

Supplementary material

Table S1 Bayesian information criterion (BIC) values of different numbers of clusters in the development cohort

Number of clusters	SCr trajectories	Comment	AKI staging trajectories	Comment
2	30501.39		43951.88	
3	29325.21		41981.71	
4	28812.04		41110.41	A cluster comprises <5% of the cohort
5	28496.8	A cluster comprises <5% of the cohort	40681.68	A cluster comprises <5% of the cohort
6	28371.11	A cluster comprises <5% of the cohort	40159.68	A cluster comprises <5% of the cohort

Abbreviations: AKI, acute kidney injury; SCr, serum creatinine

Table S2 Univariate logistic regression for outcomes by AKI staging clusters in the development (SEA-AKI) and validation (KCMH) cohort

SEA-AKI	ICU mortality			Hospital mortality			28-day mortality		
	OR	95% CI	P value	OR	95% CI	P value	OR	95% CI	P value
Cluster 1 (reference)	1			1			1		
Cluster 2	1.21	0.76-1.93	0.43	1.15	0.75-1.76	0.53	1.09	0.69-1.71	0.72
Cluster 3	2.17	1.24-3.81	0.007	1.85	1.08-3.17	0.026	2.02	1.17-3.51	0.012
KCMH	ICU mortality			Hospital mortality			28-day mortality		
	OR	95% CI	P value	OR	95% CI	P value	OR	95% CI	P value
Cluster 1 (reference)	1			1			1		
Cluster 2	1.09	0.38-3.09	0.87	1.45	0.76-2.78	0.26	1.42	0.69-2.95	0.34
Cluster 3	2.90	1.50-5.62	0.002	2.40	1.45-3.96	0.001	2.49	1.46-4.23	0.001

Abbreviations: CI, confidence interval; ICU, intensive care units; OR, odds ratio

Table S3 Univariate and multivariate analysis for associations between AKI staging clusters and clinical characteristics and 28-day mortality in the development cohort

	Univariate			Multivariate		
Variables	OR	95%CI	P value	OR	95%CI	P value
Age	0.99	0.99-1.01	0.807			
Sex	0.73	0.50-1.07	0.111			
Diabetes	0.69	0.44-1.06	0.09			
Hypertension	0.68	0.45-1.01	0.058			
CVD	0.56	0.27-1.17	0.123			
CKD	1.13	0.59-2.19	0.706			
CAD	1.09	0.53-2.24	0.810			
Mechanical ventilation	0.48	0.27-0.88	0.018			
Vasopressors	2.26	1.50-3.40	<0.001			
Non-renal SOFA	1.08	1.00-1.16	0.051	1.06	0.98-1.15	0.134
APACHE II	1.02	0.99-1.06	0.143			
AKI	1.30	0.85-1.99	0.226			
Maximal AKI staging						
0	Ref	Ref	Ref			
1	0.95	0.52-1.76	0.881			
2	1.09	0.56-2.11	0.805			
3	1.53	0.96-2.43	0.071			
Persistent AKI	1.30	0.74-2.27	0.361			
AKI recovery	0.58	0.36-0.93	0.023			
AKD	1.74	1.18-2.55	0.005			
AKI staging clusters						
Cluster 1	Ref	Ref	Ref	Ref		
Cluster 2	1.09	0.69-1.71	0.72	1.06	0.67-1.67	0.812
Cluster 3	2.02	1.17-3.51	0.012	1.87	1.07-3.27	0.028

Abbreviations: AKD, acute kidney disease; AKI, acute kidney injury; APACHE II, Acute Physiologic and Chronic Health Evaluation II; CAD, coronary artery disease; CKD, chronic kidney disease; CVD, cerebrovascular disease; ICU, intensive care units; RRT, renal replacement therapy; SOFA, Sequential Organ Failure Assessment

Table S4 Baseline characteristics and outcomes by staging clusters in the validation (KCMH) cohort (n=333)

	Cluster			P value
	1	2	3	
N	189 (56.8%)	46 (13.8%)	98 (29.4%)	
			64.43	
Age (years)	63.26 (18.25)	67.80 (15.02)	(19.00)	0.310
Male sex (%)	82 (43.4%)	13 (28.3%)	46 (46.9%)	0.097
Diabetes (%)	52 (27.5%)	15 (32.6%)	35 (35.7%)	0.343
Hypertension (%)	83 (43.9%)	30 (65.2%)	47 (48.0%)	0.035
Cerebrovascular disease (%)	11 (5.8%)	2 (4.4%)	6 (6.1%)	1.000
Chronic kidney disease (%)	12 (6.4%)	5 (10.9%)	8 (8.2%)	0.556
Coronary artery disease (%)	31 (16.4%)	6 (13.0%)	25 (25.5%)	0.099
Mechanical ventilation (%)	137 (72.5%)	31 (67.4%)	77 (78.6%)	0.322
Vasopressors (%)	138 (73.0%)	37 (80.4%)	81 (82.7%)	0.154
Liver SOFA ≥ 2 (%)	50 (26.5%)	17 (37.0%)	36 (36.7%)	0.129
Coagulation SOFA ≥ 2 (%)	48 (24.9%)	8 (17.4%)	33 (33.7%)	0.090
Cardiovascular SOFA ≥ 2 (%)	138 (73.0%)	37 (80.4%)	81 (82.7%)	0.154
Respiratory SOFA ≥ 2 (%)	19 (10.1%)	5 (10.9%)	7 (7.1%)	0.670
Non-renal SOFA score	2 (0,3)	2 (0,3)	2 (1,4)	0.090
APACHE II	17 (13,24)	23 (7,29)	20 (13,26)	0.954
			0.93	
Baseline creatinine (mg/dL)	0.81 (0.64,1.01)	1.03 (0.81,1.1)	(0.77,1.09)	0.005
AKI within 7 days (%)	67 (35.5%)	46 (100%)	98 (100%)	<0.001
First AKI stage (%)				
- 1	66 (34.9%)	29 (63%)	22 (22.5%)	
- 2	1 (0.5%)	9 (19.6%)	10 (10.2%)	
- 3	0	8 (17.4%)	66 (67.4%)	<0.001
Maximal AKI stage (%)				
- 1	66 (34.9%)	18 (39.1%)	0	
- 2	1 (0.5%)	20 (43.5%)	14 (14.3%)	
- 3	0	8 (17.4%)	84 (85.7%)	<0.001
AKI onset (days)	0 (0,2)	1 (1,1)	1 (1,1)	0.124
Persistent AKI (%)	19 (28.4%)	41 (89.1%)	98 (100%)	<0.001
RRT (%)	10 (5.3%)	6 (13.0%)	68 (69.4%)	<0.001
RRT date from ICU admission (days)	17 (15,19)	6 (0,18)	2 (1,5)	0.002
ICU mortality (%)	19 (10.1%)	5 (10.9%)	24 (24.5%)	0.003
Hospital mortality (%)	77 (40.7%)	23 (50%)	61 (62.2%)	0.002
ICU length of stay (days)	10 (8,15)	10 (8,17)	12 (9,18)	0.092
Hospital length of stay (days)	32 (20,54)	33 (18,53)	33 (18,52)	0.749
28-day mortality (%)	41 (21.7%)	13 (28.3%)	40 (40.8%)	0.003
AKD (%)	14 (7.4%)	30 (65.2%)	97 (98.9%)	<0.001
AKD staging (%)				<0.001

- 0	175 (92.6%)	16 (34.8%)	1 (1.0%)
- 1	14 (7.4%)	28 (60.9%)	3 (3.1%)
- 2	0	2 (4.4%)	16 (16.3%)
- 3	0	0	78 (79.6%)

Abbreviations: AKD, acute kidney disease; AKI, acute kidney injury; APACHE II, Acute Physiologic and Chronic Health Evaluation II; ICU, intensive care units; RRT, renal replacement therapy; SOFA, Sequential Organ Failure Assessment