

Supplementary table 1. Summary of univariable and multivariable analyses performed for clinical, haematological and biochemical parameters

Covariate	Outcome	Cohort	Univariable analysis								Multivariable analysis		
			Total # of records	# of outcome = YES	# of outcome = NO	YES mean (sd)	NO mean (sd)	P value	Sig. ^[1]	Effect size (CL)	OR (95% CI)	P value	Sig. ^[1]
Age	Required O2	all	283	157 (55%)	126 (45%)	70.0 (10.5)	62.49 (15.63)	<0.001	***	0.63	1.03 (1.00-1.05)	0.042	*
	Death		300	104 (35%)	196 (65%)	71.98 (10.88)	64.22 (14.15)	<0.001	***	0.66	1.04 (1.01-1.07)	0.002	**
Total # of comorbidities	Required O2		260	145 (56%)	115 (44%)	1.76 (1.58)	1.14 (1.3)	<0.001	***	0.52	1.11 (0.88-1.39)	0.377	
	Death		273	89 (33%)	184 (67%)	1.68 (1.39)	1.35 (1.51)	0.010	**	0.52	0.94 (0.77-1.14)	0.535	
Lymphocyte	Required O2	UK	152	93 (61%)	59 (39%)								
		Liverpool	53	34 (64%)	19 (36%)								
		Manchester	57	25 (44%)	32 (56%)								
		all	252	152 (60%)	110 (44%)	0.94 (1.55)	1.05 (1.85)	0.043	*	0.56	1.02 (0.83-1.26)	0.832	
	Death	UK	168	63 (38%)	105 (63%)								
		Liverpool	53	26 (49%)	27 (51%)								
		Manchester	57	10 (18%)	47 (82%)								
all	278	99 (36%)	179 (64%)	1.04 (1.88)	0.92 (1.49)	0.126		0.54	1.11 (0.91-1.37)	0.302			
Neutrophil	Required O2	UK	152	93 (61%)	59 (39%)								
		Liverpool	54	34 (63%)	20 (37%)								
		Manchester	58	26 (45%)	32 (55%)								
		all	264	153 (58%)	111 (42%)	6.36 (6.25)	4.42 (4.93)	<0.001	***	0.65	1.04 (0.93-1.16)	0.47	
	Death	UK	168	63 (38%)	105 (63%)								
		Liverpool	54	27 (50%)	27 (50%)								
		Manchester	58	10 (17%)	48 (83%)								
all	280	100 (36%)	180 (64%)	6.58 (7.29)	4.88 (4.57)	0.007	**	0.6	1.00 (0.93-1.08)	0.937			
Neutrophil:Lymphocyte ratio	Required O2	UK	150	92 (61%)	58 (39%)								
		Liverpool	53	34 (64%)	19 (36%)								
		Manchester	56	24 (43%)	32 (57%)								
		all	259	150 (58%)	109 (42%)	13.2 (21.62)	6.57 (7.79)	<0.001	***	0.67	1.04 (0.98-1.09)	0.166	
	Death	UK	166	63 (38%)	103 (62%)								
		Liverpool	53	26 (49%)	27 (51%)								
		Manchester	56	10 (18%)	46 (82%)								
all	275	99 (36%)	176 (64%)	15.93 (27.91)	7.97 (8.16)	0.010	**	0.59	1.03 (1.00-1.07)	0.036	*		
C-reactive protein	Required O2	UK	163	93 (57%)	53 (33%)								
		Liverpool	42	28 (67%)	14 (33%)								

Covariate	Outcome	Cohort	Univariable analysis								Multivariable analysis		
			Total # of records	# of outcome = YES	# of outcome = NO	YES mean (sd)	NO mean (sd)	P value	Sig. ^[1]	Effect size (CL)	OR (95% CI)	P value	Sig. ^[1]
		Manchester	54	27 (50%)	27 (50%)								
		all	259	148 (57%)	94 (36%)	122.25 (100.45)	61.19 (70.11)	<0.001	***	0.72	1.01 (1.00-1.01)	0.002	**
	Death	UK	163	63 (39%)	100 (61%)								
		Liverpool	42	23 (55%)	19 (45%)								
		Manchester	54	10 (19%)	44 (81%)								
all	259	96 (37%)	163 (63%)	133.35 (107.59)	79.07 (78.64)	<0.001	***	0.66	1.00 (1.00-1.01)	0.004	**		
Albumin	Required O2	UK	149	90 (60%)	59 (40%)								
		Liverpool	40	26 (65%)	14 (35%)								
		Manchester	63	27 (43%)	36 (57%)								
		all	252	143 (57%)	109 (43%)	31.68 (7.09)	37.16 (6.11)	<0.001	***	0.71	0.91 (0.86-0.95)	<0.001	***
	Death	UK	166	63 (38%)	103 (62%)								
		Liverpool	40	18 (45%)	22 (55%)								
		Manchester	63	10 (16%)	53 (84%)								
		all	269	91 (34%)	178 (66%)	31.0 (7.85)	35.08 (6.56)	<0.001	***	0.63	0.95 (0.91-0.99)	0.02	*
					Covariate = True and outcome = YES (% in YES)	Covariate = True and outcome = NO (% in NO)			Effect size (Cramer's V)				
Sex (Male)	Required O2	all	283	157 (55%)	126 (45%)	96 (61%)	56 (44%)	0.047		0.11	1.25 (0.68-2.27)	0.473	
	Death		300	104 (35%)	196 (65%)	65 (63%)	98 (50%)	0.047	*	0.11	1.27 (0.72-2.23)	0.409	
Haematological cancer	Required O2		283	157 (55%)	126 (45%)	49 (31%)	31 (25%)	0.020		0.13	1.35 (0.69-2.64)	0.389	
	Death		300	104 (35%)	196 (65%)	39 (38%)	47 (24%)	0.020	*	0.13	2.00 (1.05-3.79)	0.034	*
Chemotherapy	Required O2		283	157 (55%)	126 (45%)	49 (31%)	31 (25%)	0.094		0.10	0.55 (0.29-1.01)	0.055	
	Death		300	104 (35%)	196 (65%)	33 (32%)	83 (42%)	0.094		0.10	0.71 (0.39-1.31)	0.278	
Immunotherapy	Required O2		283	157 (55%)	126 (45%)	10 (6%)	4 (3%)	0.436		0.04	3.18 (0.77-13.16)	0.11	
	Death		300	104 (35%)	196 (65%)	3 (3%)	11 (6%)	0.436		0.04	0.66 (0.16-2.69)	0.561	
Targeted therapy	Required O2		283	157 (55%)	126 (45%)	22 (14%)	20 (16%)	0.963		0.00	1.44 (0.64-3.25)	0.374	
	Death		300	104 (35%)	196 (65%)	16 (15%)	32 (16%)	0.963		0.00	1.05 (0.49-2.26)	0.905	
Cancer stage (Distant metastases)	Required O2	260	145 (56%)	115 (44%)	103 (71%)	70 (61%)	0.496		0.04	1.27 (0.68-2.38)	0.448		
	Death	273	89 (33%)	184 (67%)	62 (70%)	119 (65%)	0.496		0.04	1.16 (0.63-2.15)	0.635		

[1] – Significance: * - P value < 0.05, ** - P value < 0.01, *** - P value < 0.001

No imputation was performed for univariable analysis. For multivariable analysis missing data were: CRP 14.0%, lymphocyte 7.6%, neutrophil 7.0%, neutrophil:lymphocyte ratio 8.6%, platelets 4.7%, albumin 10.6%, cancer stage 9.3%. Numeric variable imputed using Bayesian ridge regression (with logarithmic transformation where appropriate), cancer stage imputed using logistic regression.

Supplementary table 2. Summary of univariable analyses performed for haematological and biochemical parameters (excluded from the multivariable analysis)

Parameter	Range	Outcome	Cohort	Total # of records	# of outcome = YES	# of outcome = NO	YES mean (sd)	NO mean (sd)	P value	Sig. ^[1]	Effect size (CL)
Lymphocyte	Minimum value from day 0 to 14 (during COVID-19 illness)	Required O2	Liverpool	56	33 (59%)	23 (41%)	0.57 (0.62)	0.99 (1.79)	0.005	**	0.61
			Manchester	57	25 (44%)	32 (56%)					
			all	113	58 (51%)	55 (49%)					
		Death	Liverpool	56	25 (45%)	31 (55%)					
			Manchester	57	10 (18%)	47 (82%)					
			all	113	35 (31%)	78 (69%)					
	CHRONIC: Average value from day -170 to -15	Required O2	Liverpool	61	36 (59%)	25 (41%)	1.51 (2.34)	1.7 (2.88)	0.264		0.56
			Manchester	53	22 (42%)	31 (58%)					
			all	114	58 (51%)	56 (49%)					
		Death	Liverpool	61	28 (46%)	33 (54%)					
			Manchester	53	9 (17%)	44 (83%)					
			all	114	37 (32%)	77 (68%)					
	IMMED: Value at day -15	Required O2	Liverpool	61	36 (59%)	25 (41%)	1.31 (0.79)	1.73 (2.89)	0.471		0.52
			Manchester	53	22 (42%)	31 (58%)					
			all	114	58 (51%)	56 (49%)					
		Death	Liverpool	61	28 (46%)	33 (54%)					
			Manchester	53	9 (17%)	44 (83%)					
			all	114	37 (32%)	77 (68%)					
	CHRONIC: Average value from day -170 to -15	Haematological cancer	Liverpool	61	24 (39%)	37 (61%)	2.27 (4.69)	1.32 (0.55)	0.183		0.58
			Manchester	53	10 (19%)	43 (81%)					
			all	114	34 (30%)	80 (70%)					
IMMED: Value at day -15	Haematological cancer	Liverpool	61	24 (39%)	37 (61%)	1.98 (3.71)	1.32 (0.67)	0.958		0.48	
		Manchester	53	10 (19%)	43 (81%)						
		all	114	34 (30%)	80 (70%)						
Value at day 0	Haematological cancer	UK	168	42 (25%)	126 (75%)	1.16 (2.7)	0.89 (0.99)	0.004	**	0.59	
		Liverpool	53	20 (38%)	33 (62%)						
		Manchester	57	13 (23%)	44 (77%)						
		all	278	75 (27%)	203 (73%)						
Neutrophil	Maximum value from day 0 to 14 (during COVID-19 illness) (GCSF in Manchester excluded)	Required O2	Liverpool	57	33 (58%)	24 (42%)	8.07 (6.87)	6.34 (5.42)	0.086		0.59
			Manchester	50	24 (48%)	26 (52%)					
			all	107	57 (53%)	50 (47%)					
		Death	Liverpool	57	26 (46%)	31 (54%)					
			Manchester	50	10 (20%)	40 (80%)					
			all	107	36 (34%)	71 (66%)					
					8.94 (7.87)	6.45 (5.21)	0.026	*	0.63		

Parameter	Range	Outcome	Cohort	Total # of records	# of outcome = YES	# of outcome = NO	YES mean (sd)	NO mean (sd)	P value	Sig. ^[1]	Effect size (CL)
	Minimum value from day 0 to 14 (during COVID-19 illness) (GCSF in Manchester excluded)	Required O2	Liverpool	57	33 (58%)	24 (42%)	3.84 (3.26)	3.44 (4.31)	0.382		0.54
			Manchester	50	24 (48%)	26 (52%)					
			all	107	57 (53%)	50 (47%)					
		Death	Liverpool	57	26 (46%)	31 (54%)	4.62 (4.34)	3.21 (3.46)	0.244		0.56
			Manchester	50	10 (20%)	40 (80%)					
			all	107	36 (34%)	71 (66%)					
	CHRONIC: Average value from day -170 to -15	Required O2	Manchester	54	23 (43%)	31 (57%)	4.48 (2.93)	4.03 (2.84)	0.807		0.52
		Death	Manchester	54	9 (17%)	45 (83%)	3.44 (1.79)	4.38 (3.02)	0.562		0.56
	IMMED: Value at day -15	Required O2	Liverpool	58	34 (59%)	24 (41%)	5.07 (4.37)	4.6 (3.89)	0.545		0.53
			Manchester	54	23 (43%)	31 (57%)					
			all	112	57 (51%)	55 (49%)					
		Death	Liverpool	58	26 (45%)	32 (55%)	5.57 (5.12)	4.51 (3.58)	0.5		0.54
			Manchester	54	9 (17%)	45 (83%)					
			all	112	35 (31%)	77 (69%)					
	CHRONIC: Average value from day -170 to -15	Haematological cancer	Manchester	54	11 (20%)	43 (80%)	4.02 (4.6)	4.27 (2.3)	0.103		0.66
	IMMED: Value at day -15	Haematological cancer	Liverpool	58	23 (40%)	35 (60%)	3.37 (3.21)	5.49 (4.33)	0.002	**	0.68
Manchester			54	11 (20%)	43 (80%)						
all			112	34 (30%)	78 (70%)						
Value at day 0	Haematological cancer	UK	168	42 (25%)	126 (75%)	4.56 (8.09)	5.84 (4.52)	0.001	***	0.67	
		Liverpool	54	21 (39%)	33 (61%)						
		Manchester	58	14 (24%)	44 (76%)						
		all	280	77 (28%)	203 (73%)						
Neutrophil:Lymphocyte ratio	Max increase rate 0-14 days (during COVID-19 illness)	Required O2	Manchester	46	23 (50%)	23 (50%)	16.13 (35.33)	4.96 (12.37)	0.003	**	0.75
		Death	Manchester	46	9 (20%)	37 (80%)	33.3 (53.4)	5.02 (10.08)	0.004	**	0.81
C-reactive protein	Max increase rate	Required O2	Manchester	48	26 (54%)	22 (46%)	30.17 (29.14)	14.27 (21.15)	0.013	*	0.71
		Death	Manchester	48	10 (21%)	38 (79%)	44.1 (38.22)	17.3 (20.0)	0.009	**	0.77
LDH	Value at day 0	Required O2	UK	30	21 (70%)	9 (30%)	481.67 (252.55)	295.33 (77.97)	<0.001	***	0.72
			Manchester	62	25 (40%)	37 (60%)					
			all	92	46 (50%)	46 (50%)					
		Death	UK	33	11 (33%)	22 (67%)					
			Manchester	62	9 (15%)	53 (85%)					

Parameter	Range	Outcome	Cohort	Total # of records	# of outcome = YES	# of outcome = NO	YES mean (sd)	NO mean (sd)	P value	Sig. ^[1]	Effect size (CL)
			all	95	20 (21%)	75 (79%)	489.05 (221.85)	378.99 (227.41)	0.008	**	0.69
	Max increase rate	Required O2	Manchester	46	23 (50%)	23 (50%)	100.66 (79.6)	34.48 (55.93)	0.001		0.78
		Death	Manchester	46	9 (20%)	37 (80%)	142.0 (84.93)	49.47 (62.12)	0.002		0.83
	IMMED: Value at day -15	Required O2	Manchester	57	24 (42%)	33 (58%)	253.33 (76.88)	237.33 (53.55)	0.513		0.55
		Death	Manchester	57	10 (18%)	47 (82%)	231.1 (55.11)	246.83 (66.24)	0.564		0.56

[1] – Significance: * - P value < 0.05, ** - P value < 0.01, *** - P value < 0.001

No imputation was performed for univariable analysis.

Supplementary table 3. Characteristics of cancer patients presenting in Manchester

Characteristic	Number (percentage)
Median Age (range)	65 (19-82)
Sex - Male	36 (53.7)
- Female	31 (46.3)
Comorbidities	
Hypertension	12 (17.9)
Chronic obstructive pulmonary disease	6 (9.0)
Diabetes	10 (14.9)
Cardiovascular disease	7 (10.4)
Smoking status	
Never	23 (34.3)
Ex-smoker	26 (38.8)
Current	4 (6.0)
Not available	14 (20.6)
Cancer type	
Haematological	49 (73.1)
Solid	18 (26.9)
Cancer Stage	
Early stage/radical intent	18 (26.9)
Advanced/Distant metastases	48 (71.6)
Unknown	1 (1.5)
Therapy within 4 weeks of infection*	
Chemotherapy	31 (46.3)
Targeted therapy	9 (13.4)
Radiation therapy	7 (10.4)
Immune therapy	6 (9.0)
Other**	9 (13.4)

* Can have more than one therapy

**Other= including hormone treatment

Supplementary table 4. Characteristics of cancer patients presenting in Liverpool

Characteristic	Number (percentage)
Median Age (range)	74 (36-93)
Sex - Male	33 (53.2)
- Female	29 (46.8)
Comorbidities	
Hypertension	19 (30.6)
Chronic obstructive pulmonary disease	14 (22.6)
Diabetes	16 (25.8)
Cardiovascular disease	21 (33.9)
Smoking status	
Never	26 (41.9)
Ex-smoker	27 (43.5)
Current	8 (12.9)
Not available	1 (1.6)
Cancer type	
Haematological	24 (38.7)
Solid	38 (61.3)
Cancer Stage	
Early stage/radical intent	19 (30.2)
Advanced/Distant metastases	27 (42.9)
Unknown	17 (27)
Therapy within 4 weeks of infection	
Chemotherapy	16 (25.4)
Targeted therapy	3 (4.8)
Radiation therapy	2 (3.2)
Immune therapy	4 (6.3)
Other	6 (9.5)

** Can have more than one therapy

*Other= including hormone treatment

Supplementary table 5. Characteristics of cancer patients presenting in United Kingdom (UK) cohort

Characteristic	Number (percentage)
Median Age (range)	70 (23-87)
Sex - Male	74 (42.8)
- Female	99 (57.2)
Comorbidities	
Hypertension	64 (37.0)
Chronic obstructive pulmonary disease	18 (10.4)
Chronic kidney disease	17 (9.8)
Diabetes	34 (19.7)
Cardiovascular disease	40 (23.1)
Cancer type	
Haematological	44 (25.4)
Solid	129 (74.6)
Cancer Stage	
Early stage/radical intent	59 (34.1)
Advanced/Distant metastases	109 (63)
Unknown	5 (2.9)
Therapy within 4 weeks of infection	
Chemotherapy	70 (40.5)
Targeted therapy	34 (19.7)
Radiation therapy	14 (8.1)
Immune therapy	4 (2.3)
Other	7 (4.0)

** Can have more than one therapy

*Other= including hormone treatment

Supplementary table 6. Summary of multivariable analysis performed using linear regression.

As a dependent variable, the number of days from hospital admission to death was considered. Analysis included 81 patients. High neutrophils and advanced cancer stage were significantly associated with earlier death.

Feature	Coefficient (95% CI)	P value	Sig. ^[1]
Intercept	42.28 (15.22 - 69.33)	0.003	**
Age	-0.08 (-0.35 ÷ 0.19)	0.543	
Sex	-3.98 (-9.45 ÷ 1.48)	0.15	
Haematological cancer	-3.92 (-9.92 ÷ 2.08)	0.197	
Chemotherapy	-1.64 (-7.22 ÷ 3.93)	0.558	
Immunotherapy	-2.94 (-15.8 ÷ 9.91)	0.649	
Targetted therapy	-4.46 (-11.6 ÷ 2.67)	0.216	
Total no. of comorbidities	0.08 (-1.87 ÷ 2.03)	0.938	
C-reactive protein	-0.01 (-0.04 ÷ 0.01)	0.352	
Lymphocyte	1.39 (-0.72 ÷ 3.5)	0.194	
Neutrophils	-0.51 (-0.96 ÷ -0.06)	0.027	*
Neutrophil/lymphocyte ratio	0.01 (-0.09 ÷ 0.11)	0.8	
Platelets	-0.0 (-0.02 ÷ 0.02)	0.793	
Albumin	-0.29 (-0.68 ÷ 0.11)	0.148	
Cancer stage (Early/radical intent vs. advanced/distant metastases)	-6.3 (-12.37 ÷ -0.23)	0.042	*

[1] – Significance: * - P value < 0.05, ** - P value < 0.01, *** - P value < 0.001

Missing data: CRP 9.9%, lymphocyte 4.9%, neutrophil 3.7%, neutro/lympho ratio 4.9%, platelets 3.7%, albumin 14.8%, cancer stage 14.8%. Numeric variable imputed using Bayesian ridge regression (with logarithmic transformation where appropriate), cancer stage imputed using logistic regression.