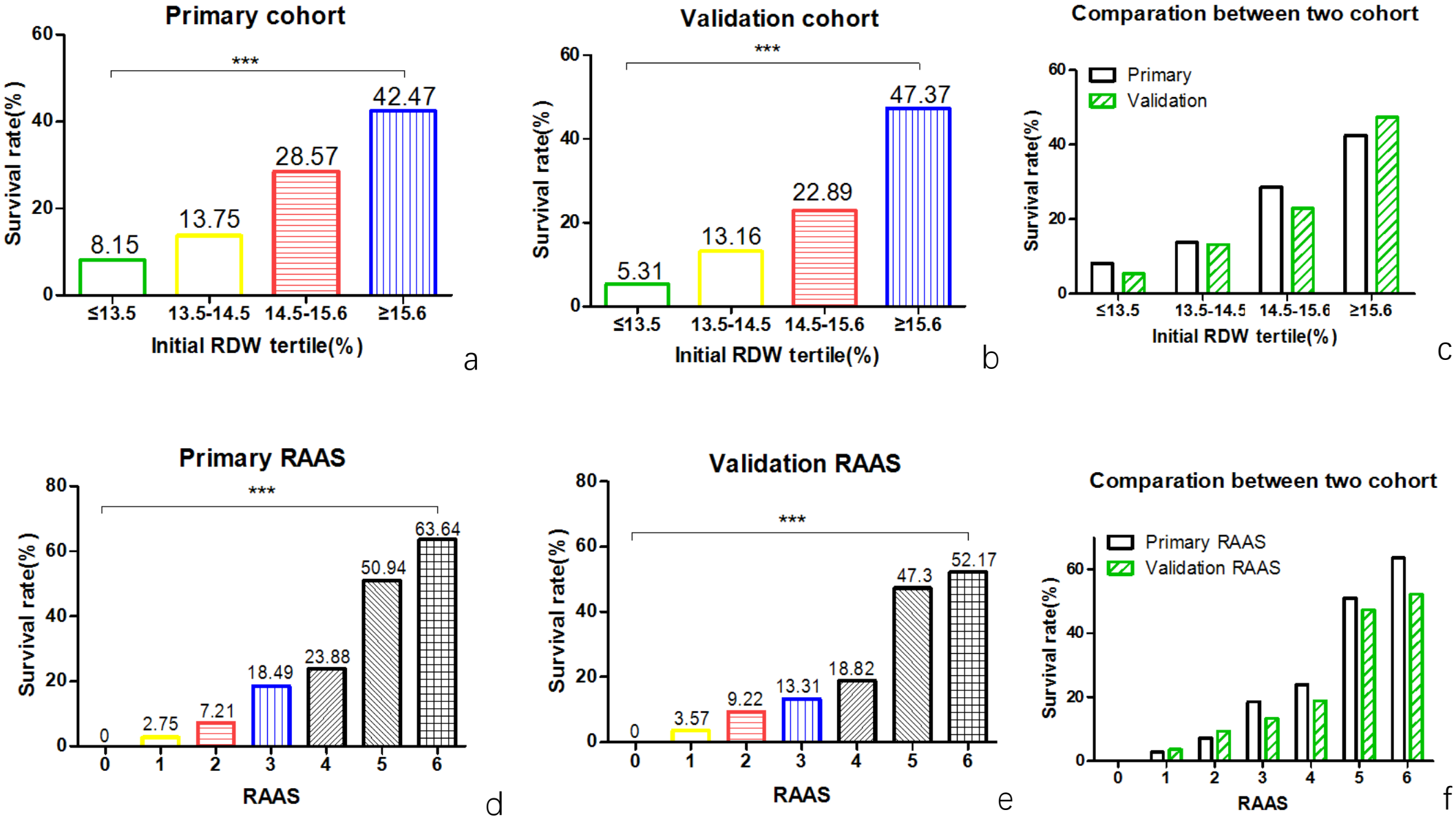

*** $P < 0.05$

Supplementary Figure 1. The survival rates of RDW and RAAS segments were compared between the primary and validation cohorts, followed by no significant difference in survival rates between the two validated cohorts after RDW and RAAS segments (p< 0.05).

Supplementary Table 1. Assignment and segmentation of the RAAS scoring system and RDW

RAAS scoring system	RDW	3	group-1	0-1	RDW subsection	≤13.4	0	subsection-1
	SOFA>2	1	group-2	2-3		13.5-14.4	1	subsection-2
	Age > 72.5	1	group-3	4-5		14.5-15.4	2	subsection-3
	APACHE II>18.5	1	group-4	6		≥15.5	3	subsection-4

RDW can assign different 0-3 points through quartet. The reason for choosing SOFA score greater than 2 as the assignment standard, rather than the cutoff value is: if the CUTOFF value of SOFA (5.5) in this paper is used for assignment, the number of patients meeting the standard is very small, which will lead to the practicability of the whole score is not strong, the prognostic ability deviation, and the results are meaningless. Physiological variables were scored accordingly, which were divided into 7 levels according to the assignment of parameters.

Supplementary Table 2. the mortality rate of two cohort in each group

2-1

	mortality rate (%)			
	group-1	group-2	group-3	group-4
primary cohort	4.5	30.4	53.3	81.8
validation cohort	9.4	25.1	47.5	84.0

2-2

	mortality rate						
	RAAS=0	RAAS=1	RAAS=2	RAAS=3	RAAS=4	RAAS=5	RAAS=6
primary cohort	2.1	5.6	21.1	39.3	41.3	65.5	81.8
validation cohort	4.2	10.6	17.8	34.0	37.3	59.7	84.0

Supplementary Table 3. Comparison of demographics and baseline clinical data between the RAAS primary group and the RAAS validation group

Demographics	Primary cohort	Validation cohort	*p*
Number (*n*)	529	537	
Male [*n(%)*]	320(60.5)	301(56.1)	0.142
Hospital time (day, *x*±*s*)	11.7 ± 8.4	11.0 ± 6.6	0.105
Age [years, M(Q)]	70.1(62-82)	75.2(68-83)	0.001
APACHE II (*x*±*s*)	15.4±8.1	14.6±7.3	0.692
SOFA (*x*±*s*)	5.3±3.2	4.7±3.1	0.086
Cardiovascular disease [*n(%)*]	178(33.6)	253(47.1)	0.000
ACS [*n(%)*]	67(12.7)	35(6.5)	
CAD [*n(%)*]	114(21.6)	249(46.4)	
Kidney disease [*n(%)*]	162(30.6)	249(46.4)	0.000
AKI [*n(%)*]	119(22.5)	118(22.0)	
CKD [*n(%)*]	43(8.1)	170(31.7)	
Hypertension [*n(%)*]	252(47.6)	299(55.7)	0.009
Diabetes [*n(%)*]	193 (36.5)	191(35.6)	0.756
Mechanical ventilation [*n(%)*]	118(22.3)	90(16.8)	0.304
CRRT [*n(%)*]	57(10.8)	320(60.5)	0.025
RDW admission, (*x*±*s*)	14.0±1.5	14.3±2.0	0.013
30 days mortality [*n(%)*]	90(17.0)	95(17.7)	0.094
Source of infection			
Lower respiratory [*n(%)*]	232 (43.9 %)	259 (48.2 %)	
Urogenital [*n(%)*]	98 (18.5 %)	85 (15.3 %)	
Intra-abdominal [*n(%)*]	174 (32.9 %)	177 (33.0 %)	
Catheter-related device [*n(%)*]	1 (0.2 %)	0 (0.0 %)	
Blood stream [*n(%)*]	5 (0.9 %)	4 (0.7 %)	
Skin-soft tissues [*n(%)*]	7 (1.3 %)	3 (0.6 %)	
Intracerebral infection [*n(%)*]	2 (0.4 %)	8 (1.5 %)	
Other unknown [*n(%)*]	10 (1.9 %)	4 (0.7 %)	

	features VIF Factor	features
0	1.2	RDW
1	4.0	AGE
2	2.4	APACHE II
3	2.6	SOFA

Supplementary table 4. The closer the VIF (variance inflation factor value) is close to 5, the lighter the multiple copies. The larger the VIF is, the smaller the tolerance of the independent variable is, and the more collinearity there is. When multiple coordinates are serious, appropriate methods should be adjusted.