

**TableS1** Area under the curve(AUC), cut-off value, sensitivity, specificity for predicting 28-day mortality of AECOPD patients in the ICU by RHR.

Variable	AUC	95CI	Cut-off	Specificity	Sensitivity
RHR	0.624	0.585-0.662	0.473	59.20%	62.12%

**TableS2** Variance inflation factor (VIF) for each variable.

Variable	VIF
Age	1.450
Gender	1.165
Ethnicity	1.074
HR	1.227
SBP	1.125
DBP	1.103
MBP	1.101
SpO2	1.246
RR	1.153
RDW	1.377
Hematocrit	1.597
WBC	1.264
PLT	1.281
Potassium	1.350
Sodium	1.205
Glucose	1.216
Creatinine	1.841
PH	1.504
PaCO2	3.194
Anion gap	1.739
Bicarbonate	3.175
Hypertension	1.238
Diabetes	1.103
Asthma	1.065
Pulmonary embolism	1.065
Anemia	1.091
Malignant blood diseases	1.225
Connective tissue disease	1.059
Peripheral vascular disease	1.103
Myocardial infarct	1.091
Liver disease	1.102
Chronic renal disease	1.149

Malignant cancer	1.085
Sepsis	1.338
Vasopressin	1.233
Corticosteroids	1.086
Bronchodilator	1.140
Infusion	1.167
Blood transfusion	1.299
Invasive mechanical ventilation	2.085
Non-invasive mechanical ventilation	1.289
SOFA	3.536
SAPS II	2.694
Length of ICU stay	1.189

**TableS3** Area under the curve(AUC), cut-off value, sensitivity, specificity for predicting 28-day mortality of AECOPD patients in the ICU by RHR, RDW and HCT.

Variable	AUC	95CI	Cut-off	Specificity	Sensitivity
RHR	0.624	0.585-0.662	0.473	59.20%	62.12%
RDW	0.593	0.553-0.632	14.6	73.60%	43.49%
HCT	0.616	0.576-0.654	35.5	69.60%	49.10%

**Table S4** Baseline characteristics of AECOPD patients in the eICU database

Variable	Total(n=3125)	Survivors(n=2857)	Non-survivors(n=268)	P-Value
Demographic				
Age	68.0 (60.0, 76.0)	67.0 (59.0, 75.0)	73.0 (66.0, 80.0)	<0.001
Male	1449 (46.4)	1327 (46.5)	122 (45.5)	0.772
Ethnicity				
White	2603 (83.3)	2364 (82.7)	239 (89.2)	0.024
Black	285 (9.1)	268 (9.4)	17 (6.3)	
Others	237 (7.6)	225 (7.9)	12 (4.5)	
Vital signs				
HR (beats/min)	90.0 (80.7, 99.1)	90.00 (80.3, 98.7)	92.9 (86.0, 106.2)	<0.001
RR (beats/min)	20.9 (18.3, 23.3)	20.9 (18.3, 23.1)	21.1 (18.9, 24.2)	0.014
SBP (mmHg)	122.4 (110.7, 132.3)	122.4(111.1, 132.8)	113.9 (103.8, 124.0)	<0.001
DBP (mmHg)	67.0 (60.0, 73.0)	67.0 (60.3, 73.4)	63.9 (57.0, 69.3)	<0.001
SpO2 (%)	95.8 (94.8, 97.3)	95.8 (94.7, 97.2)	95.8 (95.3, 97.4)	0.052
Laboratory				
RDW/HCT	0.40 (0.35, 0.49)	0.40 (0.35, 0.48)	0.43 (0.37, 0.53)	<0.001
WBC (K/uL)	10.7 (7.9, 14.3)	10.6 (7.9, 13.9)	13.4 (8.5, 18.5)	<0.001
PLT (K/uL)	210.5 (165.3, 268.0)	211.0(166.0, 267.0)	206.5 (154.8, 273.1)	0.358
Potassium (mEq/L)	4.3 (3.9, 4.7)	4.3 (3.0, 4.7)	4.3 (3.9, 4.8)	0.389
Sodium (mEq/L)	138.5 (135.5, 141.0)	138.5(135.7, 141.0)	138.1 (134.7, 141.2)	0.409
Glucose (mg/dL)	168.6 (144.0, 170.5)	168.6(144.5, 170.5)	168.6 (137.9, 171.3)	0.186
Cr (mg/dL)	0.97 (0.70, 1.40)	0.95 (0.70, 1.35)	1.12 (0.75, 1.84)	<0.001
PH	7.33 (7.30, 7.37)	7.33 (7.30, 7.37)	7.33 (7.28, 7.38)	0.995
PaCO2 (mmHg)	60.2 (48.6, 68.4)	60.2 (48.9, 69.0)	60.2 (46.4, 64.2)	0.070
Anion gap (mEq/L)	9.9 (8.0, 11.7)	9.9 (8.0, 11.6)	9.9 (8.0, 12.2)	0.352
Bicarbonate (mEq/L)	29.8 (25.2, 34.0)	29.8 (25.4, 34.0)	28.5 (24.5, 32.5)	0.006
Comorbidities				
Hypertension	523 (16.7)	482 (16.9)	41 (15.3)	0.510
Diabetes	475 (15.2)	429 (15.0)	46 (17.2)	0.349
Asthma	146 (4.7)	136 (4.8)	10 (3.7)	0.445
Pulmonary embolism	41 (1.3)	35 (1.2)	6 (2.2)	0.265
Anemia	59 (1.9)	51 (1.8)	8 (3.0)	0.168

Hematological malignancies	10 (0.3)	7 (0.3)	3 (1.1)	0.048
Connective tissue diseases	11 (0.4)	9 (0.3)	2 (0.8)	0.242
Peripheral vascular diseases	17 (0.5)	15 (0.5)	2 (0.8)	0.971
Myocardial infarction	108 (3.5)	89 (3.1)	19 (7.1)	<0.001
Liver disease	35 (1.1)	26 (0.9)	9 (3.4)	<0.001
Chronic kidney disease	185 (5.9)	163 (5.7)	22 (8.2)	0.097
Malignant tumors	77 (2.5)	64 (2.2)	13 (4.9)	0.008
Sepsis	487 (15.6)	407 (14.3)	80 (29.9)	<0.001
Prescriptions*				
Corticosteroid	369 (11.8)	347 (12.2)	22 (8.2)	0.056
Bronchodilators	490 (15.7)	449 (15.7)	41 (15.3)	0.857
Vasopressors	28 (0.9)	16 (0.6)	12 (4.5)	<0.001
Intravenous fluids	957 (30.6)	854 (29.9)	103 (38.4)	0.004
Blood transfusions	12 (0.4)	9 (0.3)	3 (1.1)	0.129
Invasive mechanical ventilation	1693 (54.2)	1531 (53.6)	162 (60.5)	0.031
ICU stay (day)	2.7 (1.7, 4.7)	2.6 (1.7, 4.4)	4.1 (2.4, 7.1)	<0.001

**Notes:** \*All prescriptions were issued within 24 hours of ICU admission for patients.

A p-value less than 0.05 is considered statistically significant.

**Abbreviations:** HR, Heart Rate; RR, Respiratory Rate; SBP, Systolic Blood Pressure; DBP, Diastolic Blood Pressure; WBC, White Blood Cell; PLT, Platelet; Cr, Creatinine.

**TableS5** The relationship between RHR as a continuous/categorical variable and mortality among AECOPD patients in the ICU.

	Model 1	OR	Model 2	OR	Model 3	OR	Model 4	OR	Model 5	OR
Continuous variable	<0.001	6.522 (2.741~15.516)	0.002	4.403 (1.759~11.018)	0.001	4.642 (1.863~11.568)	0.003	4.276 (1.631~11.212)	0.033	2.940 (1.089~7.934)
Categorical variable	<0.001	1.701 (1.319~2.194)	0.003	1.485 (1.144~1.926)	0.001	1.577 (1.213~2.052)	0.001	1.567 (1.189~2.064)	0.013	1.421 (1.076~1.875)

**Notes:**

Model 1 was not adjusted for any variables

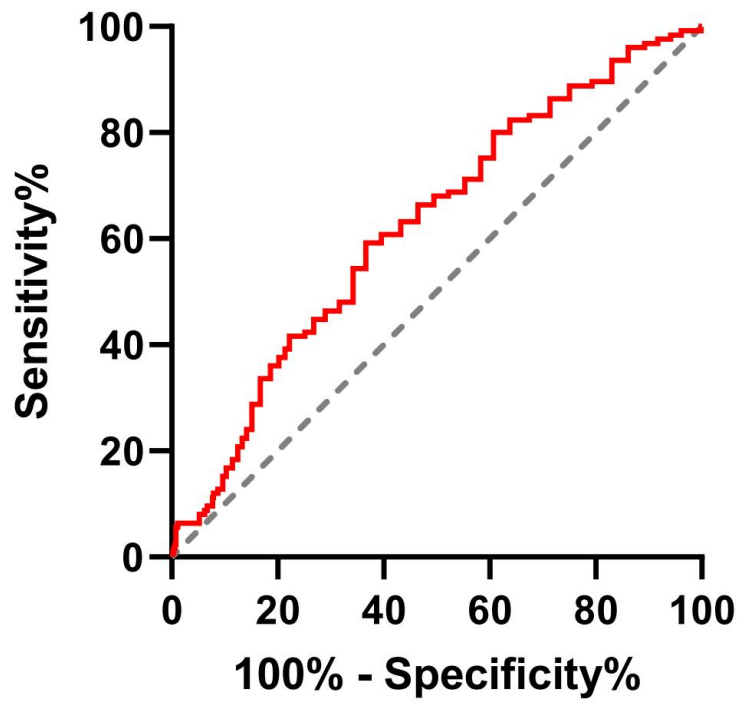
Model 2 was adjusted for gender, age, and ethnicity

Model 3 was adjusted for hypertension, diabetes, asthma, pulmonary embolism, anemia, hematologic malignancy, connective tissue disease, myocardial infarction, peripheral vascular disease, liver disease, chronic kidney disease, malignancy, and sepsis.

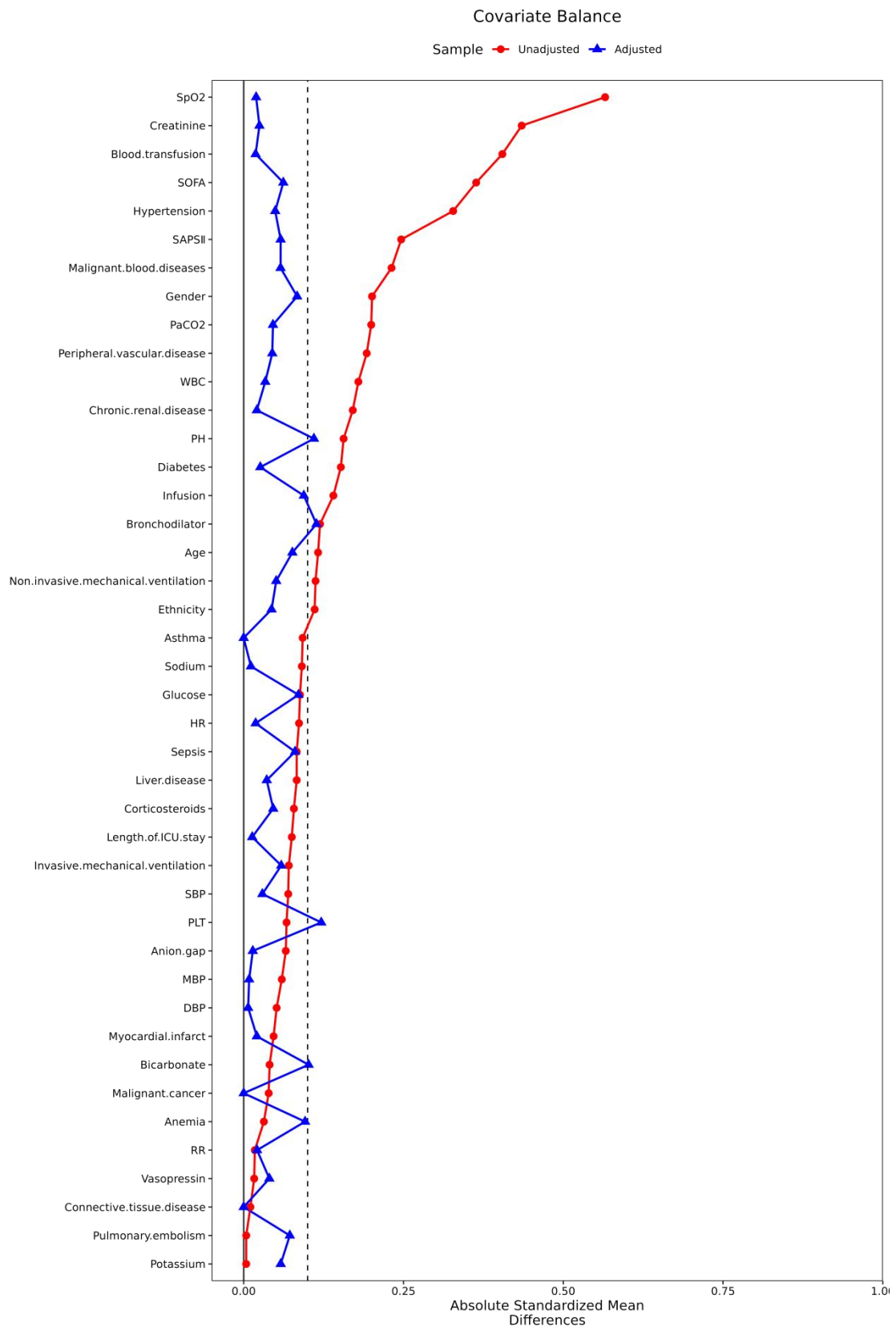
Model 4 was adjusted for heart rate, respiratory rate, systolic blood pressure, diastolic blood pressure, SpO2, white blood cell, platelet, potassium, sodium, glucose, creatinine, pH, PaCO2, anion gap, and bicarbonate.

Model 5 was adjusted for age, gender, ethnicity, white blood cell, platelet, creatinine, hypertension, anemia, hematologic malignancy, connective tissue disease, peripheral vascular disease, myocardial infarction, liver disease, chronic kidney disease, sepsis, vasopressors, corticosteroids, intravenous fluids, and red blood cell transfusions.

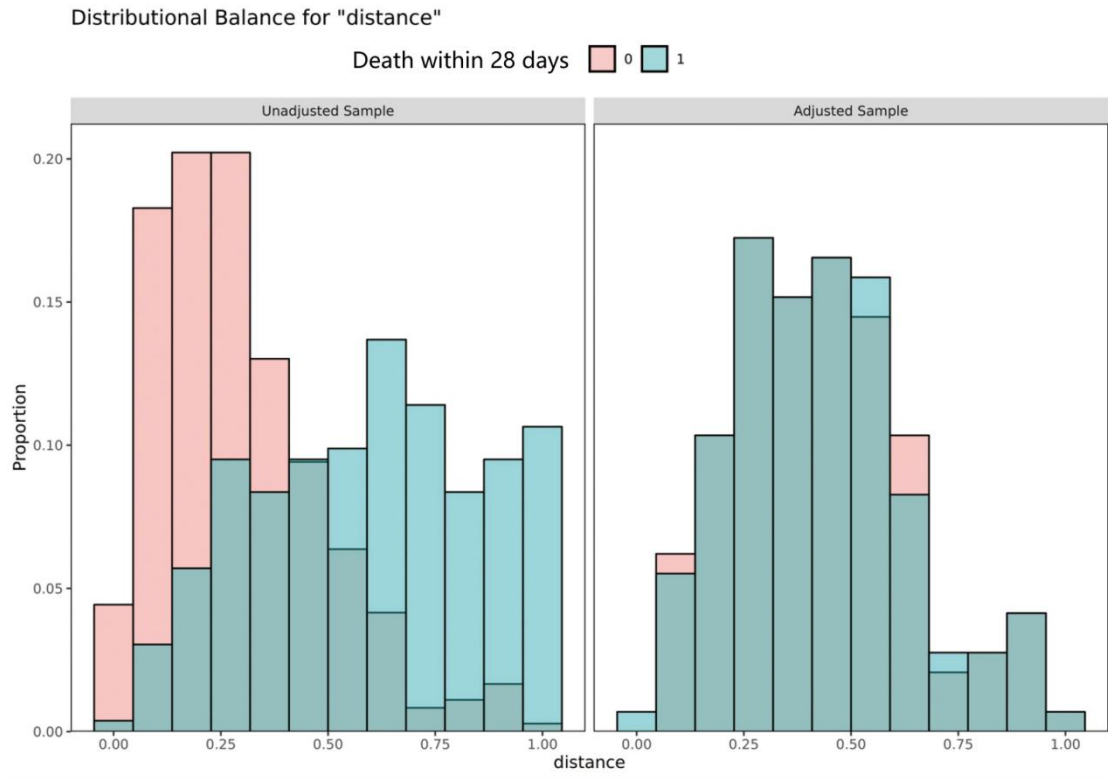
## ROC of RHR



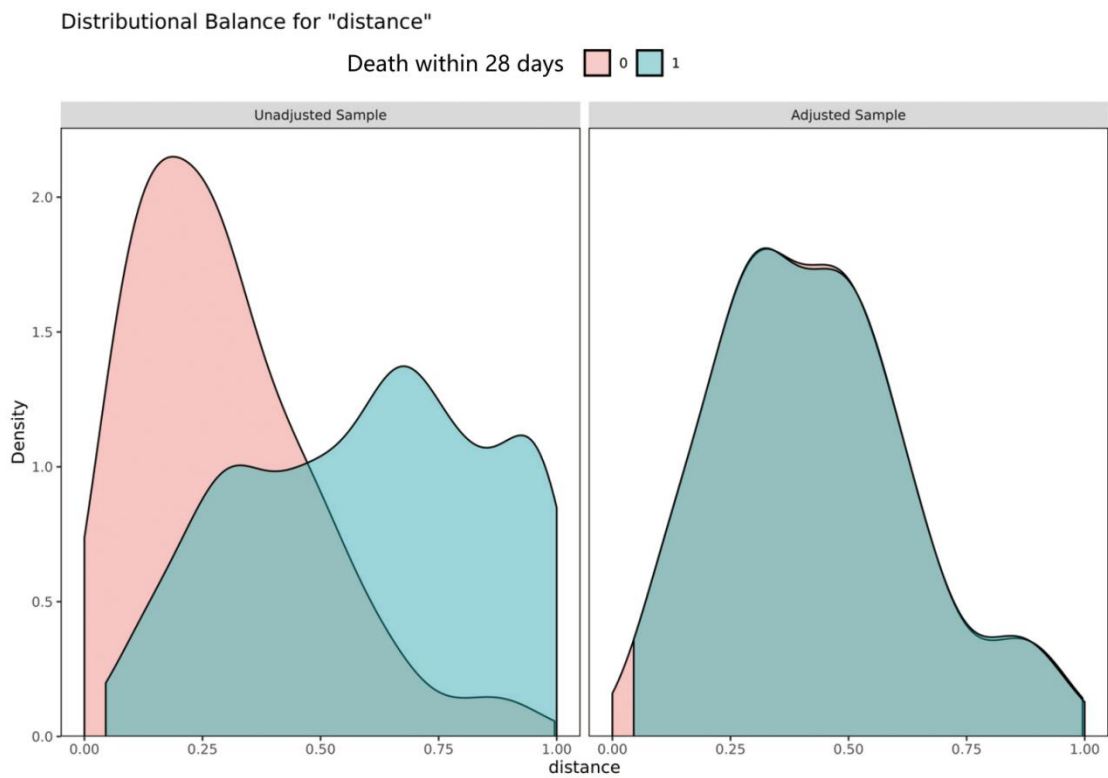
**FigureS1** Receiver operating characteristic curve(ROC curve) for RHR in the survival and non-survival groups.



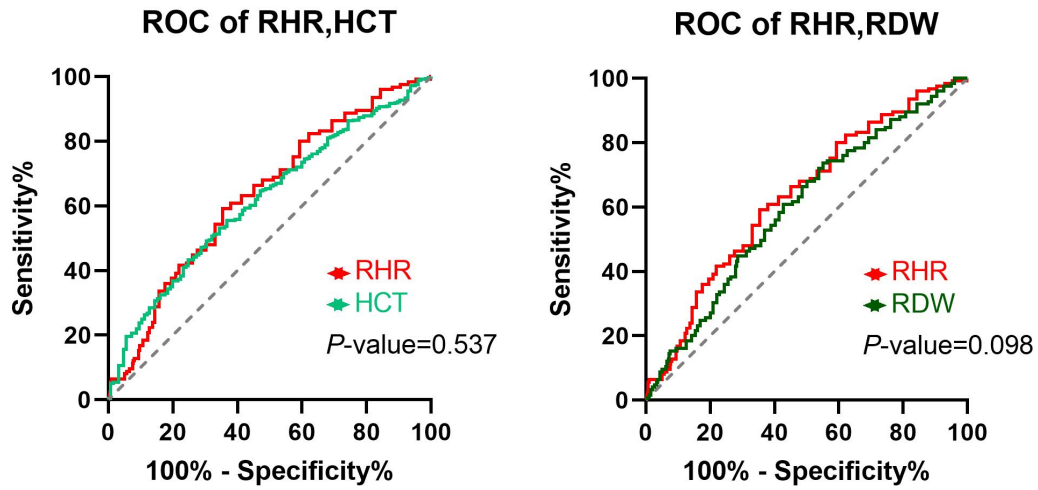
**FigureS2** Standardized mean differences (SMD) of each variable before and after propensity score matching(PSM).



**FigureS3** Histograms before and after propensity score matching (PSM).



**FigureS4** Density plots before and after propensity score matching (PSM).



**FigureS5** Receiver operating characteristic (ROC) curves for RHR, RDW, and HCT in both the survival and non-survival groups, accompanied by the p-value indicating the difference between the ROC curves.