

Pulse Pressure

Cambridge MA, United States

Abstract

Objective. To study the characteristics of patients across pulse pressure.

Keywords: Intensive Care Unit, Pulse Pressure

1. Materials and Methods

All statistical analysis was performed using R. Baseline comparisons were performed using χ^2 tests for equal proportion with results reported as numbers, percentages, and 95% confidence intervals. Continuously variables were compared using Pearson's correlation coefficient from a linear model of correlation reported as medians and interquartile ranges for quartiles of pulse pressure.

2. Results

Table 1: Characteristics of study cohorts: Demographics and Outcomes.

	No. (%) of Patients		
	Septic Cohort (N = 9566)	CCU (nonseptic) (N = 2579)	GI bleed (N = 1214)
Gender (males)	5251 (54.9)	1578 (61.2)	696 (57.3)
Service type:			
MICU	5178 (54.1)	0 (0.0)	819 (67.5)
CCU	1175 (12.3)	2579 (100.0)	142 (11.7)
SICU	2028 (21.2)	0 (0.0)	189 (15.6)
CSRU	1185 (12.4)	0 (0.0)	64 (5.3)
Primary Outcomes:			
ICU Mortality	1083 (11.3)	129 (5.0)	151 (12.4)
Hospital Mortality	1635 (17.1)	174 (6.7)	262 (21.6)
28-day Mortality	1793 (18.7)	216 (8.4)	276 (22.7)
1-year Mortality	3417 (35.7)	410 (15.9)	497 (40.9)
2-year Mortality	4100 (42.9)	520 (20.2)	580 (47.8)
	Median (IQR)		
Age, yrs	65.1 (24.3)	67.2 (21.7)	68.8 (24.3)
SOFA Day 1	6.0 (6.0)	2.0 (4.0)	4.0 (6.0)
SOFA Day 2	5.0 (6.0)	2.0 (4.0)	4.0 (5.0)
SOFA Day 3	3.0 (3.0)	2.0 (3.0)	3.0 (3.0)
SAPS-I Day 1	14.0 (8.0)	10.0 (6.0)	13.0 (7.0)
SAPS-I Day 2	13.0 (7.0)	9.0 (7.0)	13.0 (6.0)
SAPS-I Day 3	9.0 (5.0)	8.0 (5.0)	9.0 (4.8)
Secondary Outcomes:			
ICU Length-of-stay, days	2.8 (4.8)	1.7 (2.1)	2.8 (4.4)
ElixHauser Score	5.0 (9.0)	0.0 (5.0)	5.0 (10.0)

Table 2: Characteristics of study cohorts: ICD-9 codes and Comorbidity.

	No. (%) of Patients		
	Septic Cohort (N = 9566)	CCU (nonseptic) (N = 2579)	GI bleed (N = 1214)
ICD-9 Codes:			
Cancer	2086 (21.8)	68 (2.6)	227 (18.7)
Cardiovascular	2664 (27.8)	2164 (83.9)	251 (20.7)
Respiratory	1164 (12.2)	60 (2.3)	97 (8.0)
Endocrine metabolic	317 (3.3)	18 (0.7)	27 (2.2)
Other	580 (6.1)	58 (2.2)	59 (4.9)
GI	1100 (11.5)	61 (2.4)	438 (36.1)
GU	297 (3.1)	12 (0.5)	24 (2.0)
Trauma	1342 (14.0)	134 (5.2)	91 (7.5)
Treatment	9 (0.1)	0 (0.0)	0 (0.0)
Comorbidities:			
Diabetes	3131 (32.7)	735 (28.5)	350 (28.8)
CHF	3654 (38.2)	612 (23.7)	410 (33.8)
Alcohol abuse	590 (6.2)	95 (3.7)	106 (8.7)
Arrhythmias	2670 (27.9)	453 (17.6)	351 (28.9)
Valvular disease	1278 (13.4)	269 (10.4)	175 (14.4)
Hypertension	3590 (37.5)	1001 (38.8)	442 (36.4)
Renal failure	1500 (15.7)	164 (6.4)	184 (15.2)
Chronic Pulmonary	2307 (24.1)	432 (16.8)	260 (21.4)
Liver disease	1076 (11.2)	51 (2.0)	187 (15.4)
Cancer	574 (6.0)	45 (1.7)	81 (6.7)
Psychosis	423 (4.4)	51 (2.0)	50 (4.1)
Depression	852 (6.2)	88 (3.7)	90 (8.7)

	Pulse Pressure (Day 1)				Missing
	[3, 50)	[50, 61)	[61, 73.5)	[73.5, 143]	
	N (%)				
M	991 (9.8)	976 (9.7)	1118 (11.1)	1263 (12.5)	
F	1422 (14.1)	1318 (13.0)	1350 (13.4)	1230 (12.2)	
WHITE	72 (0.7)	53 (0.5)	51 (0.5)	45 (0.4)	
BLACK	241 (2.4)	207 (2.0)	268 (2.7)	306 (3.0)	
HISPANIC	72 (0.7)	66 (0.7)	73 (0.7)	63 (0.6)	
ASIAN	368 (3.6)	302 (3.0)	335 (3.3)	321 (3.2)	
OTHER	1660 (16.4)	1666 (16.5)	1741 (17.2)	1758 (17.4)	
0x VSP	1180 (11.7)	1349 (13.4)	1760 (17.4)	2167 (21.4)	
1x VSP	638 (6.3)	617 (6.1)	475 (4.7)	234 (2.3)	
2x VSP	314 (3.1)	221 (2.2)	152 (1.5)	76 (0.8)	
3x VSP	188 (1.9)	85 (0.8)	64 (0.6)	12 (0.1)	
4x VSP	72 (0.7)	19 (0.2)	15 (0.1)	4 (0.0)	
5x VSP	17 (0.2)	2 (0.0)	2 (0.0)	0 (0.0)	
6x VSP	4 (0.0)	1 (0.0)	0 (0.0)	0 (0.0)	
VNT	1192 (11.8)	1053 (10.4)	1061 (10.5)	928 (9.2)	
SD	1089 (10.8)	967 (9.6)	917 (9.1)	732 (7.2)	
BB	493 (4.9)	507 (5.0)	751 (7.4)	1042 (10.3)	
	Median (IQR)				
WEIGHT	77.00 (27.55)	79.20 (28.90)	79.30 (27.78)	76.20 (27.50)	-0.0443*
AGE	59.46 (21.55)	62.39 (24.73)	68.22 (23.35)	71.76 (19.57)	0.2322*
ELIX28DPT	5.00 (10.00)	5.00 (9.00)	4.00 (9.00)	5.00 (9.00)	-0.0050
TCO2	23.00 (6.50)	24.00 (5.50)	24.00 (5.50)	24.50 (5.50)	0.0440*
CREATININE	1.05 (1.05)	1.05 (1.10)	1.10 (1.10)	1.20 (1.45)	0.0097*
POTASSIUM	4.10 (0.75)	4.10 (0.70)	4.10 (0.70)	4.10 (0.70)	-0.0008*
CHLORIDE	106.00 (8.00)	106.00 (7.50)	105.50 (7.00)	105.00 (8.00)	-0.0126*
SODIUM	138.50 (5.00)	139.00 (5.50)	139.00 (6.00)	139.00 (5.00)	0.0254*
BUN	22.00 (25.88)	22.00 (24.00)	24.00 (26.00)	28.00 (29.00)	0.1845*
CALCIUM	8.00 (1.15)	8.10 (1.00)	8.20 (1.05)	8.35 (0.95)	0.0099*
MAGNESIUM	1.90 (0.45)	1.90 (0.40)	1.95 (0.35)	1.95 (0.40)	0.0001
WBC	11.50 (9.23)	11.40 (8.25)	11.20 (7.20)	10.90 (6.70)	-0.0305*
LACTATE	2.20 (2.20)	2.00 (1.75)	1.80 (1.50)	1.60 (1.22)	-0.0295*
ALT	38.00 (68.00)	31.00 (53.00)	30.00 (45.00)	27.00 (46.50)	-0.7697
AST	59.00 (124.75)	49.00 (84.00)	40.00 (71.00)	35.00 (54.88)	-2.8999*
SBP	103.00 (13.00)	111.00 (15.00)	120.00 (16.50)	137.00 (20.50)	0.8376*
DBP	59.00 (11.00)	56.00 (12.50)	55.50 (15.50)	56.00 (17.00)	-0.0722*
HR	94.00 (24.00)	89.00 (20.88)	86.00 (21.00)	80.00 (21.00)	-0.3131*
RR	19.00 (7.00)	18.00 (6.00)	18.00 (5.00)	18.00 (5.00)	-0.0225*
SPO2	98.00 (3.00)	98.00 (2.00)	98.00 (2.50)	98.00 (2.00)	0.0136*
TEMP	98.20 (1.70)	98.35 (1.60)	98.40 (1.45)	98.30 (1.39)	0.0035*
UO	1664.50 (2195.00)	1865.00 (2124.00)	1908.50 (2042.75)	1811.50 (1902.75)	4.6306*
PH	7.36 (0.10)	7.38 (0.08)	7.38 (0.09)	7.38 (0.08)	-0.0021
PAO2	119.00 (68.00)	119.50 (64.67)	123.00 (74.00)	118.00 (66.00)	0.0326
HEMOG	10.50 (2.45)	10.30 (2.15)	10.20 (2.20)	10.20 (2.20)	-0.0083*

Table 3: Characteristics of Sepsis patients (Angus Criteria) on Day 1 (N = 9,566)

	Pulse Pressure (Day 2)				Missing
	[3, 50)	[50, 61)	[61, 73.5)	[73.5, 143]	
	N (%)				
M	898 (10.3)	823 (9.5)	917 (10.6)	1031 (11.9)	
F	1248 (14.4)	1142 (13.2)	1105 (12.7)	1043 (12.0)	
WHITE	55 (0.6)	44 (0.5)	39 (0.4)	44 (0.5)	
BLACK	230 (2.6)	176 (2.0)	192 (2.2)	259 (3.0)	
HISPANIC	68 (0.8)	57 (0.7)	54 (0.6)	50 (0.6)	
ASIAN	308 (3.5)	281 (3.2)	303 (3.5)	247 (2.8)	
OTHER	1485 (17.1)	1407 (16.2)	1434 (16.5)	1474 (17.0)	
0x VSP	1185 (13.6)	1358 (15.6)	1558 (17.9)	1849 (21.3)	
1x VSP	542 (6.2)	410 (4.7)	323 (3.7)	177 (2.0)	
2x VSP	254 (2.9)	137 (1.6)	101 (1.2)	41 (0.5)	
3x VSP	125 (1.4)	41 (0.5)	30 (0.3)	5 (0.1)	
4x VSP	33 (0.4)	18 (0.2)	8 (0.1)	2 (0.0)	
5x VSP	3 (0.0)	1 (0.0)	2 (0.0)	0 (0.0)	
6x VSP	4 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
VNT	95 (1.1)	68 (0.8)	69 (0.8)	72 (0.8)	
SD	811 (9.3)	657 (7.6)	545 (6.3)	486 (5.6)	
BB	411 (4.7)	478 (5.5)	551 (6.3)	822 (9.5)	
	Median (IQR)				
WEIGHT	77.50 (27.20)	78.50 (28.80)	79.10 (28.40)	77.00 (27.80)	-0.0384*
AGE	59.45 (21.62)	62.77 (24.22)	68.81 (22.50)	72.34 (17.91)	0.2465*
ELIX28DPT	5.00 (10.00)	5.00 (9.00)	5.00 (9.00)	5.00 (9.00)	-0.0017
TCO2	23.50 (7.00)	24.00 (6.00)	24.00 (6.00)	24.50 (6.00)	0.0319*
CREATININE	1.10 (1.15)	1.10 (1.20)	1.20 (1.30)	1.30 (1.50)	0.0056*
POTASSIUM	4.05 (0.70)	4.00 (0.70)	4.00 (0.70)	4.00 (0.70)	-0.0012*
CHLORIDE	106.00 (9.00)	106.00 (7.00)	106.00 (8.00)	106.00 (8.00)	0.0141*
SODIUM	138.00 (6.00)	138.50 (5.00)	139.00 (6.00)	140.00 (5.50)	0.0363*
BUN	23.00 (27.00)	23.00 (27.00)	26.00 (28.88)	29.00 (28.50)	0.1393*
CALCIUM	8.05 (0.90)	8.20 (0.80)	8.20 (0.90)	8.30 (0.80)	0.0055*
MAGNESIUM	2.00 (0.40)	2.00 (0.35)	2.00 (0.31)	2.00 (0.40)	0.0001
WBC	11.00 (8.75)	11.10 (7.90)	10.90 (6.97)	11.30 (6.60)	-0.0165*
LACTATE	1.90 (1.95)	1.62 (1.14)	1.50 (0.90)	1.30 (0.90)	-0.0365*
ALT	49.25 (114.25)	43.00 (107.00)	44.00 (99.75)	34.00 (93.00)	-0.5808
AST	69.00 (159.25)	63.50 (134.12)	57.00 (110.00)	42.00 (98.00)	-4.9875*
SBP	102.00 (13.00)	112.00 (15.00)	122.50 (17.00)	141.00 (21.00)	0.9310*
DBP	59.00 (12.50)	57.00 (13.50)	57.00 (17.50)	56.50 (17.00)	-0.0614*
HR	92.50 (23.62)	87.00 (21.00)	84.50 (21.00)	80.00 (21.00)	-0.2755*
RR	19.50 (7.00)	19.00 (6.00)	19.00 (6.00)	19.00 (6.00)	-0.0098*
SPO2	97.00 (3.00)	97.00 (3.00)	98.00 (3.00)	98.00 (3.00)	0.0196*
TEMP	98.40 (1.77)	98.40 (1.62)	98.50 (1.50)	98.50 (1.40)	0.0012
UO	1410.00 (1822.75)	1495.00 (1896.25)	1565.00 (1974.50)	1765.00 (2034.00)	8.5058*
PH	7.38 (0.09)	7.39 (0.08)	7.39 (0.08)	7.40 (0.08)	-0.0004
PAO2	100.00 (44.50)	101.00 (44.00)	106.50 (45.00)	104.00 (50.00)	0.0308
HEMOG	10.15 (2.00)	10.10 (1.81)	10.00 (1.90)	10.00 (1.65)	-0.0047*

Table 4: Characteristics of Sepsis patients (Angus Criteria) on Day 2 (N = 9,566)

N	Pulse Pressure (Day 3)				
	[-46, 50)	[50, 60.5)	[60.5, 72.5)	[72.5, 133.5]	Missing
	1953	2106	1814	1937	1756
	[3, 50)	[50, 61)	[61, 73.5)	[73.5, 143]	Missing
N (%)					
M	653 (9.9)	709 (10.8)	712 (10.8)	788 (12.0)	
F	897 (13.6)	915 (13.9)	832 (12.7)	844 (12.8)	
WHITE	39 (0.6)	35 (0.5)	31 (0.5)	33 (0.5)	
BLACK	154 (2.3)	167 (2.5)	147 (2.2)	199 (3.0)	
HISPANIC	42 (0.6)	52 (0.8)	38 (0.6)	27 (0.4)	
ASIAN	224 (3.4)	248 (3.8)	242 (3.7)	207 (3.1)	
OTHER	1091 (16.6)	1122 (17.1)	1086 (16.5)	1166 (17.7)	
0x VSP	884 (13.4)	1153 (17.5)	1229 (18.7)	1466 (22.3)	
1x VSP	376 (5.7)	320 (4.9)	228 (3.5)	147 (2.2)	
2x VSP	180 (2.7)	107 (1.6)	65 (1.0)	15 (0.2)	
3x VSP	83 (1.3)	35 (0.5)	15 (0.2)	4 (0.1)	
4x VSP	23 (0.3)	8 (0.1)	7 (0.1)	0 (0.0)	
5x VSP	4 (0.1)	1 (0.0)	0 (0.0)	0 (0.0)	
VNT	54 (0.8)	51 (0.8)	68 (1.0)	74 (1.1)	
SD	657 (10.0)	613 (9.3)	461 (7.0)	412 (6.3)	
BB	328 (5.0)	375 (5.7)	453 (6.9)	635 (9.7)	
Median (IQR)					
WEIGHT	76.90 (26.70)	78.50 (29.58)	80.00 (29.40)	77.95 (27.00)	-0.0149
AGE	58.82 (22.23)	64.10 (25.38)	69.18 (22.43)	72.28 (17.88)	0.2412*
ELIX28DPT	6.00 (10.00)	5.00 (10.00)	5.00 (10.00)	5.00 (8.25)	-0.0059
TCO2	24.00 (6.00)	25.00 (6.00)	25.00 (6.00)	25.00 (6.00)	0.0244*
CREATININE	1.10 (1.30)	1.10 (1.20)	1.10 (1.27)	1.30 (1.45)	0.0041*
POTASSIUM	4.00 (0.65)	4.00 (0.60)	3.90 (0.60)	3.95 (0.65)	-0.0017*
CHLORIDE	105.00 (8.50)	106.00 (8.50)	106.00 (8.50)	106.00 (8.00)	0.0213*
SODIUM	138.00 (6.00)	139.00 (6.00)	140.00 (6.50)	140.00 (6.00)	0.0375*
BUN	25.50 (29.50)	24.00 (29.50)	27.25 (27.62)	30.00 (30.00)	0.1341*
CALCIUM	8.10 (0.95)	8.15 (0.90)	8.20 (0.85)	8.25 (0.80)	0.0039*
MAGNESIUM	2.00 (0.35)	2.00 (0.35)	2.00 (0.45)	2.00 (0.40)	0.0005
WBC	11.00 (7.90)	10.80 (7.23)	10.60 (6.90)	10.75 (6.20)	-0.0131*
LACTATE	1.85 (1.77)	1.60 (0.95)	1.50 (1.00)	1.20 (0.70)	-0.0353*
ALT	57.00 (135.50)	43.00 (110.00)	45.00 (111.75)	30.00 (77.25)	-0.1808
AST	74.50 (184.88)	61.50 (135.50)	49.00 (101.25)	42.00 (64.50)	-3.8346*
SBP	102.00 (13.50)	113.00 (14.00)	125.00 (18.50)	143.00 (21.00)	0.9512*
DBP	59.00 (13.00)	58.00 (13.50)	58.00 (18.00)	57.50 (17.00)	-0.0464*
HR	92.00 (23.00)	87.00 (20.00)	83.50 (20.00)	78.50 (18.00)	-0.2600*
RR	20.00 (7.00)	19.00 (6.50)	19.00 (6.00)	19.00 (6.00)	-0.0100*
SPO2	97.00 (3.00)	97.50 (3.00)	97.50 (3.00)	97.75 (3.00)	0.0177*
TEMP	98.40 (1.85)	98.40 (1.60)	98.42 (1.60)	98.40 (1.60)	0.0005
UO	1420.00 (2038.00)	1670.00 (2167.50)	1790.00 (2325.00)	1940.00 (2458.00)	13.2291*
PH	7.39 (0.09)	7.40 (0.08)	7.39 (0.09)	7.40 (0.08)	-0.0017
PAO2	100.00 (40.25)	101.00 (42.75)	101.50 (41.00)	106.50 (45.00)	0.0702
HEMOG	10.10 (1.70)	10.10 (1.80)	10.00 (1.60)	10.00 (1.60)	-0.0035*

Table 5: Characteristics of Sepsis patients (Angus Criteria) on Day 3 (N = 9,566)

	Pulse Pressure (Day 1)				Missing
	[21, 46.5)	[46.5, 58)	[58, 70)	[70, 120]	
	N (%)				
M	178 (7.0)	194 (7.6)	235 (9.2)	324 (12.7)	
F	419 (16.4)	428 (16.8)	320 (12.5)	313 (12.3)	
WHITE	9 (0.4)	9 (0.4)	4 (0.2)	4 (0.2)	
BLACK	34 (1.3)	31 (1.2)	31 (1.2)	31 (1.2)	
HISPANIC	9 (0.4)	17 (0.7)	9 (0.4)	11 (0.4)	
ASIAN	135 (5.3)	175 (6.8)	153 (6.0)	175 (6.8)	
OTHER	410 (16.0)	390 (15.3)	358 (14.0)	416 (16.3)	
0x VSP	382 (15.0)	479 (18.7)	460 (18.0)	529 (20.7)	
1x VSP	133 (5.2)	97 (3.8)	79 (3.1)	92 (3.6)	
2x VSP	51 (2.0)	34 (1.3)	12 (0.5)	14 (0.5)	
3x VSP	19 (0.7)	7 (0.3)	2 (0.1)	2 (0.1)	
4x VSP	8 (0.3)	5 (0.2)	2 (0.1)	0 (0.0)	
5x VSP	3 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	
6x VSP	1 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
VNT	141 (5.5)	116 (4.5)	95 (3.7)	121 (4.7)	
SD	131 (5.1)	108 (4.2)	80 (3.1)	103 (4.0)	
BB	295 (11.5)	319 (12.5)	280 (11.0)	296 (11.6)	
	Median (IQR)				
WEIGHT	82.00 (25.20)	82.00 (28.00)	79.40 (25.70)	79.00 (24.90)	-0.1407*
AGE	60.40 (20.86)	62.74 (20.84)	70.49 (20.68)	74.83 (15.79)	0.3081*
ELIX28DPT	0.00 (5.00)	0.00 (5.00)	0.00 (5.00)	0.00 (5.00)	-0.0111
TCO2	24.00 (5.00)	25.00 (3.50)	25.00 (4.00)	25.00 (4.00)	0.0432*
CREATININE	0.90 (0.40)	0.90 (0.50)	0.90 (0.60)	1.00 (0.61)	0.0075*
POTASSIUM	4.05 (0.50)	4.05 (0.50)	4.00 (0.50)	4.00 (0.55)	-0.0019*
CHLORIDE	104.00 (6.00)	104.50 (5.00)	104.00 (5.00)	103.50 (5.50)	-0.0235*
SODIUM	138.00 (4.00)	139.00 (3.50)	139.00 (4.00)	138.50 (5.00)	0.0038
BUN	17.00 (12.00)	17.00 (10.38)	18.00 (13.75)	20.00 (19.00)	0.1575*
CALCIUM	8.47 (0.80)	8.53 (0.70)	8.60 (0.70)	8.50 (0.74)	0.0028*
MAGNESIUM	1.95 (0.35)	1.90 (0.30)	1.90 (0.30)	1.90 (0.30)	-0.0009*
WBC	11.10 (5.53)	10.35 (5.00)	10.07 (4.76)	9.50 (4.60)	-0.0317*
LACTATE	2.00 (2.59)	2.00 (2.20)	1.60 (1.42)	1.70 (1.48)	-0.0351*
ALT	47.00 (58.00)	37.00 (42.00)	30.00 (31.50)	26.00 (31.50)	-1.6706*
AST	117.00 (232.00)	72.75 (126.38)	49.50 (81.25)	35.50 (53.75)	-4.1369*
SBP	102.00 (12.00)	110.00 (12.00)	118.00 (14.50)	130.00 (19.00)	0.7624*
DBP	62.00 (13.00)	60.00 (15.00)	58.00 (15.75)	54.50 (16.00)	-0.1821*
HR	84.50 (25.00)	77.00 (20.50)	75.00 (18.25)	70.00 (17.00)	-0.3511*
RR	18.50 (5.50)	17.50 (4.00)	17.50 (4.00)	17.75 (4.00)	-0.0244*
SPO2	98.00 (3.00)	97.50 (3.00)	97.50 (3.00)	97.00 (3.00)	0.0013
TEMP	98.30 (1.30)	98.10 (1.15)	98.20 (1.16)	98.00 (1.10)	-0.0044
UO	2219.50 (2197.25)	2272.50 (2033.75)	1952.50 (1820.00)	1930.00 (1772.50)	-10.4698*
PH	7.38 (0.09)	7.38 (0.08)	7.39 (0.07)	7.40 (0.08)	0.0250
PAO2	117.00 (72.12)	123.00 (99.00)	120.75 (75.75)	128.00 (126.25)	0.5664*
HEMOG	12.20 (2.60)	12.00 (2.70)	11.80 (2.70)	11.00 (2.05)	-0.0305*

Table 6: Characteristics of CCU patients (non-sepsis) (N = 2,579)

	Pulse Pressure (Day 2)				Missing
	[21, 46.5)	[46.5, 58)	[58, 70)	[70, 120]	
	N (%)				
M	178 (7.0)	194 (7.6)	235 (9.2)	324 (12.7)	
F	419 (16.4)	428 (16.8)	320 (12.5)	313 (12.3)	
WHITE	9 (0.4)	9 (0.4)	4 (0.2)	4 (0.2)	
BLACK	34 (1.3)	31 (1.2)	31 (1.2)	31 (1.2)	
HISPANIC	9 (0.4)	17 (0.7)	9 (0.4)	11 (0.4)	
ASIAN	135 (5.3)	175 (6.8)	153 (6.0)	175 (6.8)	
OTHER	410 (16.0)	390 (15.3)	358 (14.0)	416 (16.3)	
0x VSP	382 (15.0)	479 (18.7)	460 (18.0)	529 (20.7)	
1x VSP	133 (5.2)	97 (3.8)	79 (3.1)	92 (3.6)	
2x VSP	51 (2.0)	34 (1.3)	12 (0.5)	14 (0.5)	
3x VSP	19 (0.7)	7 (0.3)	2 (0.1)	2 (0.1)	
4x VSP	8 (0.3)	5 (0.2)	2 (0.1)	0 (0.0)	
5x VSP	3 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	
6x VSP	1 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
VNT	141 (5.5)	116 (4.5)	95 (3.7)	121 (4.7)	
SD	131 (5.1)	108 (4.2)	80 (3.1)	103 (4.0)	
BB	295 (11.5)	319 (12.5)	280 (11.0)	296 (11.6)	
	Median (IQR)				
WEIGHT	82.00 (25.20)	82.00 (28.00)	79.40 (25.70)	79.00 (24.90)	-0.1407*
AGE	60.40 (20.86)	62.74 (20.84)	70.49 (20.68)	74.83 (15.79)	0.3081*
ELIX28DPT	0.00 (5.00)	0.00 (5.00)	0.00 (5.00)	0.00 (5.00)	-0.0111
TCO2	24.00 (5.00)	25.00 (3.50)	25.00 (4.00)	25.00 (4.00)	0.0432*
CREATININE	0.90 (0.40)	0.90 (0.50)	0.90 (0.60)	1.00 (0.61)	0.0075*
POTASSIUM	4.05 (0.50)	4.05 (0.50)	4.00 (0.50)	4.00 (0.55)	-0.0019*
CHLORIDE	104.00 (6.00)	104.50 (5.00)	104.00 (5.00)	103.50 (5.50)	-0.0235*
SODIUM	138.00 (4.00)	139.00 (3.50)	139.00 (4.00)	138.50 (5.00)	0.0038
BUN	17.00 (12.00)	17.00 (10.38)	18.00 (13.75)	20.00 (19.00)	0.1575*
CALCIUM	8.47 (0.80)	8.53 (0.70)	8.60 (0.70)	8.50 (0.74)	0.0028*
MAGNESIUM	1.95 (0.35)	1.90 (0.30)	1.90 (0.30)	1.90 (0.30)	-0.0009*
WBC	11.10 (5.53)	10.35 (5.00)	10.07 (4.76)	9.50 (4.60)	-0.0317*
LACTATE	2.00 (2.59)	2.00 (2.20)	1.60 (1.42)	1.70 (1.48)	-0.0351*
ALT	47.00 (58.00)	37.00 (42.00)	30.00 (31.50)	26.00 (31.50)	-1.6706*
AST	117.00 (232.00)	72.75 (126.38)	49.50 (81.25)	35.50 (53.75)	-4.1369*
SBP	102.00 (12.00)	110.00 (12.00)	118.00 (14.50)	130.00 (19.00)	0.7624*
DBP	62.00 (13.00)	60.00 (15.00)	58.00 (15.75)	54.50 (16.00)	-0.1821*
HR	84.50 (25.00)	77.00 (20.50)	75.00 (18.25)	70.00 (17.00)	-0.3511*
RR	18.50 (5.50)	17.50 (4.00)	17.50 (4.00)	17.75 (4.00)	-0.0244*
SPO2	98.00 (3.00)	97.50 (3.00)	97.50 (3.00)	97.00 (3.00)	0.0013
TEMP	98.30 (1.30)	98.10 (1.15)	98.20 (1.16)	98.00 (1.10)	-0.0044
UO	2219.50 (2197.25)	2272.50 (2033.75)	1952.50 (1820.00)	1930.00 (1772.50)	-10.4698*
PH	7.38 (0.09)	7.38 (0.08)	7.39 (0.07)	7.40 (0.08)	0.0250
PAO2	117.00 (72.12)	123.00 (99.00)	120.75 (75.75)	128.00 (126.25)	0.5664*
HEMOG	12.20 (2.60)	12.00 (2.70)	11.80 (2.70)	11.00 (2.05)	-0.0305*

Table 7: Characteristics of CCU patients (non-sepsis) (N = 2,579)

	Pulse Pressure (Day 3)				Missing
	[21, 46.5)	[46.5, 58)	[58, 70)	[70, 120]	
	N (%)				
M	178 (7.0)	194 (7.6)	235 (9.2)	324 (12.7)	
F	419 (16.4)	428 (16.8)	320 (12.5)	313 (12.3)	
WHITE	9 (0.4)	9 (0.4)	4 (0.2)	4 (0.2)	
BLACK	34 (1.3)	31 (1.2)	31 (1.2)	31 (1.2)	
HISPANIC	9 (0.4)	17 (0.7)	9 (0.4)	11 (0.4)	
ASIAN	135 (5.3)	175 (6.8)	153 (6.0)	175 (6.8)	
OTHER	410 (16.0)	390 (15.3)	358 (14.0)	416 (16.3)	
0x VSP	382 (15.0)	479 (18.7)	460 (18.0)	529 (20.7)	
1x VSP	133 (5.2)	97 (3.8)	79 (3.1)	92 (3.6)	
2x VSP	51 (2.0)	34 (1.3)	12 (0.5)	14 (0.5)	
3x VSP	19 (0.7)	7 (0.3)	2 (0.1)	2 (0.1)	
4x VSP	8 (0.3)	5 (0.2)	2 (0.1)	0 (0.0)	
5x VSP	3 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	
6x VSP	1 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
VNT	141 (5.5)	116 (4.5)	95 (3.7)	121 (4.7)	
SD	131 (5.1)	108 (4.2)	80 (3.1)	103 (4.0)	
BB	295 (11.5)	319 (12.5)	280 (11.0)	296 (11.6)	
	Median (IQR)				
WEIGHT	82.00 (25.20)	82.00 (28.00)	79.40 (25.70)	79.00 (24.90)	-0.1407*
AGE	60.40 (20.86)	62.74 (20.84)	70.49 (20.68)	74.83 (15.79)	0.3081*
ELIX28DPT	0.00 (5.00)	0.00 (5.00)	0.00 (5.00)	0.00 (5.00)	-0.0111
TCO2	24.00 (5.00)	25.00 (3.50)	25.00 (4.00)	25.00 (4.00)	0.0432*
CREATININE	0.90 (0.40)	0.90 (0.50)	0.90 (0.60)	1.00 (0.61)	0.0075*
POTASSIUM	4.05 (0.50)	4.05 (0.50)	4.00 (0.50)	4.00 (0.55)	-0.0019*
CHLORIDE	104.00 (6.00)	104.50 (5.00)	104.00 (5.00)	103.50 (5.50)	-0.0235*
SODIUM	138.00 (4.00)	139.00 (3.50)	139.00 (4.00)	138.50 (5.00)	0.0038
BUN	17.00 (12.00)	17.00 (10.38)	18.00 (13.75)	20.00 (19.00)	0.1575*
CALCIUM	8.47 (0.80)	8.53 (0.70)	8.60 (0.70)	8.50 (0.74)	0.0028*
MAGNESIUM	1.95 (0.35)	1.90 (0.30)	1.90 (0.30)	1.90 (0.30)	-0.0009*
WBC	11.10 (5.53)	10.35 (5.00)	10.07 (4.76)	9.50 (4.60)	-0.0317*
LACTATE	2.00 (2.59)	2.00 (2.20)	1.60 (1.42)	1.70 (1.48)	-0.0351*
ALT	47.00 (58.00)	37.00 (42.00)	30.00 (31.50)	26.00 (31.50)	-1.6706*
AST	117.00 (232.00)	72.75 (126.38)	49.50 (81.25)	35.50 (53.75)	-4.1369*
SBP	102.00 (12.00)	110.00 (12.00)	118.00 (14.50)	130.00 (19.00)	0.7624*
DBP	62.00 (13.00)	60.00 (15.00)	58.00 (15.75)	54.50 (16.00)	-0.1821*
HR	84.50 (25.00)	77.00 (20.50)	75.00 (18.25)	70.00 (17.00)	-0.3511*
RR	18.50 (5.50)	17.50 (4.00)	17.50 (4.00)	17.75 (4.00)	-0.0244*
SPO2	98.00 (3.00)	97.50 (3.00)	97.50 (3.00)	97.00 (3.00)	0.0013
TEMP	98.30 (1.30)	98.10 (1.15)	98.20 (1.16)	98.00 (1.10)	-0.0044
UO	2219.50 (2197.25)	2272.50 (2033.75)	1952.50 (1820.00)	1930.00 (1772.50)	-10.4698*
PH	7.38 (0.09)	7.38 (0.08)	7.39 (0.07)	7.40 (0.08)	0.0250
PAO2	117.00 (72.12)	123.00 (99.00)	120.75 (75.75)	128.00 (126.25)	0.5664*
HEMOG	12.20 (2.60)	12.00 (2.70)	11.80 (2.70)	11.00 (2.05)	-0.0305*

Table 8: Characteristics of CCU patients (non-sepsis) (N = 2,579)

	Pulse Pressure (Day 1)				Missing
	[18, 52)	[52, 61.5)	[61.5, 74)	[74, 137]	
	N (%)				
M	123 (9.8)	108 (8.6)	141 (11.3)	155 (12.4)	
F	185 (14.8)	199 (15.9)	153 (12.2)	155 (12.4)	
WHITE	8 (0.6)	9 (0.7)	6 (0.5)	5 (0.4)	
BLACK	29 (2.3)	26 (2.1)	38 (3.0)	43 (3.4)	
HISPANIC	14 (1.1)	13 (1.0)	3 (0.2)	6 (0.5)	
ASIAN	41 (3.3)	43 (3.4)	42 (3.4)	32 (2.6)	
OTHER	216 (17.2)	216 (17.2)	205 (16.4)	224 (17.9)	
0x VSP	183 (14.6)	232 (18.5)	250 (20.0)	292 (23.3)	
1x VSP	63 (5.0)	45 (3.6)	29 (2.3)	13 (1.0)	
2x VSP	30 (2.4)	16 (1.3)	8 (0.6)	4 (0.3)	
3x VSP	18 (1.4)	11 (0.9)	5 (0.4)	1 (0.1)	
4x VSP	13 (1.0)	3 (0.2)	2 (0.2)	0 (0.0)	
5x VSP	1 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	
VNT	135 (10.8)	107 (8.5)	83 (6.6)	71 (5.7)	
SD	129 (10.3)	100 (8.0)	86 (6.9)	53 (4.2)	
BB	44 (3.5)	71 (5.7)	78 (6.2)	121 (9.7)	
	Median (IQR)				
WEIGHT	72.95 (27.00)	78.60 (28.80)	78.15 (31.08)	74.00 (25.97)	-0.0325
AGE	60.56 (22.29)	60.79 (29.06)	70.84 (22.56)	76.02 (14.09)	0.2986*
ELIX28DPT	5.00 (9.00)	5.00 (10.00)	4.00 (10.00)	5.00 (9.00)	-0.0212
TCO2	22.50 (6.50)	24.00 (6.00)	23.00 (5.50)	24.00 (6.00)	0.0364*
CREATININE	0.93 (0.99)	1.00 (0.91)	1.08 (1.05)	1.10 (1.10)	0.0098*
POTASSIUM	4.05 (0.70)	4.00 (0.60)	4.10 (0.60)	3.90 (0.65)	-0.0009
CHLORIDE	107.00 (8.00)	106.00 (8.00)	107.00 (6.00)	106.00 (6.00)	-0.0188
SODIUM	139.00 (6.00)	139.50 (6.50)	140.00 (4.50)	140.00 (5.12)	0.0197*
BUN	23.00 (25.50)	24.00 (26.12)	27.00 (31.75)	27.75 (26.25)	0.1297*
CALCIUM	7.95 (1.20)	8.05 (0.90)	8.05 (0.85)	8.28 (0.85)	0.0085*
MAGNESIUM	1.90 (0.40)	1.90 (0.40)	1.90 (0.35)	1.90 (0.40)	-0.0002
WBC	10.80 (8.25)	11.05 (9.21)	10.30 (8.62)	10.80 (6.47)	-0.0015
LACTATE	2.35 (2.40)	2.20 (1.43)	1.98 (1.85)	1.90 (1.30)	-0.0284*
ALT	31.75 (62.75)	28.00 (36.25)	29.00 (37.50)	23.00 (36.00)	0.7918
AST	56.50 (129.25)	50.00 (76.00)	40.00 (61.50)	32.00 (36.00)	-0.0879
SBP	104.00 (14.00)	112.00 (15.00)	122.25 (20.38)	140.25 (22.38)	0.8715*
DBP	58.00 (11.12)	54.50 (12.25)	55.75 (17.00)	57.00 (15.00)	-0.0175
HR	94.00 (24.62)	86.50 (25.25)	85.75 (21.88)	80.00 (20.00)	-0.2820*
RR	18.00 (5.50)	19.00 (6.00)	19.00 (6.00)	18.00 (5.00)	-0.0047
SPO2	98.00 (2.50)	98.00 (2.00)	98.00 (2.00)	98.00 (2.00)	0.0062
TEMP	98.20 (1.50)	98.20 (1.50)	98.20 (1.40)	98.30 (1.40)	0.0027
UO	1415.00 (1608.50)	1680.00 (1891.25)	2065.00 (2015.00)	1800.00 (1427.50)	4.5197
PH	7.34 (0.11)	7.37 (0.12)	7.38 (0.11)	7.39 (0.09)	-0.0009
PAO2	118.00 (59.00)	121.25 (75.50)	120.50 (63.38)	113.50 (66.00)	0.3094
HEMOG	10.30 (1.96)	10.20 (1.65)	10.10 (2.17)	10.02 (2.00)	-0.0019

Table 9: Characteristics of GI Bleed patients on Day 1 (N = 1,214)

	Pulse Pressure (Day 2)				Missing
	[18, 52)	[52, 61.5)	[61.5, 74)	[74, 137]	
	N (%)				
M	100 (9.4)	96 (9.0)	108 (10.1)	130 (12.2)	
F	148 (13.9)	169 (15.8)	141 (13.2)	119 (11.1)	
WHITE	8 (0.7)	7 (0.7)	8 (0.7)	3 (0.3)	
BLACK	25 (2.3)	18 (1.7)	27 (2.5)	33 (3.1)	
HISPANIC	11 (1.0)	7 (0.7)	5 (0.5)	3 (0.3)	
ASIAN	36 (3.4)	37 (3.5)	33 (3.1)	31 (2.9)	
OTHER	168 (15.7)	196 (18.4)	176 (16.5)	179 (16.8)	
0x VSP	162 (15.2)	210 (19.7)	213 (19.9)	229 (21.4)	
1x VSP	39 (3.7)	34 (3.2)	27 (2.5)	13 (1.2)	
2x VSP	23 (2.2)	16 (1.5)	5 (0.5)	7 (0.7)	
3x VSP	17 (1.6)	3 (0.3)	2 (0.2)	0 (0.0)	
4x VSP	7 (0.7)	1 (0.1)	2 (0.2)	0 (0.0)	
5x VSP	0 (0.0)	1 (0.1)	0 (0.0)	0 (0.0)	
VNT	10 (0.9)	14 (1.3)	6 (0.6)	9 (0.8)	
SD	101 (9.5)	80 (7.5)	61 (5.7)	38 (3.6)	
BB	46 (4.3)	64 (6.0)	70 (6.6)	95 (8.9)	
	Median (IQR)				
WEIGHT	74.95 (27.22)	79.00 (30.40)	77.75 (25.90)	75.05 (26.50)	-0.0228
AGE	60.38 (21.69)	66.81 (27.79)	71.08 (22.87)	76.30 (14.39)	0.2502*
ELIX28DPT	6.00 (8.75)	5.00 (10.00)	5.00 (10.00)	5.00 (10.00)	-0.0218
TCO2	23.00 (8.00)	24.00 (5.88)	24.00 (6.00)	24.00 (5.25)	0.0259*
CREATININE	1.00 (1.32)	1.00 (1.04)	1.10 (1.18)	1.10 (1.10)	0.0039
POTASSIUM	4.00 (0.80)	4.00 (0.60)	3.98 (0.60)	3.90 (0.60)	-0.0013
CHLORIDE	107.00 (10.00)	106.75 (7.00)	107.50 (7.50)	106.00 (8.00)	-0.0043
SODIUM	140.00 (7.00)	139.00 (6.00)	140.00 (5.00)	140.00 (6.00)	0.0190*
BUN	23.00 (27.38)	23.00 (25.75)	24.00 (35.00)	25.00 (27.00)	0.0858
CALCIUM	8.00 (0.90)	8.25 (0.87)	8.05 (0.80)	8.20 (0.77)	0.0034*
MAGNESIUM	2.00 (0.40)	1.95 (0.30)	2.00 (0.40)	1.90 (0.40)	-0.0002
WBC	11.30 (8.15)	10.70 (7.90)	10.55 (6.25)	11.50 (7.75)	0.0009
LACTATE	2.15 (2.23)	1.80 (0.90)	1.60 (1.28)	1.73 (1.03)	-0.0179
ALT	46.50 (132.00)	29.50 (36.50)	55.00 (161.50)	40.00 (175.75)	7.8612
AST	97.50 (200.00)	47.50 (75.25)	84.00 (184.00)	52.00 (162.75)	4.3695
SBP	102.00 (12.00)	114.00 (14.00)	124.00 (17.00)	144.50 (20.00)	0.9804*
DBP	57.00 (12.00)	58.00 (12.50)	56.00 (16.00)	58.00 (17.00)	-0.0153
HR	95.25 (29.00)	86.00 (23.00)	83.00 (20.00)	80.00 (20.00)	-0.2705*
RR	19.00 (7.00)	18.00 (5.50)	19.00 (6.00)	19.00 (5.00)	0.0067
SPO2	97.00 (3.00)	98.00 (3.00)	98.00 (3.00)	98.00 (3.00)	0.0220*
TEMP	98.34 (1.61)	98.20 (1.35)	98.25 (1.42)	98.20 (1.20)	-0.0022
UO	1155.50 (1620.25)	1468.00 (1637.50)	1552.50 (1607.75)	1459.00 (1486.25)	3.2110
PH	7.37 (0.11)	7.40 (0.08)	7.39 (0.09)	7.41 (0.08)	0.0022
PAO2	94.50 (46.12)	99.00 (52.00)	108.50 (52.00)	100.00 (62.88)	0.1516
HEMOG	10.20 (1.80)	10.40 (1.90)	10.17 (1.73)	10.40 (1.49)	0.0004

Table 10: Characteristics of GI Bleed patients (N = 1,214)

	Pulse Pressure (Day 3)				
	[18, 52)	[52, 61.5)	[61.5, 74)	[74, 137]	Missing
	N (%)				
M	76 (9.5)	76 (9.5)	82 (10.3)	90 (11.3)	
F	109 (13.7)	113 (14.2)	107 (13.4)	104 (13.0)	
WHITE	7 (0.9)	1 (0.1)	7 (0.9)	5 (0.6)	
BLACK	23 (2.9)	10 (1.3)	18 (2.3)	22 (2.8)	
HISPANIC	7 (0.9)	2 (0.3)	4 (0.5)	3 (0.4)	
ASIAN	29 (3.6)	28 (3.5)	14 (1.8)	29 (3.6)	
OTHER	119 (14.9)	148 (18.5)	146 (18.3)	135 (16.9)	
0x VSP	122 (15.3)	131 (16.4)	160 (20.1)	180 (22.6)	
1x VSP	30 (3.8)	34 (4.3)	19 (2.4)	13 (1.6)	
2x VSP	20 (2.5)	15 (1.9)	10 (1.3)	1 (0.1)	
3x VSP	12 (1.5)	8 (1.0)	0 (0.0)	0 (0.0)	
4x VSP	1 (0.1)	1 (0.1)	0 (0.0)	0 (0.0)	
VNT	1 (0.1)	12 (1.5)	6 (0.8)	1 (0.1)	
SD	66 (8.3)	72 (9.0)	46 (5.8)	40 (5.0)	
BB	36 (4.5)	42 (5.3)	52 (6.5)	67 (8.4)	
	Median (IQR)				
WEIGHT	72.80 (31.00)	75.50 (25.20)	77.75 (27.22)	77.90 (27.90)	0.0459
AGE	60.07 (20.81)	64.70 (22.84)	71.88 (20.36)	76.01 (14.91)	0.2495*
ELIX28DPT	6.00 (9.00)	6.00 (8.00)	6.00 (10.00)	4.00 (9.00)	-0.0437*
TCO2	23.00 (7.00)	24.00 (6.00)	25.00 (7.00)	24.00 (5.50)	0.0101
CREATININE	1.08 (1.54)	1.08 (1.26)	0.90 (1.06)	1.15 (1.05)	-0.0004
POTASSIUM	3.90 (0.60)	4.00 (0.66)	3.90 (0.65)	3.90 (0.68)	-0.0015
CHLORIDE	105.50 (8.00)	107.00 (7.00)	106.00 (7.75)	107.00 (8.00)	0.0174
SODIUM	138.00 (7.00)	139.00 (6.62)	139.50 (5.38)	140.00 (6.00)	0.0182
BUN	25.00 (31.12)	27.00 (30.00)	24.50 (23.50)	26.50 (34.25)	0.0365
CALCIUM	8.00 (0.90)	8.10 (1.00)	8.10 (0.90)	8.20 (0.80)	0.0023
MAGNESIUM	2.00 (0.40)	2.00 (0.40)	2.00 (0.32)	2.00 (0.40)	0.0001
WBC	12.00 (7.12)	10.90 (7.60)	11.38 (5.92)	10.70 (7.20)	-0.0114
LACTATE	1.75 (2.62)	1.65 (0.91)	1.88 (1.45)	1.40 (1.80)	-0.0225*
ALT	36.00 (61.00)	35.50 (68.50)	27.00 (111.00)	73.00 (530.50)	15.9631*
AST	69.00 (114.50)	45.50 (76.75)	36.00 (159.50)	75.00 (369.00)	10.9267
SBP	102.00 (15.50)	112.00 (13.50)	126.00 (17.50)	144.00 (17.75)	1.0092*
DBP	57.50 (13.00)	56.00 (13.00)	59.00 (16.00)	58.50 (16.12)	0.0175
HR	92.00 (24.50)	86.50 (23.50)	88.00 (17.50)	79.00 (18.50)	-0.2227*
RR	19.00 (7.00)	19.00 (7.00)	19.50 (5.25)	19.00 (6.00)	-0.0030
SPO2	97.00 (3.00)	97.50 (3.00)	97.00 (3.00)	97.00 (3.00)	0.0117*
TEMP	98.30 (1.71)	98.35 (1.75)	98.60 (1.60)	98.20 (1.45)	-0.0007
UO	1209.00 (1556.00)	1520.00 (2276.00)	1845.00 (2322.50)	1495.00 (1655.00)	7.3588
PH	7.38 (0.10)	7.40 (0.08)	7.41 (0.09)	7.40 (0.08)	0.0003
PAO2	92.00 (44.88)	102.00 (42.88)	97.50 (40.50)	110.00 (39.00)	0.2051
HEMOG	10.30 (1.43)	10.40 (1.40)	10.37 (1.21)	10.25 (1.50)	-0.0007

Table 11: Characteristics of GI Bleed patients (N = 1,214)