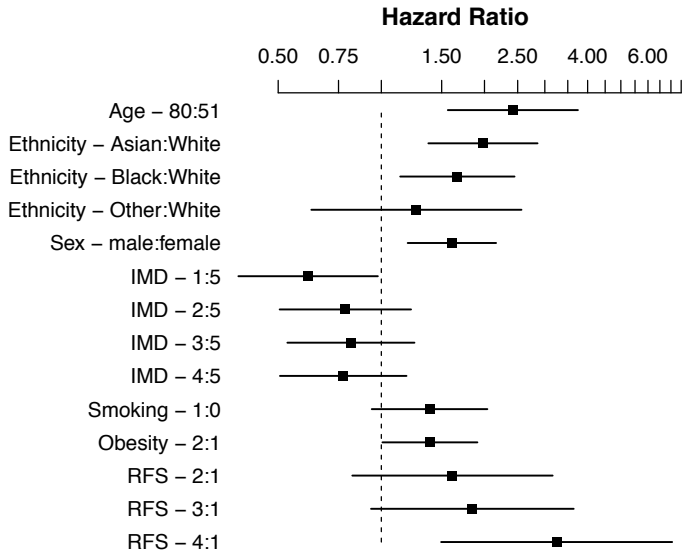
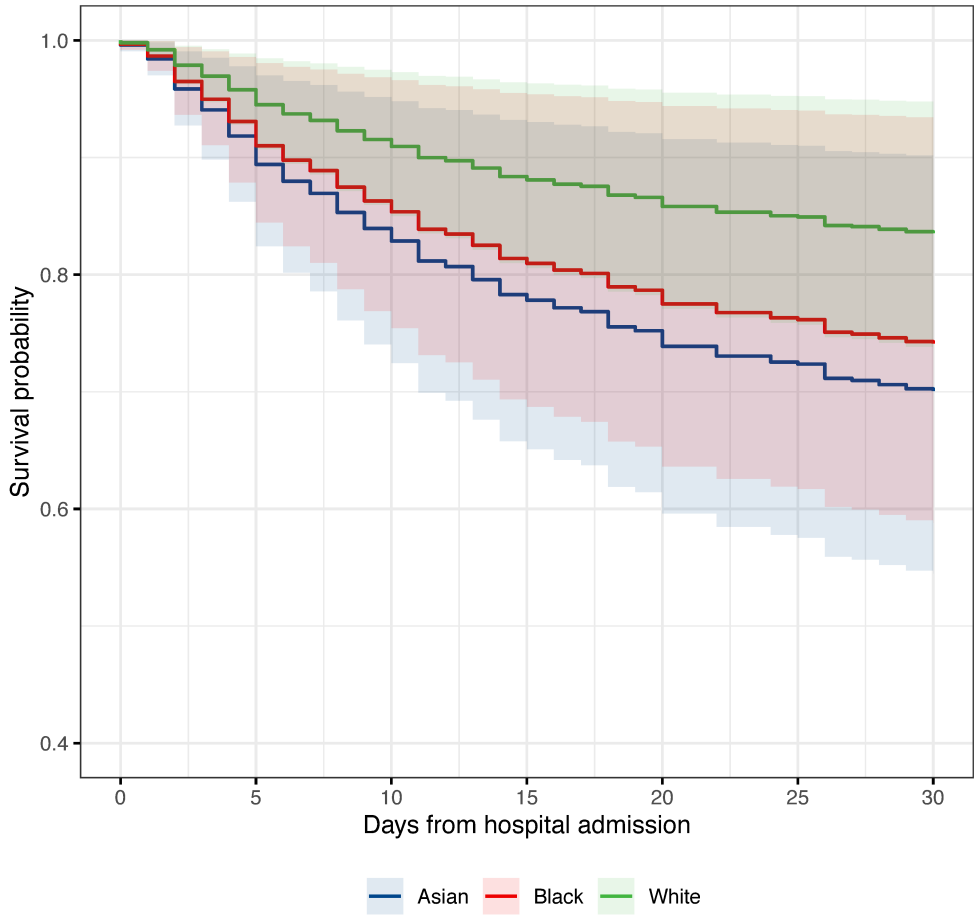


Figure S8. Survival curve to 30 days from multivariable analysis comparing Asian, Black, and White ethnic groups. Survival modelled for median age 65 years and male sex, index of multiple deprivation (IMD) least deprived quintile, no baseline risk factors defined as non-smoking, BMI <30 kg/m^2 and Rockwood frailty score lowest risk group.



d. Hospital frailty risk score

Table S7. Multivariable analysis of mortality to 30 days using cox proportional hazards modelling. Variables included age, sex, index of multiple deprivation (IMD) quintile, smoking, BMI ≥30 kg/m^2, and Hospital frailty risk score (HFRS). Censored to 30 days follow up, observations 1006, events 281.

	Adjusted	
	Hazard ratio (95% CI)	**P value**
Age (25th vs 75th centile)	2·84 (2·17-3·71)	<0·0001
Sex (Male)	1·58 (1·24-2·03)	<0·001
Ethnic group		
Asian or Asian British	1·78 (1·32-2·41)	<0·001
Black or Black British	1·57 (1·13-2·17)	0·007
Mixed and Other ethnic groups	1·10 (0·60-2·04)	0·751
White	Reference	-
IMD quintile		
1 (most deprived)	0·85 (0·59-1·24)	0·404
2	0·83 (0·57-1·22)	0·341
3	0·89 (0·62-1·29)	0·541
4	0·83 (0·57-1·20)	0·310
5 (least deprived)	Reference	-
Smoking	1·42 (1·01-1·96)	0·044
BMI ≥30 kg/m^2	1·57 (1·21-2·05)	<0·001
Hospital frailty risk score		
<5 (low risk)	Reference	-
5-15 (intermediate risk)	2·44 (1·68-3·54)	<0·0001
≥15 (high risk)	2·76 (1·89-4·04)	<0·0001

Figure S9. Forest plot showing hazards ratios of mortality to 30 days comparing multiple variables including HFRS: Hospital frailty risk score. IMD: index of multiple deprivation, Obesity defined as BMI ≥30 kg/m^2, on log scale.

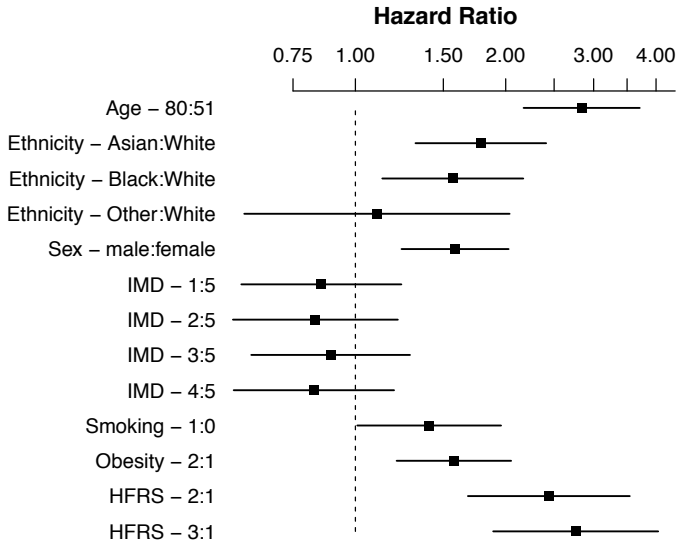
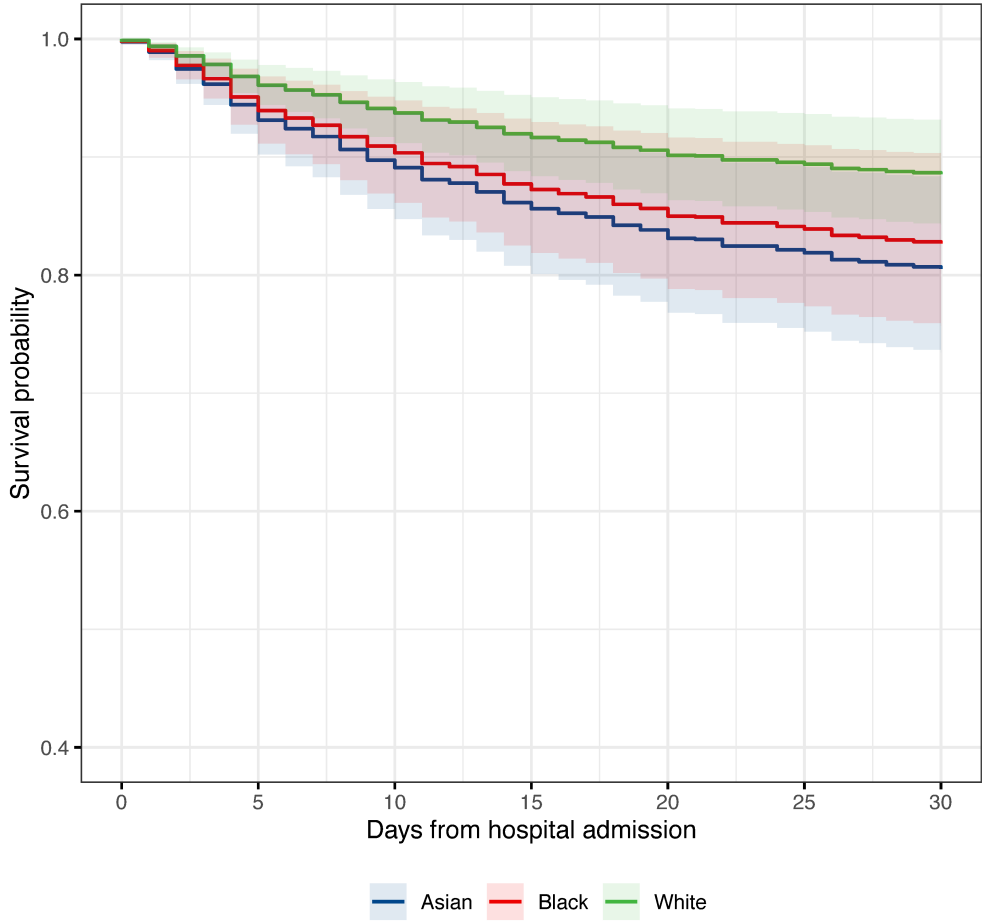


Figure S10. Survival curve to 30 days from multivariable analysis comparing Asian, Black, and White ethnic groups, age and sex corrected. Survival modelled for median age 65 years and male sex, inde of multiple deprivation (IMD) least deprived quintile, no history of baseline risk factors defined as smoking, BMI ≥30 kg/m^2, Hospital frailty risk score lowest risk group.



e. ABO blood group

Table S8. Multivariable analysis of mortality to 30 days using cox proportional hazards modelling. Variables included age, sex, and ABO blood group. Censored to 30 days follow up, observations 793, events 281.

	Adjusted	
	Hazard ratio (95% CI)	**P value**
Age (25^{th} vs 75^{th} centile)	3·26 (2·58-4·13)	<0·0001
Sex (Male)	1·67 (1·30-2·13)	<0·0001
Ethnic group		
Asian or Asian British	1·82 (1·35-2·46)	<0·0001
Black or Black British	1·63 (1·17-2·27)	0·004
Mixed and Other ethnic groups	1·62 (0·98-2·68)	0·059
White	Reference	-
ABO blood group		
A	0·81 (0·62-1·05)	0.112
AB	0·65 (0·33-1·28)	0·214
B	0·66 (0·47-0·92)	0·016
O	Reference	-

Figure S11. Forest plot showing hazards ratios of mortality to 30 days comparing multiple variables including ABO blood group, on log scale.

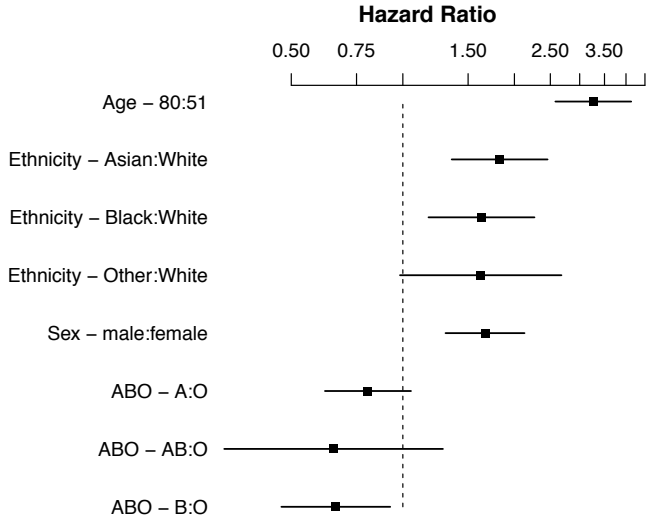
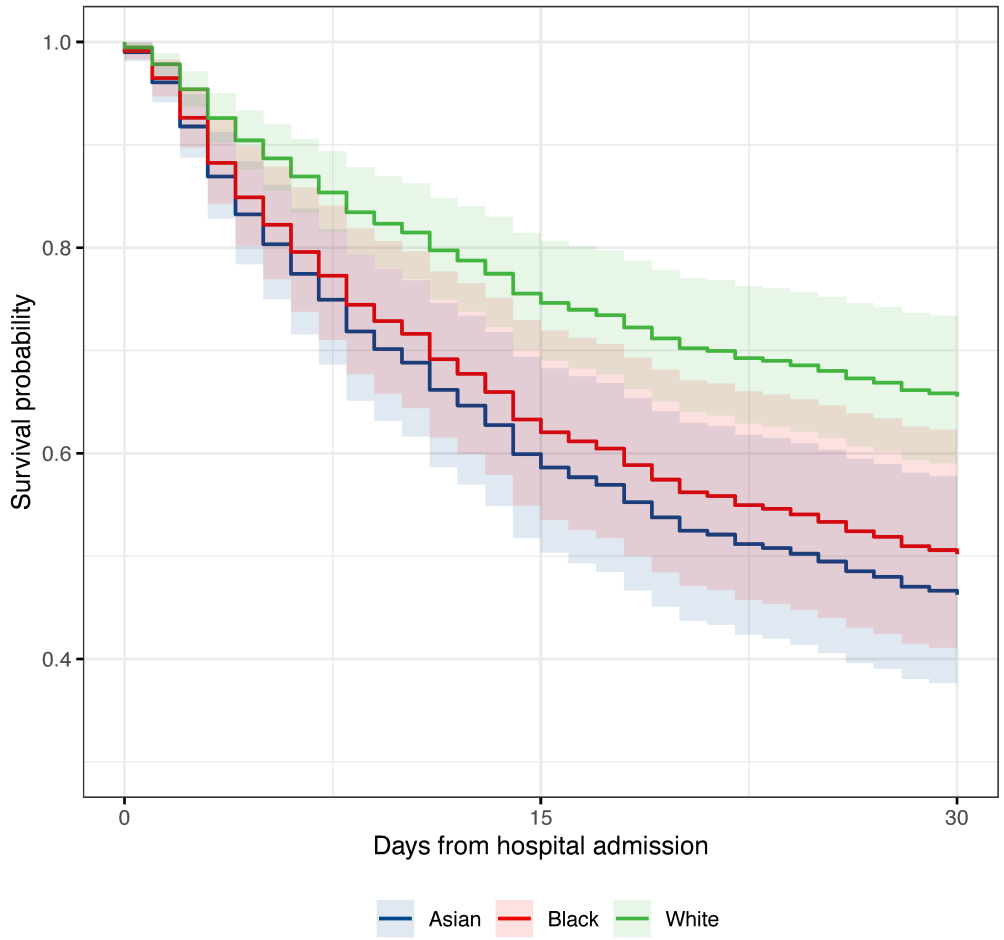


Figure S12. Survival curve to 30 days from multivariable analysis comparing Asian, Black, and White ethnic groups. Survival modelled for median age 65 years and male sex, ABO bloog group O.



f. 90 day mortality

Table S9. Association of ethnic group with mortality to 90 days using cox proportional hazards modelling, age and sex corrected. Censored to 90 days follow up, observations 1737, events 510.

	n		Unadjusted	
	Total	**Events**	**Hazard ratio (95% CI)**	**P value**
Age (25^{th} vs 75^{th} centile)	-	-	4·48 (3·74-5·35)	<0·0001
Sex (Male)	-	-	1·52 (1·27-1·83)	<0·0001
Ethnic group				
Asian or Asian British	497	106	1·46 (1·18-1·81)	<0·001
Black or Black British	342	83	1·26 (0·99-1·59)	0·058
Mixed and Other ethnic groups	142	30	1·02 (0·71-1·46)	0·934
White	651	182	Reference	-

Figure S13. Forest plot showing hazards ratios of mortality to 90 days comparing ethnic groups, age and sex, on log scale.

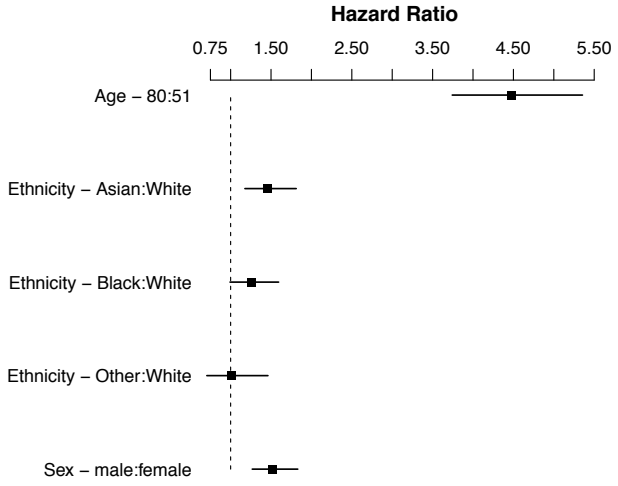
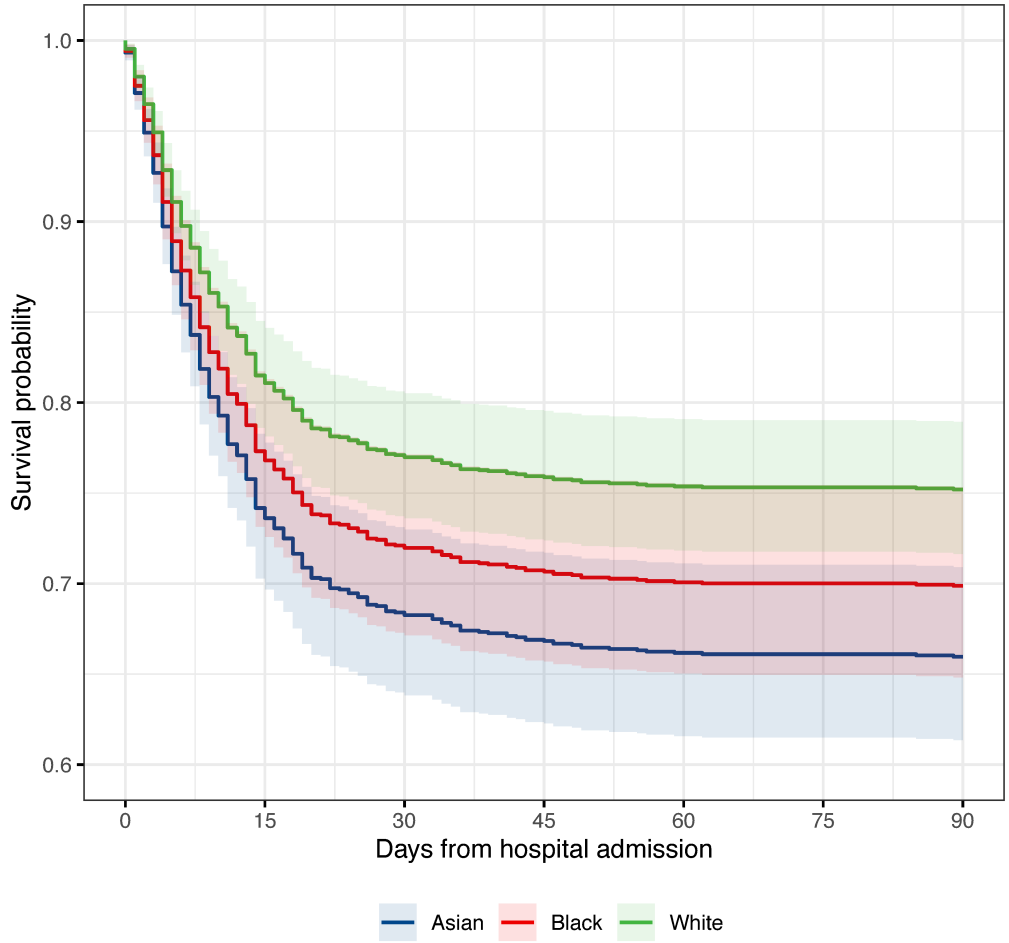


Figure S14. Survival curve to 90 days from univariate analysis comparing Asian, Black, and White ethnic groups, age and sex. Survival modelled for median age 65 years and male sex.

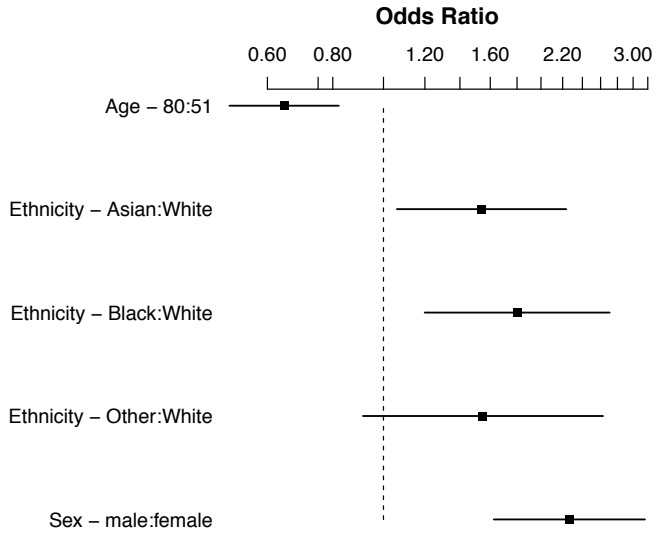


8. Secondary outcome mechanical ventilation

Table S10. Association of ethnic group with mechanical ventilation using logistic regression modelling, age and sex corrected. Observations 1737, events 210.

	Unadjusted	
	Odds ratio (95% CI)	**p value**
Age (25^{th} vs 75^{th} centile)	0·65 (0·51-0·82)	<0·001
Sex (Male)	2·27 (1·63-3·16)	<0·0001
Ethnic group		
Asian or Asian British	1·54 (1·06-2·23)	0·023
Black or Black British	1·80 (1·20-2·71)	0·005
Mixed and Other ethnic groups	1·55 (0·91-2·63)	0·104
White	Reference	-

Figure S15. Forest plot showing odds ratios of mechanical ventilation comparing ethnic groups, age and sex corrected, on log scale.



9. Cox proportional hazards testing

We assessed proportional-hazards assumption for ethnicity and adjusted variables by inspection of scaled Schoenfeld residual plots. There was some evidence of non-proportionality for Black ethnicity at later time points in the primary age and sex adjusted analysis. However, the unstratified and ethnicity-stratified survival curves for the age and sex adjusted 30-day survival were similar suggesting minimal impact of non-proportionality.

Figure S16. Scaled Schoenfeld residual plots for ethnicity, age, and sex.

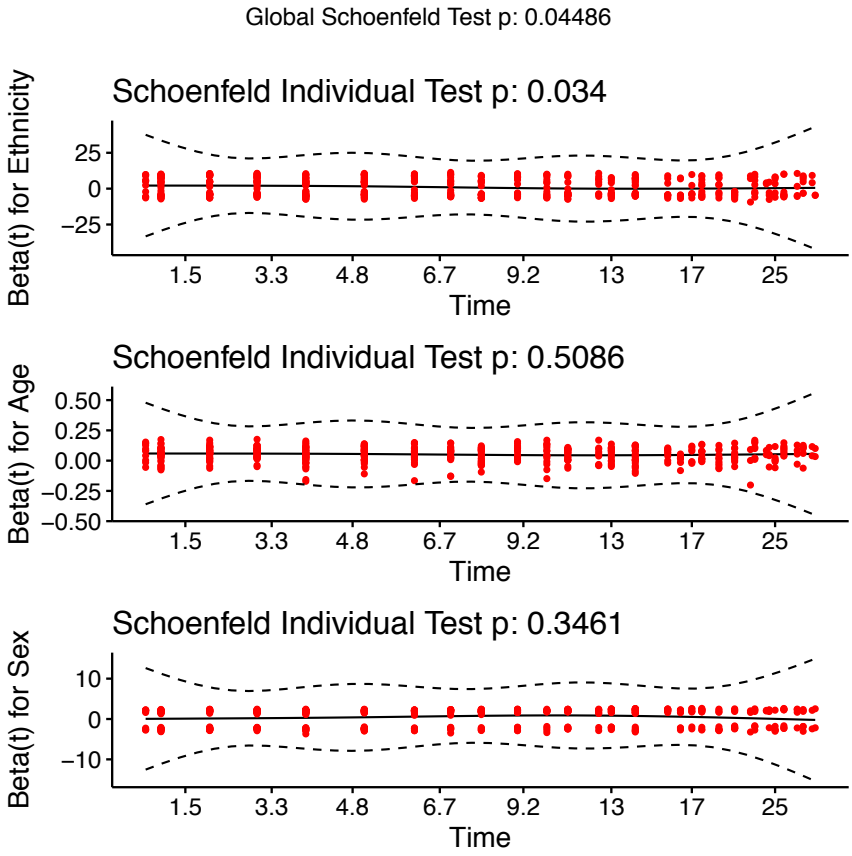


Figure S17. Ethnicity-stratified Cox survival model to 30 days based on age and sex. Survival modelled for median age 65 years and male sex. Survival over 30 days is comparable the unstratified model [Figure 3], however early mortality was greater in patients with Black ethnicity.