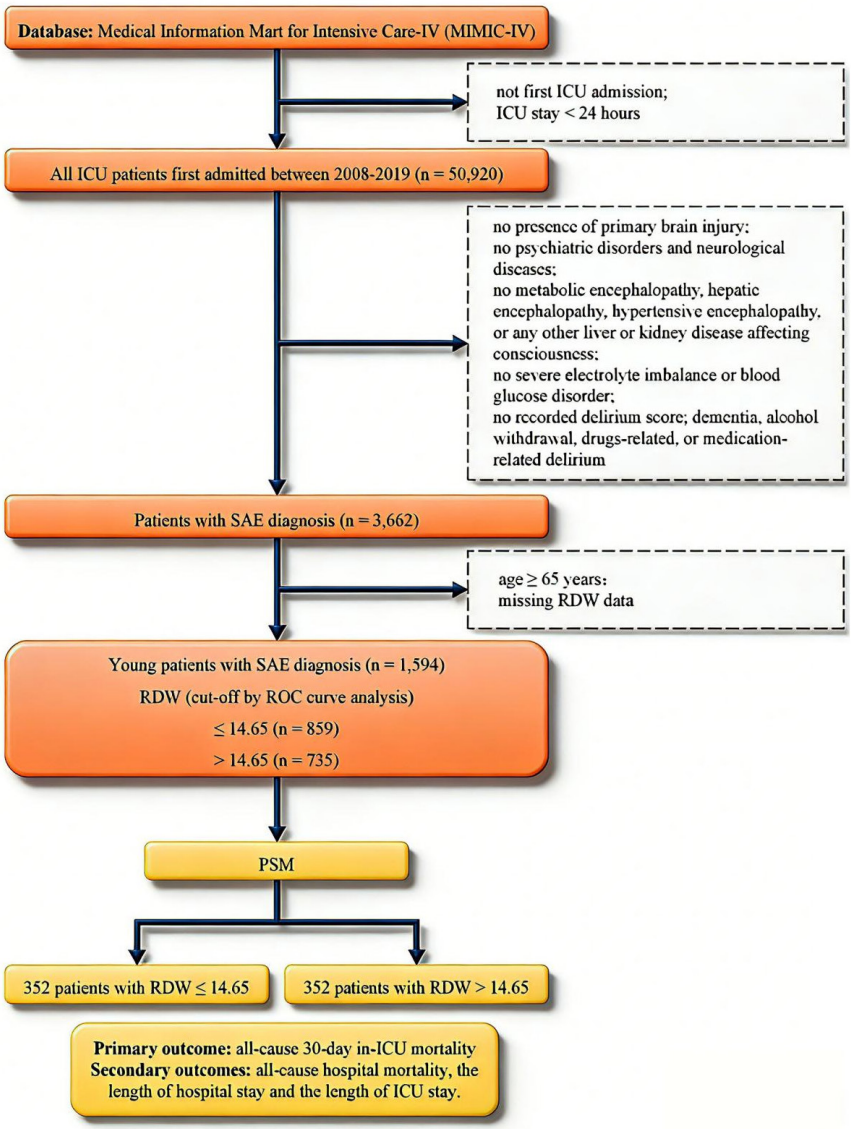
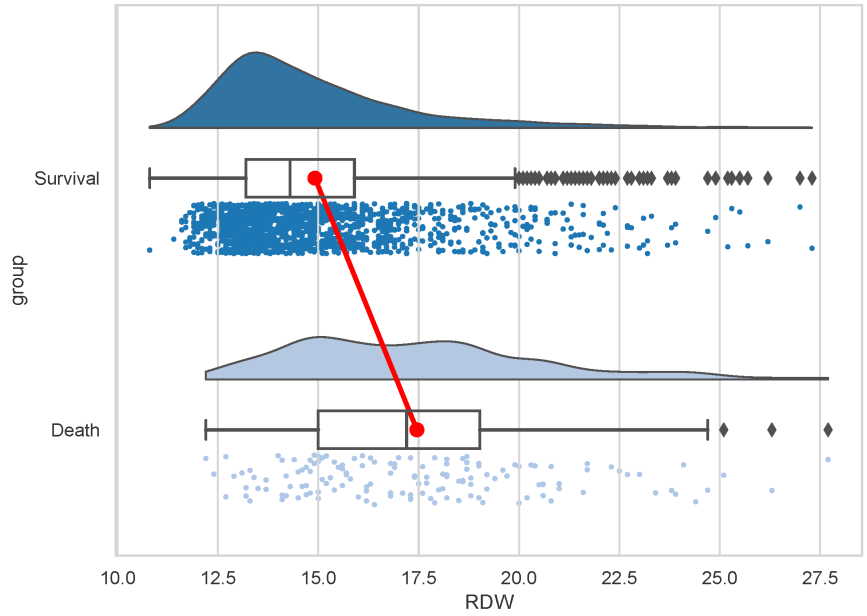
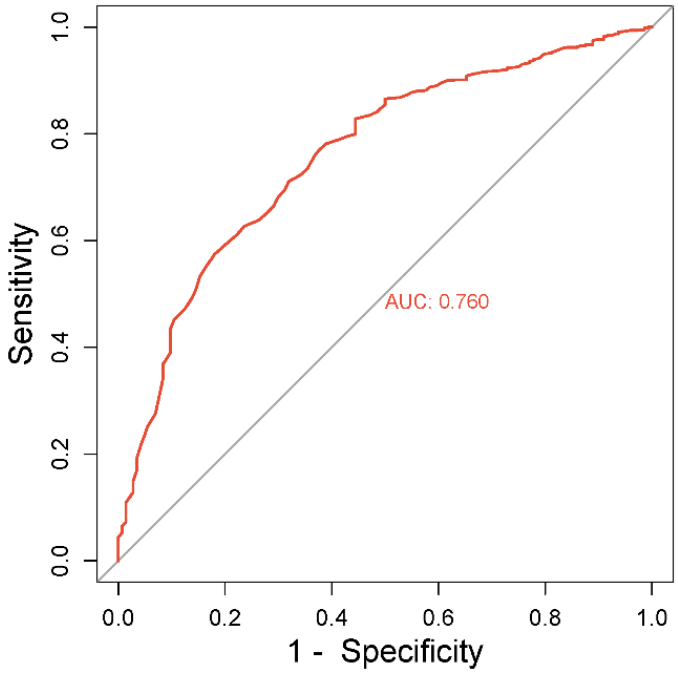
Supplementary Information



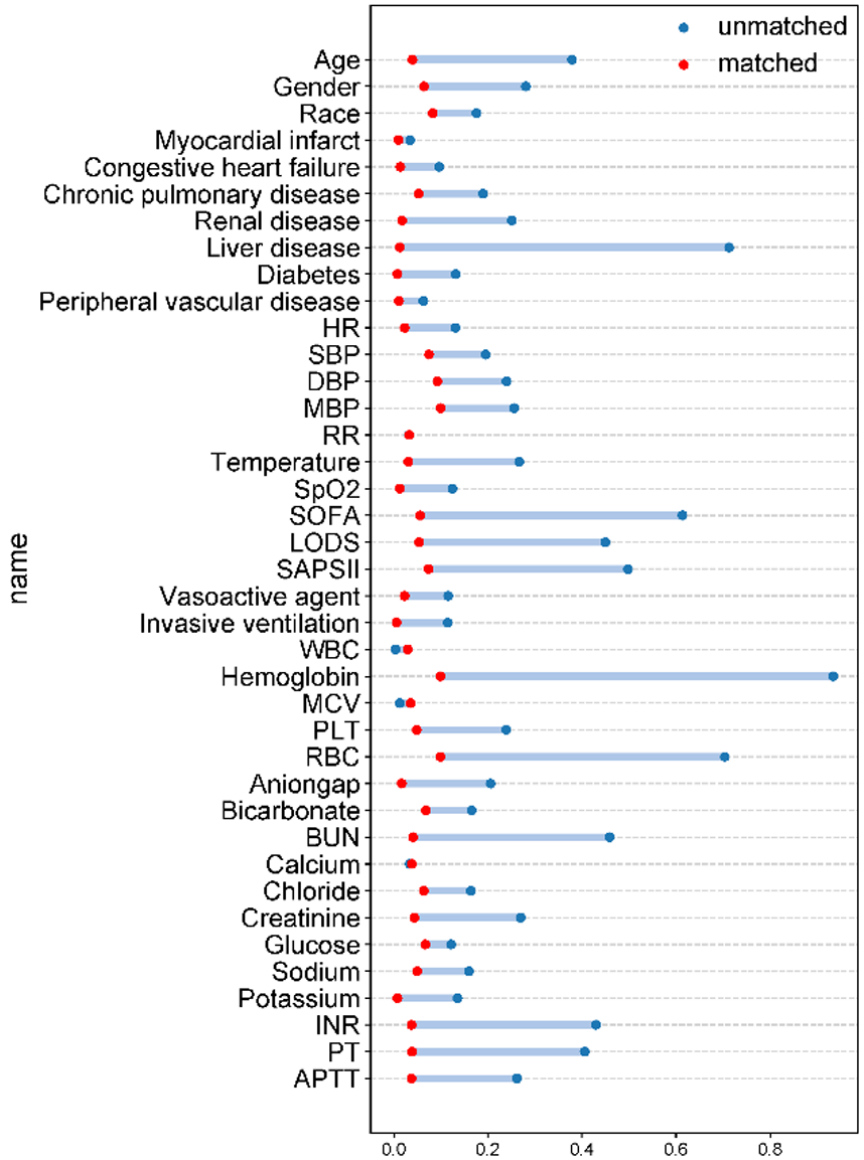
Supplementary Figure 1. Study flow chart. SAE, sepsis-associated encephalopathy; RDW, red blood cell distribution width; ICU, intensive care unit; ROC, receiver operating characteristic; PSM, propensity score matching.



Supplementary Figure 2. The different RDW levels in young SAE patients with different 30-day outcomes. The box plot represents the general distribution of the data. The boxes contain a red spot in the middle (the mean value of the data) and a line (the median). The jittered raw data (the 'rain') below the boxes is the RDW value of each case, and the 'cloud' above the boxes represents the number of young SAE patients with different RDW values. P<0.001. The differences were assessed with the Kruskal−Wallis test. SAE, sepsis-associated encephalopathy; RDW, red blood cell distribution width.



Supplementary Figure 3. The receiver operating characteristic curve for RDW in predicting all-cause 30-day death in the ICU. The cutoff value of RDW is 14.65%. AUC=0.760, 95% CI 0.720 to 0.800. ICU, intensive care unit; CI, confidence interval; AUC, area under curve; RDW, red blood cell distribution width.



Supplementary Figure 4. The SMD for variables of two groups before and after PSM. SMD, standard mean difference; PSM, propensity score matching; HR, heart rate; SBP, systolic blood pressure; DBP, diastolic blood pressure; MBP, mean blood pressure; RR, respiratory rate; SOFA, sequential organ failure assessment; LODS, logistic organ dysfunction system; SAPS II, simplified acute physiology score II; WBC, white blood cells; MCV, mean corpuscular volume; PLT, platelet; RBC, red blood cells; BUN, blood urea nitrogen; INR, international normalized ratio; PT, prothrombin time; APTT, activated partial thromboplastin time.

Supplementary Table 1. Univariate and multivariate Cox regression model used to study the association of RDW with 30-day mortality in matched young SAE patients in ICU

	Univariate analysis			Multivariate analysis		
	HR	95% CI	P-value	HR	95% CI	P-value
Age, y	1.0	(1.0, 1.1)	0.007	1.1	(1.0, 1.1)	0.003
Female	0.8	(0.4, 1.5)	0.504			
Race						
White	Ref			Ref		
Black	1.1	(0.4, 2.8)	0.850	0.9	(0.3, 3.4)	0.915
Others	0.2	(0.0, 1.2)	0.071	0.1	(0.0, 1.2)	0.075
Unknown	1.2	(0.6, 2.5)	0.536	2.2	(0.9, 5.1)	0.066
Myocardial infarct	0.4	(0.1, 1.5)	0.151			
Congestive heart failure	0.6	(0.3, 1.4)	0.238			
Chronic pulmonary disease	1.8	(0.9, 3.6)	0.108			
Renal disease	3.0	(1.7, 5.3)	<0.001			
Liver disease	0.9	(0.4, 2.0)	0.830	2.7	(1.1, 6.4)	0.024
Diabetes	1.0	(0.4, 2.8)	0.980			
Peripheral vascular disease	0.4	(0.1, 1.5)	0.151			
Heart rate, (beats/min)	1.0	(1.0, 1.0)	0.699			
SBP, mmHg	1.0	(1.0, 1.0)	0.071	1.0	(1.0, 1.1)	0.443
DBP, mmHg	1.0	(0.9, 1.0)	0.064	1.0	(0.9, 1.1)	0.888
MBP, mmHg	1.0	(0.9, 1.0)	0.015	1.0	(0.8, 1.1)	0.522
RR, (breaths/min)	0.9	(0.8, 1.0)	0.006	0.9	(0.8, 1.0)	0.075
Temperature, °C	0.6	(0.4, 0.9)	0.005	0.5	(0.3, 1.0)	0.038
SpO_2, %	0.9	(0.8, 1.0)	0.118			
SOFA	1.0	(1.0, 1.1)	0.257			
LODS	1.0	(0.9, 1.1)	0.752			
SAPS II	1.0	(1.0, 1.0)	0.046	1.0	(1.0, 1.1)	0.462
Vasoactive agent	1.5	(0.8, 2.8)	0.219			
Invasive Vent	0.4	(0.2, 0.7)	0.001	0.5	(0.2, 1.2)	0.125
WBC, 10^9/L	1.0	(0.9, 1.0)	0.278			
Hemoglobin, g/dl	0.9	(0.8, 1.0)	0.138			
MCV, fl	1.0	(1.0, 1.1)	0.091	1.0	(0.9, 1.1)	0.894
PLT, 10^9/L	1.0	(1.0, 1.0)	0.046	1.0	(1.0, 1.0)	0.680
RBC, 10^{12}/L	0.7	(0.5, 1.0)	0.040	1.4	(0.2, 10.1)	0.736
Anion gap, mmol/L	1.1	(1.0, 1.1)	0.025	1.0	(0.8, 1.2)	0.931
Bicarbonate, mmol/L	1.0	(0.9, 1.0)	0.382			
BUN, mg/dl	1.0	(1.0, 1.0)	0.119			
Calcium, mg/dl	1.1	(0.8, 1.4)	0.521			
Chloride, mmol/L	0.9	(0.9, 1.0)	<0.001	0.9	(0.8, 1.1)	0.445
Creatinine, mg/dl	1.1	(0.9, 1.2)	0.265			
Glucose, mg/dl	1.0	(1.0, 1.0)	0.100			
Sodium, mmol/L	0.9	(0.9, 1.0)	<0.001	1.0	(0.8, 1.2)	0.950
Potassium, mmol/L	0.9	(0.6, 1.3)	0.464			
INR	1.7	(1.3, 2.2)	<0.001	NA		
PT, s	1.1	(1.0, 1.1)	<0.001	0.6	(0.4, 1.1)	0.109
APTT, s	1.0	(1.0, 1.0)	0.365			
RDW, %	1.3	(1.2, 1.4)	<0.001	1.2	(1.1, 1.4)	<0.001

Note: SAE, sepsis-associated encephalopathy; ICU, intensive care unit; CI, confidence interval; HR, hazard ratio; SBP, systolic blood pressure; DBP, diastolic blood pressure; MBP, mean blood pressure; RR, respiratory rate; SOFA, sequential organ failure assessment; LODS, logistic organ dysfunction system; SAPS II, simplified acute physiology score II; WBC, white blood cells; MCV, mean corpuscular volume; PLT, platelet; RBC, red blood cells; BUN, blood urea nitrogen; INR, international normalized ratio; PT, prothrombin time; APTT, activated partial thromboplastin time; RDW, red blood cell distribution width.

Supplementary Table 2. Univariate and multivariate Cox regression model used to study the association of RDW with 30-day mortality in unmatched young SAE patients in ICU

	Univariate analysis			Multivariate analysis		
	HR	95% CI	P-value	HR	95% CI	P-value
Female	1.0	(0.7, 1.5)	0.808			
Race						
White	Ref			Ref		
Black	1.0	(0.5, 1.8)	0.902	1.1	(0.6, 2.1)	0.797
Others	0.5	(0.3, 1.0)	0.056	0.6	(0.3, 1.3)	0.212
Unknown	1.3	(0.9, 1.9)	0.210	2.0	(1.3, 3.0)	0.002
Myocardial infarct	0.4	(0.2, 1.0)	0.055	0.6	(0.2, 1.4)	0.227
Congestive heart failure	0.6	(0.3, 0.9)	0.027	0.4	(0.2, 0.7)	0.002
Chronic pulmonary disease	1.2	(0.7, 1.9)	0.529	0.9	(0.5, 1.7)	0.806
Renal disease	3.3	(2.4, 4.7)	<0.001			
Liver disease	1.0	(0.7, 1.6)	0.877	0.6	(0.2, 1.4)	0.227
Diabetes	0.7	(0.3, 1.5)	0.339			
Peripheral vascular disease	0.4	(0.2, 1.0)	0.055	0.5	(0.3, 0.9)	0.031
Heart rate, (beats/min)	1.0	(1.0, 1.0)	0.869			
SBP, mmHg	1.0	(1.0, 1.0)	<0.001	1.0	(1.0, 1.0)	0.645
DBP, mmHg	1.0	(1.0, 1.0)	0.018	1.0	(1.0, 1.1)	0.750
MBP, mmHg	1.0	(1.0, 1.0)	<0.001	1.0	(0.9, 1.0)	0.440
RR, (breaths/min)	1.0	(0.9, 1.0)	0.014	1.0	(0.9, 1.0)	0.647
Temperature, °C	0.6	(0.5, 0.8)	<0.001	0.6	(0.4, 0.8)	0.002
SpO_2, %	0.9	(0.9, 1.0)	0.036	1.0	(0.9, 1.0)	0.256
SOFA	1.1	(1.0, 1.1)	<0.001	1.1	(1.0, 1.2)	0.157
LODS	1.0	(1.0, 1.1)	0.072	1.0	(0.9, 1.1)	0.787
SAPS II	1.0	(1.0, 1.0)	<0.001	1.0	(1.0, 1.0)	0.853
Vasoactive agent	0.8	(0.6, 1.1)	0.163			
Invasive Vent	0.3	(0.2, 0.5)	<0.001	0.4	(0.3, 0.6)	<0.001
WBC, 10^9/L	1.0	(1.0, 1.0)	0.499			
Hemoglobin, g/dl	0.8	(0.8, 0.9)	<0.001	1.3	(0.9, 1.8)	0.151
MCV, fl	1.0	(1.0, 1.1)	<0.001	1.0	(1.0, 1.0)	0.522
PLT, 10^9/L	1.0	(1.0, 1.0)	<0.001	1.0	(1.0, 1.0)	0.277
RBC, 10^{12}/L	0.5	(0.4, 0.6)	<0.001	0.4	(0.2, 1.2)	0.099
Anion gap, mmol/L	1.1	(1.0, 1.1)	<0.001	1.0	(0.9, 1.1)	0.587
Bicarbonate, mmol/L	1.0	(1.0, 1.0)	0.544			
BUN, mg/dl	1.0	(1.0, 1.0)	<0.001	1.0	(1.0, 1.0)	0.253
Calcium, mg/dl	1.2	(1.0, 1.3)	0.028	1.1	(0.9, 1.3)	0.291
Chloride, mmol/L	0.9	(0.9, 1.0)	<0.001	1.0	(0.9, 1.1)	0.561
Creatinine, mg/dl	1.1	(1.0, 1.1)	0.140			
Glucose, mg/dl	1.0	(1.0, 1.0)	0.067	1.0	(1.0, 1.0)	0.958
Sodium, mmol/L	0.9	(0.9, 1.0)	<0.001	1.0	(0.9, 1.1)	0.625
Potassium, mmol/L	1.0	(0.8, 1.2)	0.884			
INR	1.3	(1.2, 1.5)	<0.001	11.4	(0.8, 157.2)	0.068
PT, s	1.0	(1.0, 1.0)	<0.001	0.8	(0.6, 1.0)	0.090
APTT, s	1.0	(1.0, 1.0)	0.028	1.0	(1.0, 1.0)	0.319
RDW, %	1.2	(1.1, 1.2)	<0.001	1.1	(1.0, 1.2)	0.012
Age, y	1.0	(1.0, 1.1)	<0.001	1.1	(1.0, 1.1)	<0.001

Note: SAE, sepsis-associated encephalopathy; ICU, intensive care unit; CI, confidence interval; HR, hazard ratio; HR, hazard ratio; SBP, systolic blood pressure; DBP, diastolic blood pressure; MBP, mean blood pressure; RR, respiratory rate; SOFA, sequential organ failure assessment; LODS, logistic organ dysfunction system; SAPS II, simplified acute physiology score II; WBC, white blood cells; MCV, mean corpuscular volume; PLT, platelet; RBC, red blood cells; BUN, blood urea nitrogen; INR, international normalized ratio; PT, prothrombin time; APTT, activated partial thromboplastin time; RDW, red blood cell distribution width.