Supplementary Online Content

Ozrazgat-Baslanti T, Loftus TJ, Ren Y, Adiyeke E, Miao S, Hashemighouchani H, Islam R, Mohandas R, Gopal S, Shenkman EA, Pardalos P, Brumback B, Segal MS, Bihorac A. Association of Persistent Acute Kidney Injury and Renal Recovery with Mortality in Hospitalized Patients

This supplementary material has been provided by the authors to give readers additional information about their work.

Supplemental Material Table of Contents

Supplementary Methods

A. Study design

Using the University of Florida Health Integrated Data Repository as Honest Broker, we created a single-center longitudinal dataset that was extracted directly from the electronic medical records derived from 156,699 patients 18 years or older at University of Florida Health during their admissions between January 1, 2012 and August 22, 2019 as well as all encounters within one-year history and one-year follow-up. All electronic health records were de-identified, except that dates of service were maintained. The dataset includes structured and unstructured clinical data, demographic information, vital signs, laboratory values, medications, diagnoses, and procedures.

After exclusion of encounters with no serum creatinine measurement to be able to determine acute kidney injury status during hospitalization and within 48 hours of hospital admission, our final cohort included 355,678 hospital encounters from 138,140 patients (Supplemental Figure 1).

B. Assessment of kidney function

We used computable phenotype algorithms we have developed for comprehensive assessment of kidney health during inpatient hospitalization to determine acute kidney injury status and type.[1] Kidney Disease: Improving Global Outcomes (KDIGO) criteria (0.3 mg/dl increase in serum creatinine within 48 hours or 50% increase from baseline within seven days or serum creatinine $\geq$ 4.0) [2] and consensus report of the Acute Disease Quality Initiative (ADQI) 16 Workgroup on renal recovery were used as conceptual framework for the development of algorithm for comprehensive assessment of kidney health during inpatient hospitalization [1,3,4] The maximum AKI stage was determined based on the ratio between peak and reference serum creatinine and need for renal replacement therapy (RRT). Stage 1 was termed "mild AKI"; stages 2 and 3 were termed "severe AKI". Duration of AKI and evidence of renal recovery5 were used to define rapidly reversed and persistent AKI with and without renal recovery at discharge. Duration of AKI and evidence of renal recovery[3] defined clinical trajectories of rapidly reversed and persistent AKI with and without renal recovery at discharge. We defined an episode of AKI as beginning with AKI onset based on KDIGO criteria and ending if there are two consecutive days without AKI identified, thus allowing us to identify a new episode of AKI in a patient who has recovered from a previous episode of AKI. Persistent AKI was defined as an episode of AKI lasting for at least 48 hours. Complete reversal of AKI by KDIGO criteria within 48 hours of AKI onset, that is any AKI episode that recovers within 48 hours of AKI onset and remains as such, characterizes rapid reversal of AKI. Any episode of shorter duration was classified as rapidly reversed AKI. Renal recovery was adjudicated for each episode based on normalization of AKI criteria at the time of hospital discharge. We grouped each encounter based on the worst trajectory group during hospitalization as persistent AKI without renal recovery, persistent AKI with renal recovery, rapidly reversed AKI, or no AKI.

To determine reference creatinine, we used previously validated modification of the NHS England alert algorithm. [1,5,6] If there were previous creatinine measurements in the interval 0-7 days before admission we used the minimum creatinine level during that interval as reference value 1. If there were previous creatinine measurements in the interval 8-365 days before admission, we used the median creatinine level during that interval as reference value 2. [6,7] The reference creatinine was then the minimum of (reference value 1, reference value 2 and the admission creatinine). For patients with no history of chronic kidney disease (CKD), the reference creatinine is the minimum of (reference value 1, reference value 2, the admission creatinine, MDRD creatinine) where MDRD creatinine is the estimated baseline creatinine using the Modification of Diet in Renal Disease Study equation assuming that baseline estimated glomerular filtration rate (eGFR) is 75 ml/min/per 1.73 m^2 with race modifier removed. For encounters with preadmission CKD, but no preadmission or admission creatinine, the first creatinine of the encounter was used as the reference creatinine to determine the first AKI status and stage of the encounter, but eGFR calculation and CKD staging were not done. For days with no serum creatinine measurement, AKI stage was imputed carrying forward last available AKI stage. If the index creatinine measurement is from 8 or more days after admission, the algorithm identifies the last available reference creatinine if the patient had AKI on prior day or the minimum creatinine from the previous seven days as the reference creatinine, otherwise.

Reference creatinine was used to estimate preadmission reference glomerular filtration rate using Chronic Kidney Disease Epidemiology Collaboration equation.[8] Following recent studies, in order to remove unfavorable impact of racial correction in MDRD and CKD-EPI formula, we removed race multiplier from these formula. Chronic kidney disease was determined from medical histories obtained prospectively at the time of enrollment and from a validated combination of International Classification of Diseases codes from electronic health records.[9] Chronic kidney disease stages were determined based on reference eGFR according to guidelines.[10,11]

For each patient, we calculated daily kinetic GFR using the estimate of creatinine production rate and percent change in creatinine over time.[12] We used creatinine values separated by at least twelve hours to estimate creatinine production rate and provides information on percent change in creatinine over time. We applied following formula:

$KeGFR = \frac{SSP_{Cr} \times CrCl}{MeanP_{Cr}} \times \left(1 - \frac{24 \times \Delta P_{Cr}}{\Delta Time(h) \times Max\Delta P_{Cr}/Day}\right)$[12]
using creatinine production rate that can be expressed as the product of initial serum creatinine (SSP_{Cr}) and creatinine clearance ($CrCl$), average of consecutive creatinine measurements ($MeanP_{Cr}$) separated by $\Delta Time(h)$ hours with difference ΔP_{Cr}. $Max\Delta P_{Cr}/Day$ refers to the maximal change in creatinine which is taken as 1.5.

C. Biological correlates, functional assessment and clinical outcomes

Chronic disease burden was characterized by Charlson-Deyo comorbidity index scores. [14] Temperature measured from oral and axillary sites were adjusted to the rectal site by adding 0.5 and 1 degrees Celsius, respectively. Values outside of ranges (20, 300) for systolic, (5, 225) for diastolic, and (10, 250) mm Hg for mean arterial blood pressure were removed from the dataset as well as systolic blood pressure values if it is less than diastolic blood pressure + 5 mm Hg. [15] Missing mean arterial blood pressure values were imputed with the sum of the 2/3 of diastolic and 1/3 of systolic blood pressure. Missing fraction of inspired oxygen (FiO2) values were imputed based on respiratory device and oxygen flow rates. [16] Blood products considered were red blood cells, plasma, platelets, and cryoprecipitate. We identified number of nephrotoxic drug types within first two days of AKI onset identifying considering drugs nephrotoxic types of aminoglycosides, diuretics, vancomycin, angiotensin-converting enzyme (ACE) inhibitor or an angiotensin receptor blocker (ARB), non-steroidal anti-inflammatory drugs (NSAIDs), and vasopressors and/or inotropes.

D. Outcomes

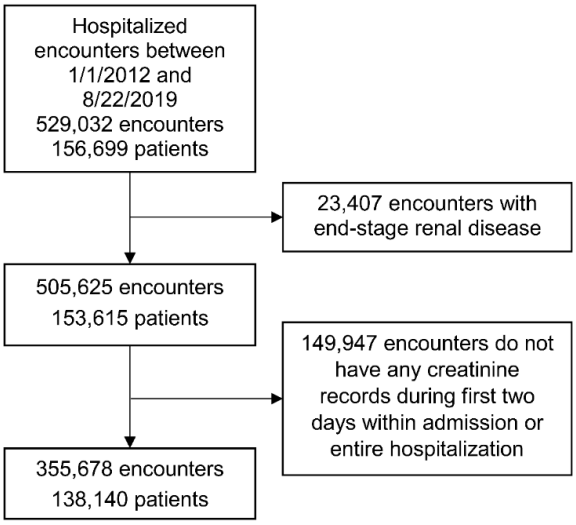
Primary clinical outcomes were hospital, one-year, and three-year mortality. Primary renal outcomes were new renal replacement therapy (RRT), new chronic kidney disease (CKD), and CKD progression within 30-day or one-year of hospital discharge. New RRT within 90-day or one-year of hospital discharge was defined as having at least one renal replacement therapy within the follow-up time among patients who were not under RRT during the entire hospitalization. Similarly, new CKD within 90-day or one-year of hospital discharge was defined as a readmission with CKD on admission among patients who did not have CKD at admission of the index encounter. CKD progression was defined for all patients had CKD at admission as having at least two eGFR measurements with at least 25% decline compared to eGFR at admission within the one year of admission. These two eGFR were calculated using creatinine where the first creatinine was taken between 90 and 180 days after admission; the second creatinine was taken between 180 and 365 days after admission and was measured at least 90 days apart from the first creatinine.

Other exploratory outcomes included hospital outcomes such as venous thromboembolism, sepsis, cardiovascular complication, discharge disposition and hospital death as well as thirty-day outcomes such as ICU-free and mechanical ventilation-free days within 30 days of hospital admission. In addition, outcomes within 30-day of hospital discharge such as death, readmission, and AKI trajectory group of readmission encounter were also determined. Exact dates and times were used to calculate the hospital length of stay, ICU length of stay, and duration of mechanical ventilation. ICU-free and mechanical ventilation-free days within 30 days of hospital admission were calculated by subtracting the number of days for each of outcome from the lesser of 30 days or the number of days between hospital admission and death. [17] The Social Security Death Index database was used to confirm death dates and obtain death dates for subjects who were lost to follow-up.

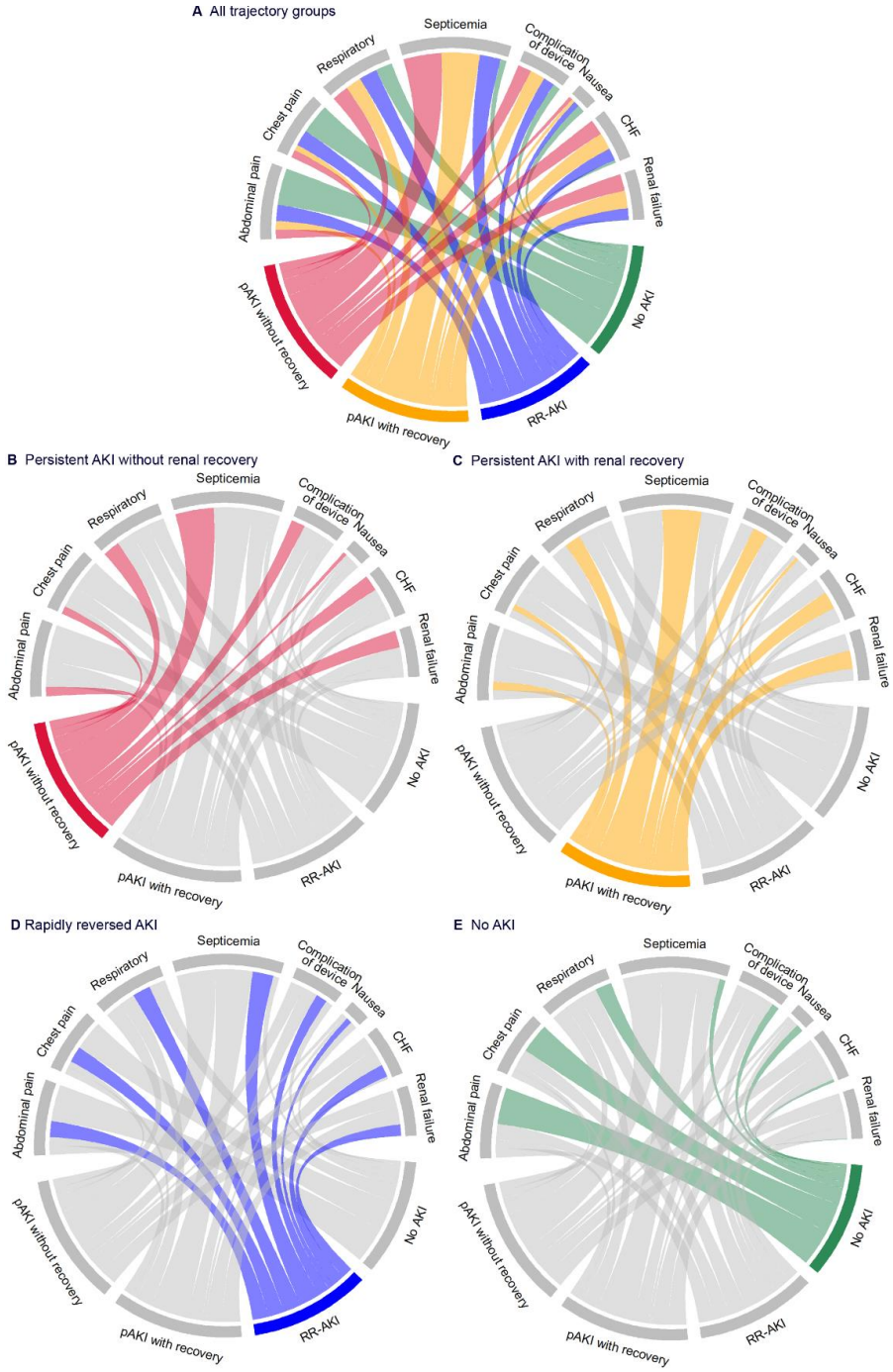
E. Statistical analysis

Differences between groups were analyzed using the Kruskal-Wallis test or analysis of variance for continuous variables and the chi-square or Fisher's exact test for discrete variables as appropriate, adjusting for multiple comparisons between trajectory groups using Bonferroni method. Overall survival of each trajectory group was evaluated using log-rank and Kaplan–Meier methods. Propensity score based inverse weighting was used to plot adjusted Kaplan Meier curves where propensity of being in a trajectory group was calculated using multinomial logistic model that included expert-selected variables which are patient demographics (age, gender, African-American ethnicity), and Charlson comorbidity score. Cox proportional-hazards regression used to assess associations between groups of interest (AKI, AKI severity, AKI trajectories, and combination of AKI trajectory and severity) and time to death while controlling for demographics, Charlson comorbidity score, and provision of mechanical ventilation and ICU admission for ≥two days, with the exception of exclusion of variable for prolonged ICU admission and mechanical ventilation for subgroup analysis of non-ICU cohort. Similarly, multivariate logistic regression was used to model hospital mortality with same baseline characteristics variables. Models were also run with and without AKI severity to examine change in association after further adjustment of AKI severity included as indicators of severe AKI or Stage 3 AKI. Survival models were started at the time of hospital discharge and followed up to three years. For patients with multiple encounters, the last encounter was used for time to event analysis. Using scaled Schoenfeld residuals we confirmed that the proportional hazards assumption was satisfied for all variables in the model. Results were reported as unadjusted and adjusted hazards ratios with 95% confidence

intervals. Model discrimination was assessed using Harrell's concordance index. Kinetic GFR values were visualized using line plot which illustrates the average value with 95% confidence interval over time. A p-value ≤ 0.05 was considered statistically significant. Statistical analyses were performed with R 3.5.3, and Python 3.8 software.

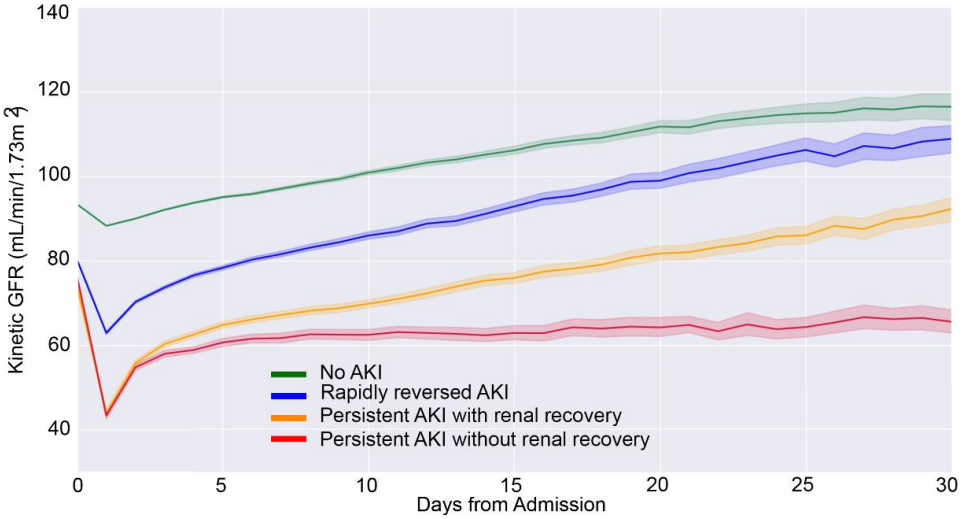


Supplemental Figure 1. Patient inclusion chart.

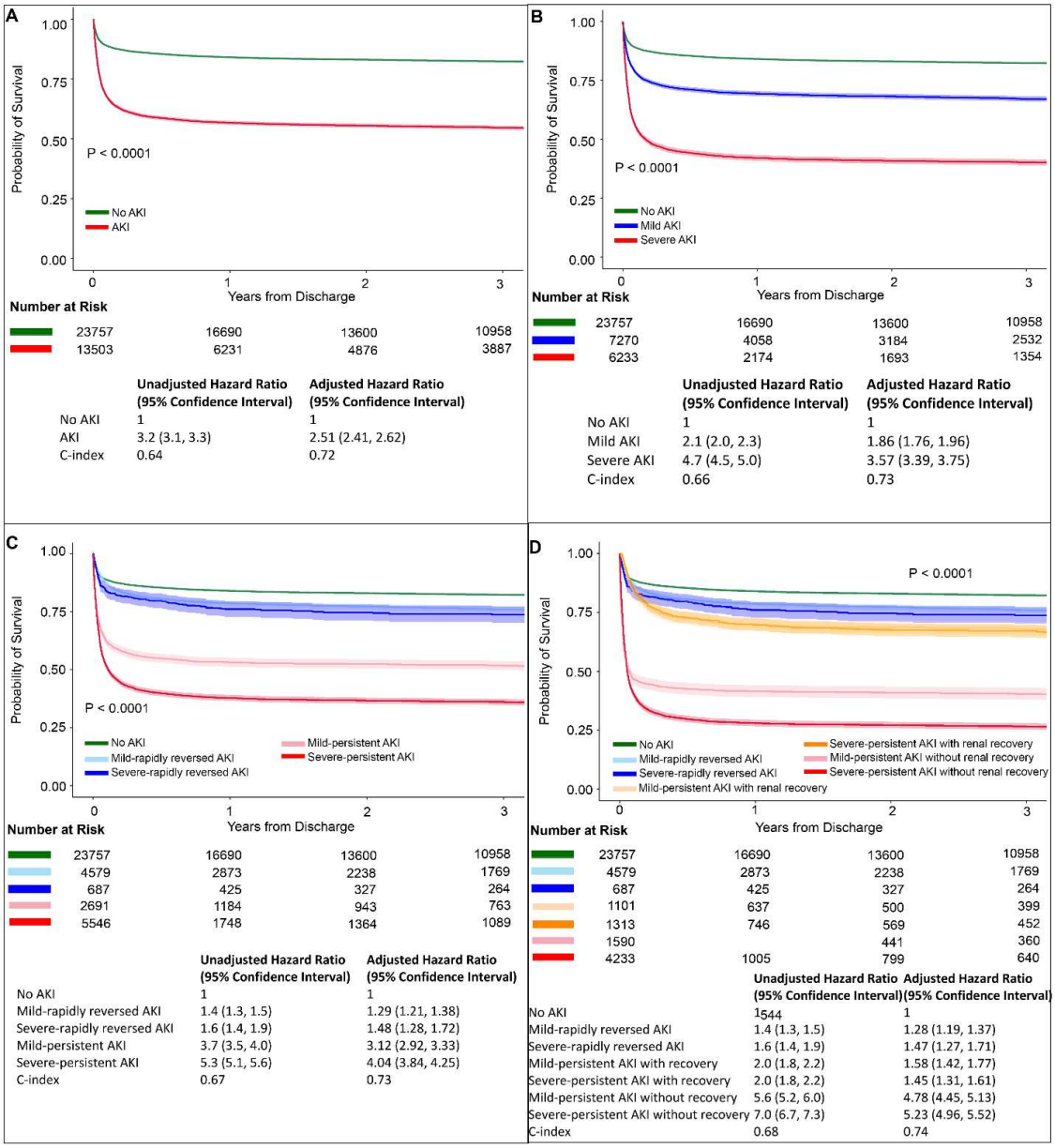


Supplemental Figure 2. Chord diagrams showing the distribution of eight most common admission diagnosis groups by AKI trajectory groups.
Diagnosis groups are shown in order of frequencies of all patients. Eight most common admission diagnosis groups are union of the top 5 most common groups of each trajectory group. For each trajectory group, the larger percentage of patients with that diagnosis, the border the ribbon. Detailed diagnosis groups from left to right are: abdominal pain, non-specific chest pain, other and unspecific lower respiratory disease, septicemia, complication of

device (implant or graft), nausea and vomiting, congestive heart failure (non-hypertensive), acute and unspecified renal failure.
Abbreviations. pAKI, persistent AKI; RR-AKI, rapidly reversed AKI.



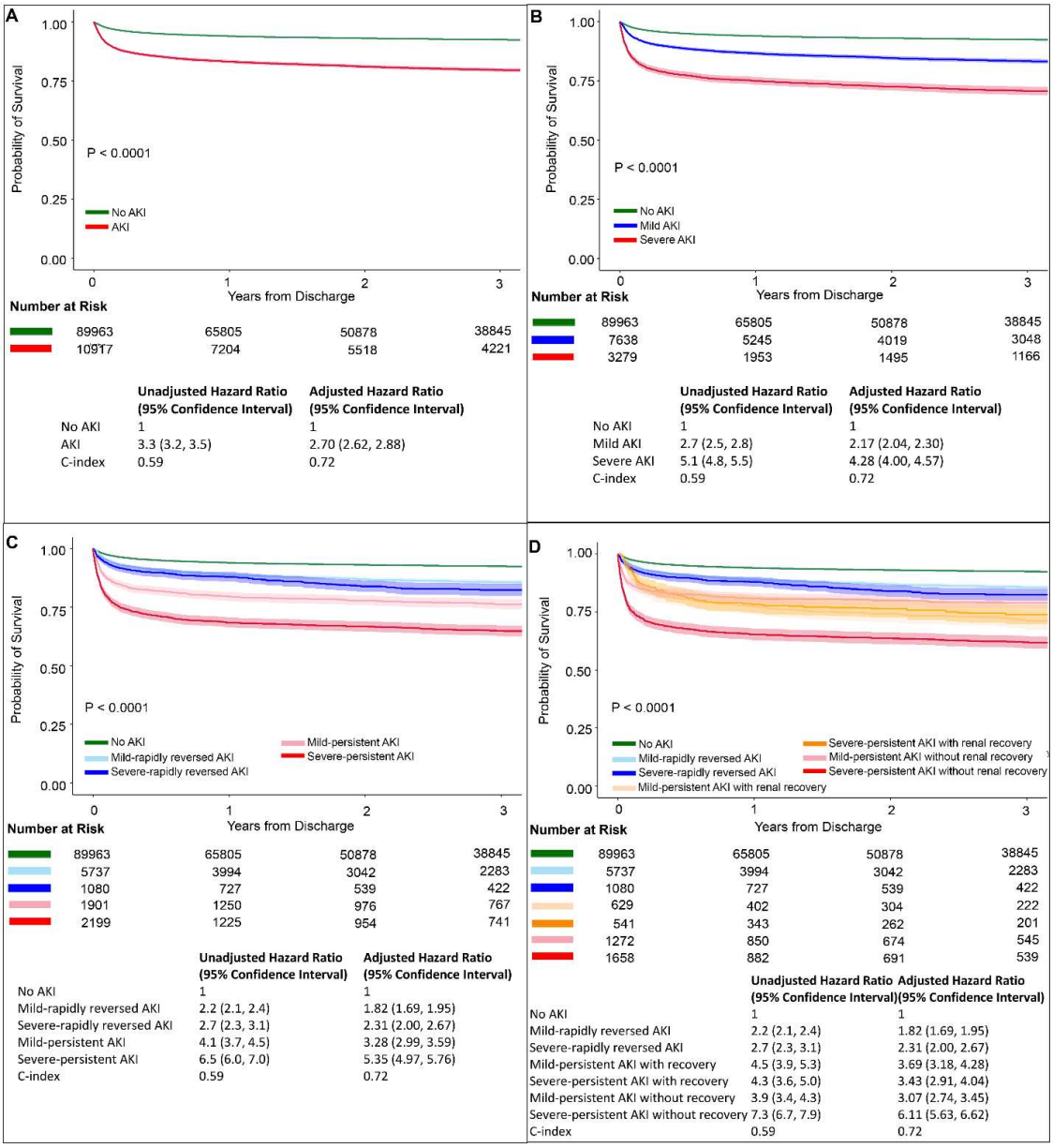
Supplemental Figure 3. Kinetic glomerular filtration rate by AKI trajectory groups



Supplemental Figure 4. Adjusted Kaplan-Meier survival curves and number at risk by AKI sub-phenotypes, in patients who have been admitted to ICU during hospitalization, obtained stratifying by

- **A.** No AKI vs. Any AKI
- **B.** AKI stratified by severity
- **C.** AKI stratified by severity and duration
- **D.** AKI stratified by severity and trajectories of AKI using duration and recovery of AKI

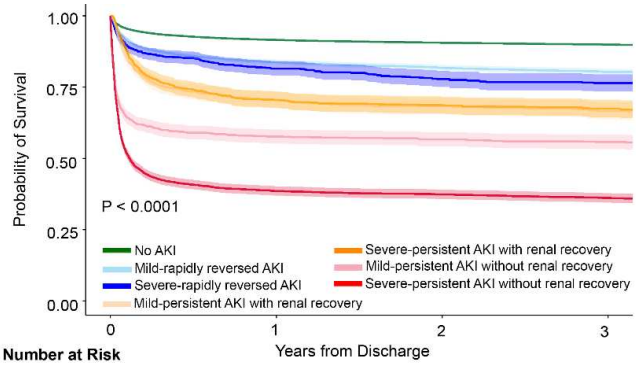
Propensity score based inverse weighting was used to plot adjusted Kaplan Meier curves where propensity of being in a trajectory group was calculated using multinomial logistic model that included age, gender, ethnicity, and Charlson comorbidity score. Adjusted hazard ratios were obtained adjusting for the same variables as well as need for mechanical ventilation for more than two days and need for intensive care unit admission for more than two days.



Supplemental Figure 5. Adjusted Kaplan-Meier survival curves and number at risk by AKI sub-phenotypes, in patients who have not been admitted to ICU during hospitalization, obtained stratifying by

- **A.** No AKI vs. Any AKI
- **B.** AKI stratified by severity
- **C.** AKI stratified by severity and duration
- **D.** AKI stratified by severity and trajectories of AKI using duration and recovery of AKI

Propensity score based inverse weighting was used to plot adjusted Kaplan Meier curves where propensity of being in a trajectory group was calculated using multinomial logistic model that included age, gender, ethnicity, and Charlson comorbidity score. Adjusted hazard ratios were obtained adjusting for the same variables.



Number at Risk

	85099	60195	46423	35457
	6684	4227	3184	3292
	1024	621	450	349
	1159	651	482	380
	1203	685	512	404
	1771	819	614	480
	3878	1212	927	707

	Unadjusted Hazard Ratio (95% Confidence Interval)	**Adjusted Hazard Ratio (95% Confidence Interval)**
No AKI	1	1
Mild-rapidly reversed AKI	2.3 (2.2, 2.4)	1.61 (1.51, 1.70)
Severe-rapidly reversed AKI	2.8 (2.4, 3.1)	2.15 (1.89, 2.44)
Mild-persistent AKI with recovery	4.2 (3.8, 4.6)	2.22 (2.00, 2.47)
Severe-persistent AKI with recovery	3.9 (3.6, 4.4)	1.89 (1.70, 2.10)
Mild-persistent AKI without recovery	7.5 (7.0, 8.0)	5.12 (4.76, 5.51)
Severe-persistent AKI without recovery	11.4 (10.9, 12.0)	6.21 (5.89, 6.54)
C-index	0.66	0.78

Supplemental Figure 6. Adjusted Kaplan-Meier survival curves and number at risk by AKI sub-phenotypes obtained stratifying by AKI severity and trajectories of AKI using duration and recovery of AKI after excluding of encounters with reference creatinine imputed using MDRD creatinine
Propensity score based inverse weighting was used to plot adjusted Kaplan Meier curves where propensity of being in a trajectory group was calculated using multinomial logistic model that included age, gender, ethnicity, and Charlson comorbidity score. Adjusted hazard ratios were obtained adjusting for the same variables as well as need for mechanical ventilation for more than two days and need for intensive care unit admission for more than two days.

Supplemental Table 1. Summary of number of serum creatinine measurements in first two days of AKI onset

Number of serum creatinine measurements	AKI	Persistent AKI with no renal recovery	Persistent AKI with renal recovery	Rapidly Reversed AKI
Day 1 of AKI onset				
Median (IQR)	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	1.0 (1.0, 1.0)
Mean (SD)	1.6 (1.2)	1.9 (1.4)	2.0 (1.4)	1.4 (1.0)
Day 2 of AKI onset				
Median (IQR)	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	1.0 (1.0, 2.0)	1.0 (1.0, 1.0)
Mean (SD)	1.5 (1.0)	1.7 (1.3)	1.7 (1.2)	1.3 (0.7)
First two days after AKI onset				
Median (IQR)	2.0 (2.0, 2.0)	2.0 (2.0, 2.0)	2.0 (2.0, 2.0)	2.0 (1.0, 2.0)
Mean (SD)	1.8 (0.4)	1.8 (0.4)	1.9 (0.3)	1.7 (0.4)

Abbreviations. IQR, interquartile range; SD, standard deviation.

Supplemental Table 2. Reclassification of AKI trajectory group among African American patients after race adjustment

		AKI trajectory group without race adjustment			
		No AKI (n=73,414, 86%)	Rapidly Reversed AKI (n=7,426, 9%)	Persistent AKI with renal recovery (n=1,928, 2%)	Persistent AKI with no renal recovery (n=3,057, 4%)
AKI trajectory group with race adjustment	No AKI (n=73,987, 86%)	73,398 (100)	487 (7)	29 (2)	73 (2)
	Rapidly Reversed AKI (n=7,113, 8%)	14 (0)	6,935 (93)	78 (4)	86 (3)
	Persistent AKI with renal recovery (n=1,874, 2%)	1 (0)	3 (0)	1,820 (94)	50 (2)
	Persistent AKI with no renal recovery (n=2,851, 3%)	1 (0)	1 (0)	1 (0)	2,848 (93)

Abbreviations. AKI, acute kidney injury.
Percentages reported are column percentages. Gray shading indicates patients who were reclassified into groups associated with shorter duration and recovery after race adjustment.

Supplemental Table 3. Baseline characteristics by trajectory groups in all cohort.

Variables	All Cohort (N=355,678)	AKI (N= 54,212, 15%)	Persistent AKI without renal recovery (N=14,122, 4%)	Persistent AKI with renal recovery (N=8,590, 2%)	Rapidly Reversed AKI (N=31,500, 9%)	No AKI (N=301,466, 85%)
Preadmission Clinical Characteristics						
Age, mean (SD), years	54 (19)	60 (17) [a]	61 (17) [a,b]	60 (17) [a,b]	59 (17) [a]	53 (19)
Female sex, n (%)	196,023 (55)	27,146 (50) [a]	7,137 (51) [a,c]	4,116 (48) [a,b]	15,893 (50) [a]	168,877 (56)
Race, n (%)						
White	247,445 (70)	38,546 (71) [a]	10,035 (71) [a]	6,163 (72) [a]	22,348 (71) [a]	208,899 (69)
African American	85,825 (24)	12,411 (23) [a]	3,057 (22) [a,b]	1,928 (22) [a]	7,426 (24) [a]	73,414 (24)
Primary Insurance, n (%)						
Private	83,736 (24)	9,927 (18) [a]	2,614 (19) [a]	1,614 (19) [a]	5,699 (18) [a]	73,809 (24)
Medicare	144,665 (41)	29,376 (54) [a]	7,780 (55) [a,b]	4,793 (56) [a,b]	16,803 (53) [a]	115,289 (38)
Medicaid	76,382 (21)	10,124 (19) [a]	2,611 (18) [a]	1,629 (19) [a]	5,884 (19) [a]	66,258 (22)
Uninsured	50,895 (14)	4,785 (9) [a]	1,117 (8) [a,b,c]	554 (6) [a,b]	3,114 (10) [a]	46,110 (15)
Residing Neighborhood Characteristics						
Proportion of African-Americans (%), mean (SD)	19.3 (17.8)	18.6 (17.5) [a]	18.1 (17.1) [a,b]	18.1 (17.1) [a,b]	18.9 (17.7) [a]	19.4 (17.8)
Proportion below poverty (%), mean (SD)	23.0 (10.1)	22.1 (9.9) [a]	21.7 (9.9) [a,b]	21.7 (9.8) [a,b]	22.4 (9.9) [a]	23.1 (10.1)
Distance from hospital (mile), median (IQR)	14 (3, 30)	21 (3, 37) [a]	23 (9, 41) [a,b,c]	24 (10, 42) [a,b]	18 (3, 36) [a]	14 (3, 27)
Comorbidities, n (%)						
Hypertension	225,192 (63)	36,556 (67) [a]	9,100 (64) [a,b,c]	5,929 (69) [a]	21,527 (68) [a]	188,636 (63)
Chronic pulmonary disease	149,551 (42)	23,044 (43) [a]	5,517 (39) [a,b,c]	3,771 (44) [a]	13,756 (44) [a]	126,507 (42)
Cardiovascular disease *	129,930 (37)	23,451 (43) [a]	5,619 (40) [a,b,c]	3,960 (46) [a,b]	13,872 (44) [a]	106,479 (35)
Diabetes mellitus	104,546 (29)	18,331 (34) [a]	4,359 (31) [a,b,c]	2,928 (34) [a]	11,044 (35) [a]	86,215 (29)
Chronic kidney disease	85,942 (24)	21,421 (40) [a]	5,442 (39) [a,c]	3,864 (45) [a,b]	12,115 (38) [a]	64,521 (21)
Moderate/Severe (≥ G-Stage 3)	34,956 (41)	11,739 (55) [a]	3,025 (56) [a]	2,211 (57) [a,b]	6,503 (54) [a]	26,236 (41)
Preadmission estimated glomerular filtration rate (mL/min per 1.73 m^2), median (IQR)	63.6 (46.4, 85.1)	55.9 (37.9, 78.7) [a]	53.9 (32.6, 81.1) [a,b]	54.1 (36.6, 76.2) [a,b]	57.2 (40.1, 78.6) [a]	65.6 (49.5, 86.6)
Admission characteristics, n (%)						
Emergent Admission	295,286 (83)	45,927 (85) [a]	12,091 (86) [a,b]	7,355 (86) [a,b]	26,481 (84) [a]	249,359 (83)
Transfer from another hospital	53,265 (15)	13,706 (25) [a]	4,626 (33) [a,b]	2,721 (32) [a,b]	6,359 (20) [a]	39,559 (13)

Variables	All Cohort (N=355,678)	AKI (N= 54,212, 15%)	Persistent AKI without renal recovery (N=14,122, 4%)	Persistent AKI with renal recovery (N=8,590, 2%)	Rapidly Reversed AKI (N=31,500, 9%)	No AKI (N=301,466, 85%)
Admission to surgical services	78,284 (22)	13,971 (26) [a]	3,830 (27) [a,b,c]	2,532 (29) [a,b]	7,609 (24) [a]	64,313 (21)
Surgery on admission day	51,310 (14)	8,327 (15) [a]	2,179 (15) [a,c]	1,455 (17) [a,b]	4,693 (15) [a]	42,983 (14)
Surgery at any time	72,541 (20)	15,216 (28) [a]	4,068 (29) [a,b,c]	3,272 (38) [a,b]	7,876 (25) [a]	57,325 (19)
Type of surgery						
Non-cardiac general surgery	24,066 (33)	6,213 (41) [a]	1,760 (43) [a,b]	1,412 (43) [a,b]	3,041 (39) [a]	17,853 (31)
Cardiothoracic surgery	6,568 (9)	2,603 (17) [a]	682 (17) [a,c]	721 (22) [a,b]	1,200 (15) [a]	3,965 (7)
Neurologic surgery	7,317 (10)	1,055 (7) [a]	321 (8) [a]	208 (6) [a]	526 (7) [a]	6,262 (11)
Specialty surgery	31,838 (44)	4,765 (31) [a]	1,155 (28) [a,b,c]	804 (25) [a,b]	2,806 (36) [a]	27,073 (47)
Other surgery	2,752 (4)	580 (4)	150 (4)	127 (4)	303 (4)	2,172 (4)
Primary admission diagnostic groups, n (%)						
Diseases of the circulatory system	64,113 (18)	11,863 (22) [a]	3,163 (22) [a]	1,981 (23) [a,b]	6,719 (21) [a]	52,250 (17)
Symptoms; signs; and ill-defined conditions	49,812 (14)	4,515 (8) [a]	926 (7) [a,b]	506 (6) [a,b]	3,083 (10) [a]	45,297 (15)
Diseases of the digestive/genitourinary systems	44,435 (12)	8,469 (16) [a]	2,135 (15) [a]	1,399 (16) [a]	4,935 (16) [a]	35,966 (12)
Diseases of the musculoskeletal/connective tissue and skin	33,128 (9)	2,827 (5) [a]	676 (5) [a,b]	354 (4) [a,b]	1,797 (6) [a]	30,301 (10)
Respiratory and infectious diseases	29,640 (8)	5,278 (10) [a]	1,435 (10) [a]	789 (9) [a]	3,054 (10) [a]	24,362 (8)
Neoplasms	17,060 (5)	2,942 (5) [a]	817 (6) [a,b]	527 (6) [a,b]	1,598 (5) [a]	14,118 (5)
Complications of pregnancy and childbirth	10,152 (3)	577 (1) [a]	191 (1) [a,b,c]	79 (1) [a]	307 (1) [a]	9,575 (3)

Abbreviations. SD, standard deviation; IQR, Interquartile Range.
[a] p<0.05 compared to no AKI
[b] p<0.05 compared to Rapidly Reversed AKI
[c] p<0.05 compared to Persistent AKI with renal recovery
* Cardiovascular disease was considered if there was a history of congestive heart failure, coronary artery disease of peripheral vascular disease.

Supplemental Table 4. Baseline characteristics by trajectory groups in hospitalized adult patients who have been admitted to ICU during hospitalization.

Variables	All Cohort (N=78,769)	AKI (N=27,711, 35%)	Persistent AKI without renal recovery (8,573, 11%)	Persistent AKI with renal recovery (5,860, 7%)	Rapidly Reversed AKI (13,278, 17%)	No AKI (51,058, 65%)
Preadmission Clinical Characteristics						
Age, mean (SD), years	59 (17)	61 (16) [a]	61 (16) [a,b,c]	60 (16) [a]	60 (17) [a]	58 (18)
Female sex, n (%)	36,021 (46)	12,672 (46)	3,988 (47)	2,679 (46)	6,005 (45)	23,349 (46)
Race, n (%)						
White	59,511 (76)	20,228 (73) [a]	6,219 (73) [a]	4,259 (73) [a]	9,750 (73) [a]	39,283 (77)
African American	14,280 (18)	5,785 (21) [a]	1,718 (20) [a]	1,254 (21) [a]	2,813 (21) [a]	8,495 (17)
Primary Insurance, n (%)						
Private	16,913 (21)	4,927 (18) [a]	1,509 (18) [a]	1,061 (18) [a]	2,357 (18) [a]	11,986 (23)
Medicare	40,012 (51)	15,496 (56) [a]	4,773 (56) [a]	3,314 (57) [a]	7,409 (56) [a]	24,516 (48)
Medicaid	13,834 (18)	5,045 (18) [a]	1,586 (18) [a]	1,097 (19) [a]	2,362 (18)	8,789 (17)
Uninsured	8,010 (10)	2,243 (8) [a]	705 (8) [a,c]	388 (7) [a,b]	1,150 (9) [a]	5,767 (11)
Residing Neighborhood Characteristics, n (%)						
Proportion of African-Americans (%), mean (SD)	17.5 (16.6)	18.1 (17.1) [a]	18.1 (17.3) [a]	18.0 (17.1) [a]	18.2 (17.1) [a]	17.2 (16.3)
Proportion below poverty (%), mean (SD)	21.5 (9.9)	21.7 (10.0) [a]	21.5 (10.0) [a]	21.6 (9.8)	22.0 (10.0) [a]	21.4 (9.9)
Distance from hospital (mile), median (IQR)	23 (9, 41)	23 (9, 41)	24 (12, 43) [a,b]	25 (11, 44) [a,b]	23 (7, 38) [a]	23 (9, 41)
Comorbidities, n (%)						
Hypertension, n (%)	50,051 (64)	18,251 (66) [a]	5,383 (63) [b,c]	4,014 (68) [a,b]	8,854 (67) [a]	31,800 (62)
Chronic pulmonary disease, n (%)	31,550 (40)	11,388 (41) [a]	3,235 (38) [a,b,c]	2,533 (43) [a]	5,620 (42) [a]	20,162 (39)
Cardiovascular disease, n (%)	31,207 (40)	11,944 (43) [a]	3,348 (39) [b,c]	2,719 (46) [a,b]	5,877 (44) [a]	19,263 (38)
Diabetes mellitus, n (%)	23,106 (29)	8,945 (32) [a]	2,541 (30) [a,b,c]	1,954 (33) [a]	4,450 (34) [a]	14,161 (28)
Chronic kidney disease, n (%)	21,398 (27)	10,879 (39) [a]	3,367 (39) [a,c]	2,517 (43) [a,b]	4,995 (38) [a]	10,519 (21)
Moderate/Severe (>= G-Stage 3), n (%)	10,813 (51)	6,076 (56) [a]	1,932 (57) [a]	1,420 (56) [a]	2,724 (55) [a]	4,737 (45)
Preadmission estimated glomerular filtration rate (mL/min per 1.73 m2), median (IQR)	59.2 (41.7, 80.6)	55.0 (37.5, 77.5) [a]	52.4 (33.1, 78.0) [a,b]	54.5 (37.3, 76.1) [a,b]	56.9 (40.1, 77.9) [a]	62.7 (46.3, 83.1)
Admission characteristics, n (%)						
Emergent Admission, n (%)	63,745 (81)	23,883 (86) [a]	7,542 (88) [a,b,c]	5,042 (86) [a]	11,299 (85) [a]	39,862 (78)

Variables	All Cohort (N=78,769)	AKI (N=27,711, 35%)	Persistent AKI without renal recovery (8,573, 11%)	Persistent AKI with renal recovery (5,860, 7%)	Rapidly Reversed AKI (13,278, 17%)	No AKI (51,058, 65%)
Transfer from another hospital, n (%)	24,223 (31)	9,550 (34) [a]	3,424 (40) [a,b,c]	2,168 (37) [a,b]	3,958 (30)	14,673 (29)
Admission to surgical services, n (%)	31,774 (40)	9,306 (34) [a]	2,670 (31) [a,b,c]	2,141 (37) [a,b]	4,495 (34) [a]	22,468 (44)
Surgery on admission day, n (%)	19,046 (24)	5,285 (19) [a]	1,441 (17) [a,b,c]	1,228 (21) [a]	2,616 (20) [a]	13,761 (27)
Surgery at any time, n (%)	29,922 (38)	10,333 (37) [a]	2,940 (34) [a,c]	2,685 (46) [a,b]	4,708 (35) [a]	19,589 (38)
Type of surgery, n (%)						
Non-cardiac general surgery	11,136 (37)	4,633 (45) [a]	1,413 (48) [a,b]	1,223 (46) [a]	1,997 (42) [a]	6,503 (33)
Cardiothoracic surgery	6,372 (21)	2,562 (25) [a]	666 (23) [a,c]	717 (27) [a,b]	1,179 (25) [a]	3,810 (19)
Neurologic surgery	5,469 (18)	927 (9) [a]	271 (9) [a,c]	184 (7) [a,b]	472 (10) [a]	4,542 (23)
Specialty surgery	5,836 (20)	1,865 (18) [a]	497 (17) [a]	480 (18) [a]	888 (19)	3,971 (20)
Other surgery	1,109 (4)	346 (3) [a]	93 (3)	81 (3)	172 (4)	763 (4)
Primary admission diagnostic groups, n (%)						
Diseases of the circulatory system	21,568 (27)	7,519 (27)	2,244 (26)	1,600 (27)	3,675 (28)	14,049 (28)
Symptoms; signs; and ill-defined conditions	3,753 (5)	1,358 (5)	425 (5)	257 (4)	676 (5)	2,395 (5)
Diseases of the digestive/genitourinary systems	7,342 (9)	3,079 (11) [a]	944 (11) [a,c]	749 (13) [a,b]	1,386 (10) [a]	4,263 (8)
Diseases of the musculoskeletal/connective tissue and skin	2,622 (3)	762 (3) [a]	220 (3) [a]	170 (3) [a]	372 (3) [a]	1,860 (4)
Respiratory and infectious diseases	9,430 (12)	3,205 (12) [a]	1,011 (12) [c]	592 (10) [a,b]	1,602 (12)	6,225 (12)
Neoplasms	5,397 (7)	1,256 (5) [a]	436 (5) [a,b]	272 (5) [a]	548 (4) [a]	4,141 (8)
Complications of pregnancy and childbirth	418 (1)	116 (0) [a]	31 (0)	28 (0)	57 (0)	302 (1)

Abbreviations. SD, standard deviation; IQR, Interquartile Range; RRT, renal replacement therapy.
[a] p<0.05 compared to no AKI
[b] p<0.05 compared to Rapidly Reversed AKI
[c] p<0.05 compared to Persistent AKI with renal recovery
* Cardiovascular disease was considered if there was a history of congestive heart failure, coronary artery disease of peripheral vascular disease.

Supplemental Table 5. Baseline characteristics by trajectory groups in hospitalized adult patients who have not been admitted to ICU at any time during hospitalization.

Variables	All Cohort (N=276,909)	AKI (N=26,501, 10%)	Persistent AKI without renal recovery (5,549, 2%)	Persistent AKI with renal recovery (2,730, 1%)	Rapidly Reversed AKI (18,222, 7%)	No AKI (250,408, 90%)
Preadmission Clinical Characteristics						
Age, mean (SD), years	52 (19)	59 (17) [a]	60 (18) [a,b]	59 (17) [a]	59 (17) [a]	51 (19)
Female sex, n (%)	160,002 (58)	14,474 (55) [a]	3,149 (57) [b,c]	1,437 (53) [a]	9,888 (54) [a]	145,528 (58)
Race, n (%)						
White	187,934 (68)	18,318 (69) [a]	3,816 (69)	1,904 (70)	12,598 (69) [a]	169,616 (68)
African American	71,545 (26)	6,626 (25) [a]	1,339 (24) [a]	674 (25)	4,613 (25)	64,919 (26)
Primary Insurance, n (%)						
Private	66,823 (24)	5,000 (19) [a]	1,105 (20) [a]	553 (20) [a]	3,342 (18) [a]	61,823 (25)
Medicare	104,653 (38)	13,880 (52) [a]	3,007 (54) [a,b]	1,479 (54) [a]	9,394 (52) [a]	90,773 (36)
Medicaid	62,548 (23)	5,079 (19) [a]	1,025 (18) [a]	532 (19) [a]	3,522 (19) [a]	57,469 (23)
Uninsured	42,885 (15)	2,542 (10) [a]	412 (7) [a,b]	166 (6) [a,b]	1,964 (11) [a]	40,343 (16)
Residing Neighborhood Characteristics, n (%)						
Proportion of African-Americans (%), mean (SD)	19.8 (18.1)	19.1 (17.8) [a]	18.2 (16.8) [a,b]	18.2 (17.2) [a,b]	19.5 (18.2) [a]	19.9 (18.1)
Proportion below poverty (%), mean (SD)	23.4 (10.1)	22.5 (9.8) [a]	22.1 (9.7) [a,b]	21.8 (9.7) [a,b]	22.8 (9.8) [a]	23.5 (10.1)
Distance from hospital (mile), median (IQR)	14 (3, 25)	18 (3, 34) [a]	22 (3, 36) [a,b]	23 (8, 39) [a,b]	14 (3, 32) [a]	13 (3, 25)
Comorbidities, n (%)						
Hypertension, n (%)	175,141 (63)	18,305 (69) [a]	3,717 (67) [a,b,c]	1,915 (70) [a]	12,673 (70) [a]	156,836 (63)
Chronic pulmonary disease, n (%)	118,001 (43)	11,656 (44) [a]	2,282 (41) [b,c]	1,238 (45) [a]	8,136 (45) [a]	106,345 (42)
Cardiovascular disease, n (%)	98,723 (36)	11,507 (43) [a]	2,271 (41) [a,b,c]	1,241 (45) [a]	7,995 (44) [a]	87,216 (35)
Diabetes mellitus, n (%)	81,440 (29)	9,386 (35) [a]	1,818 (33) [a,b]	974 (36) [a]	6,594 (36) [a]	72,054 (29)
Chronic kidney disease, n (%)	64,544 (23)	10,542 (40) [a]	2,075 (37) [a,c]	1,347 (49) [a,b]	7,120 (39) [a]	54,002 (22)
Moderate/Severe (>= G-Stage 3), n (%)	27,162 (42)	5,663 (54) [a]	1,093 (53) [a,c]	791 (59) [a,b]	3,779 (53) [a]	21,499 (40)
Preadmission estimated glomerular filtration rate (mL/min per 1.73 m2), median (IQR)	64.8 (48.2, 86.3)	56.8 (38.4, 79.9) [a]	56.6 (32.1, 86.3) [a,c]	52.7 (35.4, 76.3) [a,b]	57.4 (40.2, 79.0) [a]	66.1 (50.1, 87.3)
Admission characteristics, n						

Variables	All Cohort (N=276,909)	AKI (N=26,501, 10%)	Persistent AKI without renal recovery (5,549, 2%)	Persistent AKI with renal recovery (2,730, 1%)	Rapidly Reversed AKI (18,222, 7%)	No AKI (250,408, 90%)
(%)						
Emergent Admission, n (%)	231,541 (84)	22,044 (83) [a]	4,549 (82) [a,c]	2,313 (85)	15,182 (83)	209,497 (84)
Transfer from another hospital, n (%)	29,042 (10)	4,156 (16) [a]	1,202 (22) [a,b]	553 (20) [a,b]	2,401 (13) [a]	24,886 (10)
Admission to surgical services, n (%)	46,510 (17)	4,665 (18) [a]	1,160 (21) [a,b,c]	391 (14) [a,b]	3,114 (17)	41,845 (17)
Surgery on admission day, n (%)	32,264 (12)	3,042 (11)	738 (13) [a,b,c]	227 (8) [a,b]	2,077 (11)	29,222 (12)
Surgery at any time, n (%)	42,619 (15)	4,883 (18) [a]	1,128 (20) [a,b]	587 (22) [a,b]	3,168 (17) [a]	37,736 (15)
Type of surgery, n (%)						
Non-cardiac general surgery	12,930 (30)	1,580 (32) [a]	347 (31)	189 (32)	1,044 (33) [a]	11,350 (30)
Cardiothoracic surgery	196 (0)	41 (1) [a]	16 (1) [a]	4 (1)	21 (1)	155 (0)
Neurologic surgery	1,848 (4)	128 (3) [a]	50 (4) [b]	24 (4) [b]	54 (2) [a]	1,720 (5)
Specialty surgery	26,002 (61)	2,900 (59) [a]	658 (58)	324 (55) [a]	1,918 (61)	23,102 (61)
Other surgery	1,643 (4)	234 (5) [a]	57 (5)	46 (8) [a,b]	131 (4)	1,409 (4)
Primary admission diagnostic groups, n (%)						
Diseases of the circulatory system	42,545 (15)	4,344 (16) [a]	919 (17) [a,c]	381 (14) [b]	3,044 (17) [a]	38,201 (15)
Symptoms; signs; and ill-defined conditions	46,059 (17)	3,157 (12) [a]	501 (9) [a,b]	249 (9) [a,b]	2,407 (13) [a]	42,902 (17)
Diseases of the digestive/genitourinary systems	37,093 (13)	5,390 (20) [a]	1,191 (21) [a,b]	650 (24) [a,b]	3,549 (19) [a]	31,703 (13)
Diseases of the musculoskeletal/connective tissue and skin	30,506 (11)	2,065 (8) [a]	456 (8) [a]	184 (7) [a]	1,425 (8) [a]	28,441 (11)
Respiratory and infectious diseases	20,210 (7)	2,073 (8) [a]	424 (8)	197 (7)	1,452 (8) [a]	18,137 (7)
Neoplasms	11,663 (4)	1,686 (6) [a]	381 (7) [a,b,c]	255 (9) [a,b]	1,050 (6) [a]	9,977 (4)
Complications of pregnancy and childbirth	9,734 (4)	461 (2) [a]	160 (3) [a,b,c]	51 (2) [a]	250 (1) [a]	9,273 (4)

Abbreviations. SD, standard deviation; IQR, Interquartile Range; RRT, renal replacement therapy.
[a] p<0.05 compared to no AKI
[b] p<0.05 compared to Rapidly Reversed AKI
[c] p<0.05 compared to Persistent AKI with renal recovery
[*] Cardiovascular disease was considered if there was a history of congestive heart failure, coronary artery disease of peripheral vascular disease.

Supplemental Table 6. Early admission characteristics by trajectories of AKI in all cohort.

Variables	All Cohort (N=355,678)	AKI (N=54,212, 15%)	Persistent AKI without renal recovery (N=14,122, 4%)	Persistent AKI with renal recovery (N=8,590, 2%)	Rapidly Reversed AKI (N=31,500, 9%)	No AKI (N=301,466, 85%)
Kidney function within 48 hours of the admission						
AKI, n (%)	37,973 (11)	37,973 (70) [a]	9,706 (69) [a,b]	5,908 (69) [a,b]	22,359 (71) [a]	0 (0)
Stage 1	25,963 (68)	25,963 (68) [a]	4,538 (47) [a,b,c]	3,132 (53) [a,b]	18,293 (82) [a]	0 (0)
Stage 2	6,646 (18)	6,646 (18) [a]	2,328 (24) [a,b]	1,473 (25) [a,b]	2,845 (13) [a]	0 (0)
Stage 3	5,364 (14)	5,364 (14) [a]	2,840 (29) [a,b,c]	1,303 (22) [a,b]	1,221 (5) [a]	0 (0)
Stage 3 without RRT	4,623 (12)	4,623 (12) [a]	2,217 (23) [a,b,c]	1,195 (20) [a,b]	1,211 (5) [a]	0 (0)
Stage 3 with RRT	741 (2)	741 (2) [a]	623 (6) [a,b,c]	108 (2) [a,b]	10 (0) [a]	0 (0)
Highest blood urea nitrogen (mg/dl), mean (SD)	18 (13)	30 (22) [a]	35 (26) [a,b,c]	36 (25) [a,b]	27 (17) [a]	15 (9)
Highest serum creatinine (mg/dl), median (IQR)	0.9 (0.7, 1.1)	1.4 (1.0, 1.9) [a]	1.5 (0.9, 2.4) [a,b,c]	1.6 (1.0, 2.4) [a,b]	1.3 (1.0, 1.7) [a]	0.8 (0.7, 1.0)
Reference creatinine (mg/dl), median (IQR)	0.8 (0.7, 1.0)	0.8 (0.7, 1.1) [a]	0.8 (0.7, 1.1) [a,b,c]	0.9 (0.7, 1.2) [a,b]	0.8 (0.7, 1.1) [a]	0.8 (0.7, 0.9)
Highest / reference creatinine, mean (SD)	1.2 (0.6)	1.8 (1.2) [a]	2.1 (1.8) [a,b]	1.9 (1.4) [a,b]	1.6 (0.7) [a]	1.1 (0.2)
Highest cystatin C (mg/l), median (IQR)	1.0 (0.7, 1.4)	1.2 (0.8, 1.7) [a]	1.4 (0.9, 2.0) [a,b]	1.4 (1.0, 2.1) [a,b]	0.9 (0.8, 1.2)	0.8 (0.7, 1.1)
Urine microalbumin/creatinine ratio >300 mcg/mg, n (%)	605 (0)	388 (1)	207 (1) [a,b,c]	78 (1) [a,b]	103 (0) [a]	217 (0)
Urine microalbumin/creatinine ratio >=30 mcg/mg, n (%)	1005 (0)	514 (1) [a]	177 (1) [a,b]	128 (1) [a,b]	209 (1) [a]	491 (0)
Urine protein/creatinine ratio >500 mcg/mg, n (%)	2442 (1)	1172 (2) [a]	592 (4) [a,b,c]	295 (3) [a,b]	285 (1) [a]	1270 (0)
Urine protein/creatinine ratio >=150 mcg/mg, n (%)	3167 (1)	699 (1) [a]	252 (2) [a,b]	153 (2) [a,b]	294 (1)	2468 (1)
Urine output (L/day), median (IQR)	1.0 (0.5, 1.8)	1.1 (0.6, 1.9) [a]	1.0 (0.5, 1.8) [a,b,c]	1.2 (0.7, 2.0) [a,b]	1.2 (0.6, 1.9) [a]	1.0 (0.5, 1.7)
Count of nephrotoxic drug, mean (SD)						
Within 2 days after hospital admission	0.86 (0.97)	1.26 (1.03) [a]	1.41 (1.03) [a,b]	1.39 (1.03) [a,b]	1.17 (1.02) [a]	0.79 (0.94)
Within 3 days after hospital admission	0.92 (1.00)	1.39 (1.07) [a]	1.54 (1.07) [a,b]	1.55 (1.07) [a,b]	1.27 (1.06) [a]	0.83 (0.97)
Between hospital admission and first AKI onset	1.33 (1.18)	1.33 (1.18)	1.49 (1.20) [b]	1.47 (1.20) [b]	1.23(1.15)	NA

Variables	All Cohort (N=355,678)	AKI (N=54,212, 15%)	Persistent AKI without renal recovery (N=14,122, 4%)	Persistent AKI with renal recovery (N=8,590, 2%)	Rapidly Reversed AKI (N=31,500, 9%)	No AKI (N=301,466, 85%)
Resuscitation volume within 48 hours of the admission						
Blood products, n (%)	14,723 (4)	5,510 (10) [a]	2,092 (15) [a,b]	1,167 (14) [a,b]	2,251 (7) [a]	9,213 (3)
Saline (L), median (IQR)	1.5 (1.0, 2.9)	2.0 (1.0, 3.8) [a]	2.0 (1.0, 3.8) [a,c]	2.2 (1.0, 4.0) [a,b]	2.0 (1.0, 3.6) [a]	1.2 (1.0, 2.6)
Balanced crystalloids (L), median (IQR)	1.9 (1.0, 3.3)	2.2 (1.0, 4.0) [a]	2.3 (1.0, 4.2) [a,b,c]	2.6 (1.1, 4.4) [a,b]	2.1 (1.0, 3.7) [a]	1.8 (1.0, 3.1)
Cumulative net fluid balance (L), median (IQR)	0.3 (-0.6, 1.3)	0.3 (-0.7, 1.6) [a]	0.6 (-0.3, 1.8) [a,b]	0.5 (-0.6, 1.8)	0.2 (-0.8, 1.5)	0.3 (-0.5, 1.2)
Cumulative net fluid balance (% admission weight)	0.6 (2.7)	0.9 (3.4) [a]	1.2 (3.3) [a,b]	1.2 (3.7)	0.7 (3.4)	0.5 (2.5)
Organ dysfunction within 24 hours of the admission						
Lowest Glasgow Coma Scale	14 (2)	13 (3) [a]	12 (4) [a,b,c]	13 (4) [a,b]	14 (3) [a]	14 (2)
Lowest systolic blood pressure (mm Hg)	105 (22)	97 (23) [a]	94 (25) [a,b,c]	94 (23) [a,b]	99 (22) [a]	107 (22)
Lowest diastolic blood pressure	57 (15)	51 (15) [a]	49 (15) [a,b]	49 (15) [a,b]	52 (14) [a]	58 (15)
Lowest mean blood pressure	71 (17)	65 (17) [a]	63 (17) [a,b]	62 (17) [a,b]	66 (16) [a]	72 (16)
Duration of mean arterial blood pressure below 60 mmHg (minutes), median (IQR)	60 (18, 190)	98 (31, 250) [a]	120 (40, 300) [a,b]	111 (42, 255) [a,b]	85 (30, 225) [a]	60 (15, 173)
Number of vasopressors used, n (%)						
0	320,565 (90)	45,314 (84) [a]	10,931 (77) [a,b,c]	6,902 (80) [a,b]	2,7481 (87) [a]	275,251 (91)
1	17,529 (5)	4,084 (8) [a]	1,316 (9) [a,b]	776 (9) [a,b]	1,992 (6) [a]	13,445 (4)
>= 2	17,584 (5)	4,814 (9) [a]	1,875 (13) [a,b,c]	912 (11) [a,b]	2,027 (6) [a]	12,770 (4)
Lowest PO2/FiO2 ratio	367 (244)	322 (217) [a]	295 (205) [a,b,c]	314 (199) [a,b]	346 (229) [a]	391 (255)
Need for mechanical ventilation, n (%)	15,908 (4)	7,139 (13) [a]	2,782 (20) [a,b]	1,581 (18) [a,b]	2,776 (9) [a]	8,769 (3)
Admission to ICU, n (%)	66,402 (19)	21,885 (40) [a]	6,678 (47) [a,b,c]	4,425 (52) [a,b]	10,782 (34) [a]	44,517 (15)
pH < 7.25, n (%)	3,671 (1)	2,331 (4) [a]	1,029 (7) [a,b,c]	516 (6) [a,b]	786 (2) [a]	1,340 (0)
Highest anion gap (mmol/L)	13 (4)	15 (5) [a]	16 (6) [a,b]	15 (5) [a,b]	14 (5) [a]	13 (4)
Lactate, tested (mmol/L), n (%)	112,211 (32)	27,118 (50) [a]	7,713 (55) [a,b,c]	4,941 (58) [a,b]	14,464 (46) [a]	85,093 (28)
< 2	74,549 (66)	14,788 (55) [a]	3,746 (49) [a,b,c]	2,550 (52) [a,b]	8,492 (59) [a]	59,761 (70)
2 - 4	27,673 (25)	7,626 (28) [a]	2,018 (26) [a,b,c]	1,449 (29) [a]	4,159 (29) [a]	20,047 (24)
> 4	9,989 (9)	4,704 (17) [a]	1,949 (25) [a,b,c]	942 (19) [a,b]	1,813 (13) [a]	5,285 (6)
Highest lactate (mmol/L)	2.1 (2.1)	2.8 (3.0) [a]	3.6 (4.0) [a,b,c]	2.9 (2.7) [a,b]	2.4 (2.2) [a]	1.9 (1.6)

Variables	All Cohort (N=355,678)	AKI (N=54,212, 15%)	Persistent AKI without renal recovery (N=14,122, 4%)	Persistent AKI with renal recovery (N=8,590, 2%)	Rapidly Reversed AKI (N=31,500, 9%)	No AKI (N=301,466, 85%)
Highest glucose (mg/dL)	148 (84)	180 (113) [a]	179 (105) [a,b,c]	183 (109) [a,b]	180 (118) [a]	141 (75)
Highest temperature (Celsius)	37.6 (0.6)	37.8 (0.7) [a]	37.8 (0.8) [a,b,c]	37.9 (0.8) [a,b]	37.8 (0.7) [a]	37.6 (0.6)
Lowest temperature (Celsius)	36.6 (1.2)	36.4 (1.4) [a]	36.3 (1.5) [a,b,c]	36.3 (1.7) [a,b]	36.5 (1.3) [a]	36.7 (1.2)
Lowest hematocrit (%)	36.0 (6.6)	32.8 (7.1) [a]	31.3 (7.2) [a,b]	31.5 (7.1) [a,b]	33.9 (6.9) [a]	36.6 (6.3)
Highest red cell distribution width (%)	15.0 (2.2)	15.8 (2.4) [a]	16.2 (2.6) [a,b]	16.1 (2.5) [a,b]	15.5 (2.3) [a]	14.9 (2.2)
Highest international normalized ratio	1.3 (0.7)	1.5 (1.0) [a]	1.7 (1.2) [a,b,c]	1.6 (1.0) [a,b]	1.4 (0.8) [a]	1.3 (0.6)
Lowest platelets (thou/cu mm)	232 (100)	214 (110) [a]	203 (115) [a,b]	208 (114) [a,b]	221 (107) [a]	235 (97)
Lowest total protein (g/dL)	6.8 (1.0)	6.5 (1.1) [a]	6.2 (1.2) [a,b,c]	6.4 (1.1) [a,b]	6.7 (1.1) [a]	6.9 (0.9)
Lowest albumin (g/dL)	3.7 (0.7)	3.3 (0.7) [a]	3.1 (0.7) [a,b,c]	3.2 (0.7) [a,b]	3.5 (0.7) [a]	3.8 (0.6)

Abbreviations. SD, standard deviation; IQR, interquartile range; RRT, renal replacement therapy; PO2/FiO2, partial pressure of oxygen / fraction of inspired oxygen; ICU, intensive care unit; NA, not applicable.

[a] p<0.05 compared to no AKI

[b] p<0.05 compared to Rapidly Reversed AKI

[c] p<0.05 compared to Persistent AKI with renal recovery

Supplemental Table 7. Early admission characteristics by trajectories of AKI in hospitalized adult patients who have been admitted to ICU during hospitalization.

Variables	All Cohort (N=78,769)	AKI (N=27,711, 35%)	Persistent AKI without renal recovery (8,573, 11%)	Persistent AKI with renal recovery (5,860, 7%)	Rapidly Reversed AKI (13,278, 17%)	No AKI (51,058, 65%)
Kidney function within 48 hours of the admission						
AKI, n (%)	17,332 (22)	17,332 (63) [a]	5,310 (62) [a,c]	3,820 (65) [a,b]	8,202 (62) [a]	0 (0)
Stage 1	10,641 (61)	10,641 (61) [a]	2,216 (42) [a,b,c]	1,913 (50) [a,b]	6,512 (79) [a]	0 (0)
Stage 2	3,412 (20)	3,412 (20) [a]	1,225 (23) [a,b,c]	999 (26) [a,b]	1,188 (14) [a]	0 (0)
Stage 3 without RRT	2,593 (15)	2,593 (15) [a]	1,290 (24) [a,b,c]	801 (21) [a,b]	502 (6) [a]	0 (0)
Stage 3 with RRT	686 (4)	686 (4) [a]	579 (11) [a,b,c]	107 (3) [a,b]	0 (0)	0 (0)
Highest blood urea nitrogen (mg/dl)	23 (18)	33 (24) [a]	37 (28) [a,b]	36 (26) [a,b]	28 (19) [a]	18 (11)
Highest serum creatinine (mg/dl), median (IQR)	1.0 (0.8, 1.3)	1.4 (0.9, 2.0) [a]	1.5 (0.9, 2.5) [a,b,c]	1.5 (1.0, 2.4) [a,b]	1.3 (0.9, 1.7) [a]	0.9 (0.7, 1.1)
Reference creatinine (mg/dl), median (IQR)	0.8 (0.7, 1.0)	0.9 (0.7, 1.1) [a]	0.9 (0.7, 1.1) [a,c]	0.9 (0.7, 1.1) [a,b]	0.8 (0.7, 1.1) [a]	0.8 (0.7, 1.0)
Highest / reference creatinine, mean (SD)	1.4 (0.9)	1.8 (1.4) [a]	2.1 (1.9) [a,b,c]	2.0 (1.5) [a,b]	1.5 (0.7) [a]	1.1 (0.2)
Urine microalbumin/creatinine ratio >300 mcg/mg, n (%)	265 (0)	208 (1) [a]	121 (1) [a,b,c]	47 (1) [a,b]	40 (0) [a]	57 (0)
Urine microalbumin/creatinine ratio >=30 mcg/mg, n (%)	509 (1)	322 (1) [a]	105 (1) [a]	98 (2) [a,b]	119 (1) [a]	187 (0)
Urine protein/creatinine ratio >500 mcg/mg, n (%)	680 (1)	574 (2) [a]	303 (4) [a,b]	165 (3) [a,b]	106 (1) [a]	106 (0)
Urine protein/creatinine ratio >=150 mcg/mg, n (%)	440 (1)	315 (1) [a]	129 (2) [a,b]	86 (1) [a,b]	100 (1) [a]	125 (0)
Urine output (L/day), median (IQR)	1.3 (0.8, 2.0)	1.3 (0.7, 2.0) [a]	1.1 (0.5, 1.8) [a,b,c]	1.3 (0.8, 2.0) [a,b]	1.4 (0.8, 2.1) [a]	1.4 (0.8, 2.1)
Count of nephrotoxic drug, mean (SD)						
Within 2 days after hospital admission	1.27 (0.99)	1.48 (1.01) [a]	1.57 (1.00) [a,b,c]	1.53 (1.02) [a,b]	1.40 (1.00) [a]	1.16 (0.97)
Within 3 days after hospital admission	1.41 (1.04)	1.65 (1.05) [a]	1.74 (1.03) [a,b]	1.71 (1.05) [a,b]	1.56 (1.04) [a]	1.28 (1.01)
Between hospital admission and first AKI onset	1.65 (1.20)	1.65 (1.20)	1.75 (1.20) [b,c]	1.68 (1.21) [b]	1.57 (1.18)	NA
Resuscitation volume within 48 hours of the admission						
Blood products, n (%)	8,776 (11)	4,299 (16) [a]	1,744 (20) [a,b,c]	983 (17) [a,b]	1,572 (12) [a]	4,477 (9)
Saline (L), median (IQR)	2.0 (1.0, 3.6)	2.1 (1.0, 4.0) [a]	2.1 (1.0, 4.0) [a]	2.1 (1.0, 4.0) [a]	2.1 (1.0, 4.0) [a]	2.0 (1.0, 3.4)
Balanced crystalloids (L), median (IQR)	2.2 (1.0, 3.9)	2.5 (1.0, 4.4) [a]	2.5 (1.1, 4.6) [a]	2.7 (1.2, 4.6)	2.4 (1.0, 4.1) [a]	2.1 (1.0, 3.6)

Variables	All Cohort (N=78,769)	AKI (N=27,711, 35%)	Persistent AKI without renal recovery (8,573, 11%)	Persistent AKI with renal recovery (5,860, 7%)	Rapidly Reversed AKI (13,278, 17%)	No AKI (51,058, 65%)
Cumulative net fluid balance (L), median (IQR)	0.4 (-0.7, 1.8)	0.6 (-0.6, 2.3) [a]	0.9 (-0.2, 2.5) [a]	0.5 (-0.5, 2.1) [a,b]	0.4 (-0.8, 2.3)	0.2 (-0.8, 1.5)
Cumulative net fluid balance (% admission weight)	0.9 (3.4)	1.5 (3.9) [a]	1.7 (3.7) [a]	1.3 (4.0)	1.4 (4.0)	0.6 (3.0)
Organ dysfunction within 24 hours of the admission						
Lowest Glasgow Coma Scale	13 (4)	12 (4) [a]	12 (4) [a,b,c]	12 (4) [a,b]	13 (4) [a]	13 (3)
Lowest systolic blood pressure (mm Hg)	91 (23)	89 (24) [a]	88 (25) [a,b]	89 (24) [a,b]	91 (23) [a]	92 (23)
Lowest diastolic blood pressure	47 (14)	46 (14) [a]	45 (15) [a,b]	46 (15) [a,b]	47 (14) [a]	48 (14)
Lowest mean blood pressure	60 (16)	59 (17) [a]	58 (17) [a,b]	59 (17) [a,b]	60 (16) [a]	61 (16)
Duration of mean arterial blood pressure below 60 mmHg (minutes), median (IQR)	78 (29, 209)	111 (40, 258) [a]	120 (45, 310) [a,b,c]	112 (45, 252) [a,b]	95 (34, 239) [a]	62 (20, 180)
Number of vasopressors used, n (%)						
0	60,971 (77)	20,642 (74) [a]	5,908 (69) [a,b,c]	4,309 (74) [a,b]	10,425 (79)	40,329 (79)
1	8,419 (11)	3,205 (12) [a]	1,078 (13) [a,b]	706 (12) [a,b]	1,421 (11)	5,214 (10)
>= 2	9,379 (12)	3,864 (14) [a]	1,587 (19) [a,b,c]	845 (14) [a,b]	1,432 (11)	5,515 (11)
Lowest PO2/FiO2 ratio	351 (239)	313 (212) [a]	288 (201) [a,b,c]	308 (195) [a,b]	334 (227) [a]	376 (251)
Need for mechanical ventilation, n (%)	15,167 (19)	6,927 (25) [a]	2,634 (31) [a,b,c]	1,567 (27) [a,b]	2,726 (21) [a]	8,240 (16)
Admission to ICU, n (%)	66,402 (84)	21,885 (79) [a]	6,678 (78) [a,b,c]	4,425 (76) [a,b]	10,782 (81) [a]	44,517 (87)
pH < 7.25, n (%)	3,507 (4)	2,270 (8) [a]	990 (12) [a,b,c]	513 (9) [a,b]	767 (6) [a]	1,237 (2)
Highest anion gap (mmol/L)	15 (5)	16 (6) [a]	17 (6) [a,b,c]	16 (5) [a,b]	16 (5) [a]	15 (5)
Lactate, tested (mmol/L), n (%)	49,586 (63)	18,944 (68) [a]	6,013 (70) [a,b]	4,071 (69) [a,b]	8,860 (67) [a]	30,642 (60)
< 2	26,914 (54)	8,880 (47) [a]	2,563 (43) [a,b,c]	1,911 (47) [a,b]	4,406 (50) [a]	18,034 (59)
2-4	14,825 (30)	5,829 (31) [a]	1,673 (28) [b,c]	1,249 (31)	2,907 (33) [a]	8,996 (29)
> 4	7,847 (16)	4,235 (22) [a]	1,777 (30) [a,b,c]	911 (22) [a,b]	1,547 (17) [a]	3,612 (12)
Highest lactate (mmol/L)	2.7 (2.6)	3.2 (3.2) [a]	4.0 (4.2) [a,b,c]	3.1 (2.9) [a,b]	2.7 (2.4) [a]	2.3 (2.1)
Highest glucose (mg/dL)	178 (105)	196 (128) [a]	191 (113) [a]	191 (114) [a]	202 (143) [a]	167 (88)
Highest temperature (celsius)	37.9 (0.7)	37.9 (0.8) [a]	37.9 (0.9) [a,b,c]	38.0 (0.8)	38.0 (0.8)	37.9 (0.7)
Lowest temperature (celsius)	36.4 (1.6)	36.3 (1.7) [a]	36.2 (1.7) [a,b,c]	36.2 (1.9) [a,b]	36.4 (1.6)	36.4 (1.5)
Lowest hematocrit (%)	33.3 (7.3)	31.8 (7.4) [a]	30.6 (7.5) [a,b,c]	31.1 (7.4) [a,b]	32.8 (7.3) [a]	34.2 (7.1)
Highest red cell distribution width (%)	15.5 (2.3)	16.0 (2.5) [a]	16.4 (2.7) [a,b,c]	16.2 (2.5) [a,b]	15.7 (2.3) [a]	15.1 (2.2)
Highest international normalized ratio	1.4 (0.8)	1.6 (1.0) [a]	1.8 (1.2) [a,b,c]	1.6 (1.0) [a,b]	1.5 (0.9) [a]	1.3 (0.7)
Lowest platelets (thou/cu mm)	208 (102)	201 (109) [a]	191 (115) [a,b,c]	199 (110) [a,b]	209 (103) [a]	212 (97)
Lowest total protein (g/dL)	6.4 (1.1)	6.3 (1.2) [a]	6.1 (1.2) [a,b,c]	6.3 (1.2) [a,b]	6.5 (1.1) [a]	6.5 (1.0)

Variables	All Cohort (N=78,769)	AKI (N=27,711, 35%)	Persistent AKI without renal recovery (8,573, 11%)	Persistent AKI with renal recovery (5,860, 7%)	Rapidly Reversed AKI (13,278, 17%)	No AKI (51,058, 65%)
Lowest albumin (g/dL)	3.4 (0.7)	3.2 (0.7) [a]	3.0 (0.8) [a,b,c]	3.1 (0.7) [a,b]	3.3 (0.7) [a]	3.5 (0.7)
Lowest lymphocytes (%), median (IQR)	10 (6, 18)	9 (5, 15) [a]	8 (4, 14) [a,b,c]	8 (4, 15) [a,b]	9 (5, 16) [a]	11 (6, 19)
Highest lymphocytes (%), median (IQR)	14 (8, 22)	12 (7, 20) [a]	11 (6, 19) [a,b,c]	12 (7, 20) [a,b]	13 (8, 21) [a]	15 (8, 24)

Abbreviations. SD, standard deviation; IQR, interquartile range; RRT, renal replacement therapy; PO2/FiO2, partial pressure of oxygen / fraction of inspired oxygen; ICU, intensive care unit; NA, not applicable.
[a] p<0.05 compared to no AKI
[b] p<0.05 compared to Rapidly Reversed AKI
[c] p<0.05 compared to Persistent AKI with renal recovery

Supplemental Table 8. Early admission characteristics by trajectories of AKI in hospitalized adult patients who have been not admitted to ICU at any time during hospitalization.

Variables	All Cohort (N=276,909)	AKI (N=26,501, 10%)	Persistent AKI without renal recovery (5,549, 2%)	Persistent AKI with renal recovery (2,730, 1%)	Rapidly Reversed AKI (18,222, 7%)	No AKI (250,408, 90%)
Kidney function within 48 hours of the admission						
AKI, n (%)	20,641 (7)	20,641 (78) [a]	4,396 (79) [a,c]	2,088 (76) [a]	14,157 (78) [a]	0 (0)
Stage 1	15,322 (74)	15,322 (74) [a]	2,322 (53) [a,b,c]	1,219 (58) [a,b]	11,781 (83) [a]	0 (0)
Stage 2	3,234 (16)	3,234 (16) [a]	1,103 (25) [a,b]	474 (23) [a,b]	1,657 (12) [a]	0 (0)
Stage 3 without RRT	2,030 (10)	2,030 (10) [a]	927 (21) [a,b]	394 (19) [a,b]	709 (5) [a]	0 (0)
Stage 3 with RRT	55 (0)	55 (0) [a]	44 (1) [a,b]	1 (0) [a]	10 (0) [a]	0 (0)
Highest blood urea nitrogen (mg/dl)	16 (11)	28 (19) [a]	32 (24) [a,b,c]	34 (24) [a,b]	26 (16) [a]	15 (8)
Highest serum creatinine (mg/dl), median (IQR)	0.9 (0.7, 1.1)	1.4 (1.0, 1.9) [a]	1.5 (1.0, 2.3) [a,c]	1.6 (1.1, 2.5) [a,b]	1.3 (1.0, 1.8) [a]	0.8 (0.7, 1.0)
Reference creatinine (mg/dl), median (IQR)	0.8 (0.7, 1.0)	0.8 (0.7, 1.1) [a]	0.8 (0.6, 1.1) [a,b,c]	0.9 (0.7, 1.2) [a,b]	0.8 (0.7, 1.1) [a]	0.8 (0.7, 0.9)
Highest / reference creatinine, mean (SD)	1.1 (0.4)	1.7 (1.0) [a]	2.0 (1.8) [a,b]	1.9 (1.1) [a,b]	1.6 (0.6) [a]	1.1 (0.2)
Urine microalbumin/creatinine ratio >300 mcg/mg, n (%)	340 (0)	180 (1) [a]	86 (2) [a,b]	31 (1) [a,b]	63 (0) [a]	160 (0)
Urine microalbumin/creatinine ratio >=30 mcg/mg, n (%)	496 (0)	192 (1) [a]	72 (1) [a,b]	30 (1) [a,b]	90 (0) [a]	304 (0)
Urine protein/creatinine ratio >500 mcg/mg, n (%)	1,762 (1)	598 (2) [a]	289 (5) [a,b]	130 (5) [a,b]	179 (1) [a]	1,164 (0)
Urine protein/creatinine ratio >=150 mcg/mg, n (%)	2,727 (1)	384 (1) [a]	123 (2) [a,b]	67 (2) [a,b]	194 (1)	2,343 (1)
Urine output (L/day), median (IQR)	0.8 (0.4, 1.6)	1.0 (0.5, 1.7) [a]	1.0 (0.5, 1.8) [a,b]	1.1 (0.5, 1.8) [a,b]	0.9 (0.5, 1.7) [a]	0.8 (0.3, 1.6)
Count of nephrotoxic drug, mean (SD)						
Within 2 days after hospital admission	0.74 (0.93)	1.04 (1.01) [a]	1.17 (1.02) [a,b,c]	1.08 (0.98) [a,b]	1.00 (1.00) [a]	0.71 (0.91)
Within 3 days after hospital admission	0.78 (0.95)	1.11 (1.03) [a]	1.24 (1.04) [a,b]	1.18 (1.02) [a,b]	1.06 (1.02) [a]	0.74 (0.93)
Between hospital admission and first AKI onset	1.00 (1.07)	1.00 (1.07)	1.08 (1.09) [b]	1.03 (1.05) [b]	0.97 (1.06)	NA
Resuscitation volume within 48 hours of the admission						
Blood products, n (%)	5,947 (2)	1,211 (5) [a]	348 (6) [a,b]	184 (7) [a,b]	679 (4) [a]	4,736 (2)
Saline (L), median (IQR)	1.1 (1.0, 2.4)	2.0 (1.0, 3.5) [a]	2.0 (1.0, 3.6) [a,b,c]	2.4 (1.0, 4.0) [a,b]	2.0 (1.0, 3.3) [a]	1.0 (1.0, 2.2)

Variables	All Cohort (N=276,909)	AKI (N=26,501, 10%)	Persistent AKI without renal recovery (5,549, 2%)	Persistent AKI with renal recovery (2,730, 1%)	Rapidly Reversed AKI (18,222, 7%)	No AKI (250,408, 90%)
Balanced crystalloids (L), median (IQR)	1.6 (1.0, 2.9)	1.9 (1.0, 3.1) [a]	1.8 (1.0, 3.2) [a,c]	2.0 (1.0, 3.5) [a,b]	1.9 (1.0, 3.1) [a]	1.5 (1.0, 2.8)
Cumulative net fluid balance (L), median (IQR)	0.3 (-0.5, 1.1)	0.2 (-0.8, 1.0) [a]	0.3 (-0.6, 1.1)	0.3 (-0.6, 1.3)	0.2 (-0.8, 1.0) [a]	0.3 (-0.5, 1.1)
Cumulative net fluid balance (% admission weight)	0.4 (2.3)	0.3 (2.6) [a]	0.3 (2.2)	0.8 (2.9)	0.2 (2.7) [a]	0.5 (2.2)
Organ dysfunction within 24 hours of the admission						
Lowest Glasgow Coma Scale	15 (1)	15 (1) [a]	14 (2) [a,b,c]	15 (1) [a]	15 (1) [a]	15 (1)
Lowest systolic blood pressure (mm Hg)	109 (21)	105 (20) [a]	104 (22) [a,b]	104 (19) [a,b]	106 (20) [a]	110 (20)
Lowest diastolic blood pressure	60 (14)	56 (13) [a]	55 (14) [a,b]	55 (13) [a,b]	56 (13) [a]	60 (14)
Lowest mean blood pressure	74 (15)	70 (15) [a]	69 (15) [a,b]	70 (14) [a,b]	71 (15) [a]	74 (15)
Duration of mean arterial blood pressure below 60 mmHg (minutes), median (IQR)	56 (15, 176)	75 (24, 231) [a]	90 (29, 258) [a,b]	105 (30, 272) [a,b]	67 (21, 210) [a]	51 (15, 165)
Number of vasopressors used, n (%)						
0	259,594 (94)	24,672 (93) [a]	5,023 (91) [a,b,c]	2,593 (95) b	17,056 (94)	234,922 (94)
1	9,110 (3)	879 (3)	238 (4) [a,b,c]	70 (3)	571 (3)	8,231 (3)
>= 2	8,205 (3)	950 (4) [a]	288 (5) [a,b,c]	67 (2)	595 (3) [a]	7,255 (3)
Lowest PO2/FiO2 ratio	427 (256)	405 (235) [a]	370 (236) [a,b]	410 (234)	419 (233)	432 (260)
pH < 7.25, n (%)	164 (0)	61 (0) [a]	39 (1) [a,b,c]	3 (0)	19 (0) [a]	103 (0)
Highest anion gap (mmol/L)	12 (4)	13 (4) [a]	14 (4) [a,b]	14 (4) [a,b]	13 (4) [a]	12 (4)
Lactate, tested (mmol/L), n (%)	62,625 (23)	8,174 (31) [a]	1,700 (31) [a]	870 (32) [a]	5,604 (31) [a]	54,451 (22)
< 2	47,635 (76)	5,908 (72) [a]	1,183 (70) [a,b]	639 (73)	4,086 (73) [a]	41,727 (77)
2-4	12,848 (21)	1,797 (22) [a]	345 (20)	200 (23)	1,252 (22) [a]	11,051 (20)
> 4	2,142 (3)	469 (6) [a]	172 (10) [a,b,c]	31 (4)	266 (5) [a]	1,673 (3)
Highest lactate (mmol/L)	1.7 (1.3)	1.9 (1.9) [a]	2.3 (3.0) [a]	1.7 (1.2) [a]	1.8 (1.4) [a]	1.6 (1.2)
Highest glucose (mg/dL)	138 (74)	163 (91) [a]	161 (87) [a]	166 (94) [a,b]	163 (92) [a]	136 (71)
Highest temperature (celsius)	37.6 (0.5)	37.6 (0.6) [a]	37.6 (0.6) [a]	37.7 (0.6) [a]	37.6 (0.6) [a]	37.6 (0.5)
Lowest temperature (celsius)	36.7 (1.0)	36.6 (1.0) [a]	36.6 (1.1) [a,b]	36.6 (0.9) [a,b]	36.6 (1.0) [a]	36.7 (1.0)
Lowest hematocrit (%)	36.8 (6.2)	34.0 (6.5) [a]	32.5 (6.6) [a,b]	32.4 (6.5) [a,b]	34.7 (6.4) [a]	37.1 (6.0)
Highest red cell distribution width (%)	14.9 (2.2)	15.6 (2.3) [a]	15.8 (2.4) [a,b,c]	16.1 (2.5) [a,b]	15.4 (2.3) [a]	14.8 (2.2)
Highest international normalized ratio	1.3 (0.7)	1.4 (0.9) [a]	1.5 (1.0) [a,b]	1.5 (0.9) [a,b]	1.4 (0.8) [a]	1.3 (0.6)
Lowest platelets (thou/cu mm)	239 (98)	229 (110) [a]	224 (112) [a,b]	226 (119) [a,b]	231 (108) [a]	240 (96)

Variables	All Cohort (N=276,909)	AKI (N=26,501, 10%)	Persistent AKI without renal recovery (5,549, 2%)	Persistent AKI with renal recovery (2,730, 1%)	Rapidly Reversed AKI (18,222, 7%)	No AKI (250,408, 90%)
Lowest total protein (g/dL)	7.0 (0.9)	6.8 (1.0) [a]	6.5 (1.1) [a,b,c]	6.7 (1.0) [a,b]	6.8 (1.0) [a]	7.0 (0.8)
Lowest albumin (g/dL)	3.8 (0.6)	3.5 (0.7) [a]	3.3 (0.7) [a,b,c]	3.4 (0.7) [a,b]	3.6 (0.6) [a]	3.8 (0.6)
Lowest lymphocytes (%), median (IQR)	20 (13, 29)	16 (9, 24) [a]	15 (9, 22) [a,b]	14 (8, 22) [a,b]	17 (10, 25) [a]	21 (13, 30)
Highest lymphocytes (%), median (IQR)	22 (14, 31)	18 (11, 27) [a]	17 (10, 25) [a,b]	16 (10, 24) [a,b]	19 (12, 28) [a]	23 (15, 31)

Abbreviations. SD, standard deviation; IQR, interquartile range; RRT, renal replacement therapy; PO2/FiO2, partial pressure of oxygen / fraction of inspired oxygen; ICU, intensive care unit; NA, not applicable.

[a] p<0.05 compared to no AKI

[b] p<0.05 compared to Rapidly Reversed AKI

[c] p<0.05 compared to Persistent AKI with renal recovery

Supplemental Table 9. Renal characteristics, resource utilization, and hospital outcomes during entire hospitalization by trajectories of AKI in all cohort.

Variables	All Cohort (N=355,678)	AKI (N = 54,212, 15%)	Persistent AKI without renal recovery (N=14,122, 4%)	Persistent AKI with renal recovery (N=8,590, 2%)	Rapidly Reversed AKI (N=31,500, 9%)	No AKI (N=301,466, 85%)
Renal characteristics during entire hospitalization						
Worst AKI Staging, n (%)						
Stage 1	36,258 (10)	36,258 (67) [a]	5,210 (37) [a,b,c]	4,176 (49) [a,b]	26,872 (85) [a]	0 (0)
Stage 2	9,551 (3)	9,551 (18) [a]	3,762 (27) [a,b,c]	2,492 (29) [a,b]	3,297 (10) [a]	0 (0)
Stage 3	8,403 (2)	8,403 (16) [a]	5,150 (36) [a,b,c]	1,922 (22) [a,b]	1,331 (4) [a]	0 (0)
Stage 3 without RRT	6,351 (2)	6,351 (12) [a]	3,384 (24) [a,b,c]	1,646 (19) [a,b]	1,321 (4) [a]	0 (0)
Stage 3 with RRT	2,052 (1)	2,052 (4) [a]	1,766 (13) [a,b,c]	276 (3) [a,b]	10 (0) [a]	0 (0)
Renal replacement therapy, n (%)	2,052 (1)	2,052 (4) [a]	1,766 (13) [a,b,c]	276 (3) [a,b]	10 (0) [a]	0 (0)
AKI duration, days, median (IQR)	2 (1, 4)	2 (1, 4)	5 (3, 9) [b,c]	4 (3, 7) [b]	1 (1, 2)	NA
Recurrent AKI, n (%)	6,466 (2)	6,466 (12) [a]	2,173 (15) [a,b,c]	1,957 (23) [a,b]	2,336 (7) [a]	0 (0)
No renal recovery at discharge/death, n (%)	22,240 (6)	22,240 (41) [a]	14,122 (100) [a,b,c]	0 (0) [b]	8,118 (26) [a]	0 (0)
Resource utilization during entire hospitalization						
Hospital days, median (IQR)	3 (1, 6)	7 (4, 14) [a]	8 (4, 15) [a,b,c]	14 (8, 24) [a,b]	6 (3, 10) [a]	2 (1, 5)
Admission to ICU, n (%)	78,769 (22)	27,711 (51) [a]	8,573 (61) [a,b,c]	5,860 (68) [a,b]	13,278 (42) [a]	51,058 (17)
Days in ICU, median (IQR)	4 (2, 7)	6 (3, 12) [a]	6 (3, 13) [a,b,c]	9 (5, 18) [a,b]	5 (3, 9) [a]	3 (2, 5)
Days in ICU greater than 48 hours, n (%)	59,035 (75)	23,681 (85) [a]	7,264 (85) [a,b,c]	5,482 (94) [a,b]	10,935 (82) [a]	35,354 (69)
ICU-free calendar days in first 30 days of admission, median (IQR)	30 (30, 30)	28 (22, 30) [a]	25 (5, 30) [a,b,c]	25 (17, 30) [a,b]	30 (26, 30) [a]	30 (30, 30)
Mechanical Ventilation, n (%)	23,286 (7)	11,876 (22) [a]	4,779 (34) [a,b]	2,876 (33) [a,b]	4,221 (13) [a]	11,410 (4)
Mechanical Ventilation calendar days, median (IQR)	3 (2, 6)	4 (2, 9) [a]	4 (2, 9) [a,b,c]	5 (2, 12) [a,b]	3 (2, 7) [a]	2 (1, 4)
Mechanical Ventilation hours, median (IQR)	36 (13, 117)	62 (20, 180) [a]	71 (24, 190) [a,b,c]	93 (30, 249) [a,b]	41 (16, 119) [a]	21 (9, 59)
Mechanical Ventilation greater than 2 calendar days, n (%)	12,127 (52)	7,801 (66) [a]	3,275 (69) [a,b,c]	2,137 (74) [a,b]	2,389 (57) [a]	4,326 (38)
Mechanical Ventilation-free calendar days in first 30 days of admission, median (IQR)	30 (30, 30)	30 (30, 30) [a]	30 (14, 30) [a,b,c]	30 (27, 30) [a,b]	30 (30, 30) [a]	30 (30, 30)
Vasopressor or inotropes used, n (%)	55,415 (16)	17,261 (32) [a]	6,016 (43) [a,b]	3,781 (44) [a,b]	7,464 (24) [a]	38,154 (13)
Hospital disposition, n (%)						

Variables	All Cohort (N=355,678)	AKI (N = 54,212, 15%)	Persistent AKI without renal recovery (N=14,122, 4%)	Persistent AKI with renal recovery (N=8,590, 2%)	Rapidly Reversed AKI (N=31,500, 9%)	No AKI (N=301,466, 85%)
Hospital mortality	7,799 (2)	4,974 (9) [a]	3,918 (28) [a,b,c]	376 (4) [a,b]	680 (2) [a]	2,825 (1)
Another hospital, LTAC, SNF, Hospice	34,092 (10)	10,028 (18) [a]	3,011 (21) [a,b,c]	2,494 (29) [a,b]	4,523 (14) [a]	24,064 (8)
Home/Rehab	313,787 (88)	39,210 (72) [a]	7,193 (51) [a,b,c]	5,720 (67) [a,b]	26,297 (83) [a]	274,577 (91)
30-day outcomes (among survivors), n (%)	347,879	49,238 (14)	10,204 (3)	8,214 (2)	30,820 (9)	298,641 (86)
Death in 30 days of discharge	4,934 (1)	1,776 (4) [a]	570 (6) [a,b]	418 (5) [a,b]	788 (3) [a]	3,158 (1)
Readmission in 30 days of discharge	83,592 (24)	12,748 (26) [a]	2,528 (25) [c]	2,381 (29) [a,b]	7,839 (25) [a]	70,844 (24)
Group among readmitted encounter, n (%)						
Persistent AKI without renal recovery	2,764 (3)	1,297 (10) [a]	536 (21) [a,b,c]	223 (9) [a,b]	538 (7) [a]	1,467 (2)
Persistent AKI with renal recovery	2,118 (3)	933 (7) [a]	231 (9) [a,b]	239 (10) [a,b]	463 (6) [a]	1,185 (2)
Rapidly Reversed AKI	7,505 (9)	2,504 (20) [a]	502 (20) [a]	448 (19) [a]	1,554 (20) [a]	5,001 (7)
No AKI	59,164 (71)	7,096 (56) [a]	1,100 (44) [a,b,c]	1,337 (56) [a,b]	4,659 (59) [a]	52,068 (73)
Unknown	12,041 (14)	918 (7) [a]	159 (6) [a,b]	134 (6) [a,b]	625 (8) [a]	11,123 (16)
Other complications during entire hospitalization						
Venous Thromboembolism, n (%)	15,755 (4)	5,180 (10) [a]	1,589 (11) [a,b,c]	1,290 (15) [a,b]	2,301 (7) [a]	10,575 (4)
Sepsis, n (%)	29,836 (8)	13,995 (26) [a]	5,102 (36) [a,b,c]	3,275 (38) [a,b]	5,618 (18) [a]	15,841 (5)
Cardiovascular complication, n (%)	31,780 (9)	15,229 (28) [a]	5,553 (39) [a,b]	3,469 (40) [a,b]	6,207 (20) [a]	16,551 (5)
Thirty-day mortality, n (%)	11,082 (3)	5,655 (10) [a]	3,962 (28) [a,b,c]	506 (6) [a,b]	1,187 (4) [a]	5,427 (2)
One-year mortality, n (%)	34,687 (10)	12,570 (23) [a]	5,802 (41) [a,b,c]	2,054 (24) [a,b]	4,714 (15) [a]	22,117 (7)
Three-year mortality, n (%)	49,144 (14)	15,703 (29) [a]	6,414 (45) [a,b,c]	2,669 (31) [a,b]	6,620 (21) [a]	33,441 (11)

Abbreviations. SD, standard deviation; IQR, interquartile range; RRT, renal replacement therapy; ICU, intensive care unit; LTAC, long-term acute care hospital; SNF, skilled nursing facility; NA, not applicable.

[a] $p<0.05$ compared to no AKI

[b] $p<0.05$ compared to Rapidly Reversed AKI

[c] $p<0.05$ compared to Persistent AKI with renal recovery

Supplemental Table 10. Renal characteristics, resource utilization, and hospital outcomes during entire hospitalization by trajectories of AKI in hospitalized adult patients who have been admitted to ICU during hospitalization.

Variables	All Cohort (N=78,769)	AKI (N=27,711, 35%)	Persistent AKI without renal recovery (8,573, 11%)	Persistent AKI with renal recovery (5,860, 7%)	Rapidly Reversed AKI (13,278, 17%)	No AKI (51,058, 65%)
Renal characteristics during entire hospitalization						
Worst AKI Staging, n(%)						
Stage 1	16,409 (21)	16,409 (59) [a]	2,552 (30) [a,b,c]	2,621 (45) [a,b]	11,236 (85) [a]	0 (0)
Stage 2	5,492 (7)	5,492 (20) [a]	2,206 (26) [a,b,c]	1,812 (31) [a,b]	1,474 (11) [a]	0 (0)
Stage 3	3,895 (5)	3,895 (14) [a]	2,169 (25) [a,b,c]	1,158 (20) [a,b]	568 (4) [a]	0 (0)
Stage 3 with RRT	1,915 (2)	1,915 (7) [a]	1,646 (19) [a,b,c]	269 (5) [a,b]	0 (0)	0 (0)
Renal replacement therapy, n (%)	1,915 (2)	1,915 (7) [a]	1,646 (19) [a,b,c]	269 (5) [a,b]	0 (0)	0 (0)
AKI duration, days, median (IQR)	2 (1, 6)	2 (1, 6)	6 (3, 12) [b,c]	5 (3, 8) [b]	1 (1, 2)	NA
Recurrent AKI, n (%)	4,993 (6)	4,993 (18) [a]	1,840 (21) [a,b,c]	1,623 (28) [a,b]	1,530 (12) [a]	0 (0)
No renal recovery at discharge/death, n (%)	10,242 (13)	10,242 (37) [a]	8,573 (100) [a,b,c]	0 (0) [b]	1,669 (13) [a]	0 (0)
Resource utilization during entire hospitalization						
Hospital days, median (IQR)	7 (4, 12)	11 (6, 19) [a]	11 (6, 20) [a,b,c]	17 (10, 27) [a,b]	9 (5, 15) [a]	6 (3, 9)
Days in ICU, median (IQR)	4 (2, 7)	6 (3, 12) [a]	6 (3, 13) [a,b,c]	9 (5, 18) [a,b]	5 (3, 9) [a]	3 (2, 5)
Days in ICU greater than 48 hours, n (%)	59,035 (75)	23,681 (85) [a]	7264 (85) [a,b,c]	5,482 (94) [a,b]	10,935 (82) [a]	35,354 (69)
ICU-free calendar days in first 30 days of admission, median (IQR)	26 (22, 27)	23 (12, 26) [a]	14 (1, 25) [a,b,c]	21 (11, 25) [a,b]	25 (21, 27) [a]	27 (24, 28)
Mechanical Ventilation, n (%)	22,468 (29)	11,641 (42) [a]	4,618 (54) [a,b,c]	2,858 (49) [a,b]	4,165 (31) [a]	10,827 (21)
Mechanical Ventilation calendar days, median (IQR)	3 (2, 6)	4 (2, 9) [a]	4 (2, 10) [a,b,c]	5 (2, 12) [a,b]	3 (2, 6) [a]	2 (2, 4)
Mechanical Ventilation hours, median (IQR)	38 (14, 119)	63 (21, 181) [a]	74 (25, 194) [a,b,c]	92 (30, 248) [a,b]	41 (16, 117) [a]	21 (10, 61)
Mechanical Ventilation greater than 2 calendar days, n (%)	11,880 (53)	7,693 (66) [a]	3214 (70) [a,b,c]	2,123 (74) [a,b]	2,356 (57) [a]	4,187 (39)
Mechanical Ventilation-free calendar days in first 30 days of admission, median (IQR)	30 (28, 30)	30 (24, 30) [a]	26 (5, 30) [a,b,c]	30 (24, 30) [a,b]	30 (28, 30) [a]	30 (30, 30)
Vasopressor or inotropes used, n (%)	29,898 (38)	13,651 (49) [a]	5,113 (60) [a,b,c]	3,303 (56) [a,b]	5,235 (39) [a]	16,247 (32)

Variables	All Cohort (N=78,769)	AKI (N=27,711, 35%)	Persistent AKI without renal recovery (8,573, 11%)	Persistent AKI with renal recovery (5,860, 7%)	Rapidly Reversed AKI (13,278, 17%)	No AKI (51,058, 65%)
Hospital disposition, n(%)						
Hospital mortality	6,489 (8)	4,419 (16) [a]	3,488 (41) [a,b,c]	346 (6) [a,b]	585 (4)	2,070 (4)
Another hospital, LTAC, SNF, Hospice	14,895 (19)	6,725 (24) [a]	1,895 (22) [a,c]	1,989 (34) [a,b]	2,841 (21) [a]	8,170 (16)
Home/Rehab	57,385 (73)	16,567 (60) [a]	3,190 (37) [a,b,c]	3,525 (60) [a,b]	9,852 (74) [a]	40,818 (80)
30-day outcomes (among survivors), n (%)	72,280	23,292 (32)	5,085 (7)	5,514 (8)	12,693 (18)	48,988 (68)
Death in 30 days of discharge	2,241 (3)	1,118 (5) [a]	350 (7) [a,b,c]	310 (6) [a,b]	458 (4) [a]	1,123 (2)
Readmission in 30 days of discharge	15,202 (21)	5,697 (24) [a]	1,216 (24) [a,c]	1,520 (28) [a,b]	2,961 (23) [a]	9,505 (19)
Group among readmitted encounter, n(%)						
Persistent AKI without renal recovery	1,028 (7)	636 (11) [a]	281 (23) [a,b,c]	152 (10) [a,b]	203 (7) [a]	392 (4)
Persistent AKI with renal recovery	749 (5)	442 (8) [a]	113 (9) [a,b]	143 (9) [a,b]	186 (6) [a]	307 (3)
Rapidly Reversed AKI	2,123 (14)	1,034 (18) [a]	229 (19) [a]	256 (17) [a]	549 (19) [a]	1,089 (11)
No AKI	9,898 (65)	3,185 (56) [a]	518 (43) [a,b,c]	870 (57) [a]	1,797 (61) [a]	6,713 (71)
Unknown	1,404 (9)	400 (7) [a]	75 (6) [a]	99 (7) [a]	226 (8) [a]	1,004 (11)
Other complications during entire hospitalization						
Venous Thromboembolism, n (%)	7,369 (9)	3,791 (14) [a]	1,298 (15) [a,b,c]	1,080 (18) [a,b]	1,413 (11) [a]	3,578 (7)
Sepsis, n (%)	20,096 (26)	11,693 (42) [a]	4,467 (52) [a,b,c]	2,899 (49) [a,b]	4,327 (33) [a]	8,403 (16)
Cardiovascular complication, n (%)	20,825 (26)	12,147 (44) [a]	4,805 (56) [a,b,c]	3,009 (51) [a,b]	4,333 (33) [a]	8,678 (17)
Thirty-day mortality, n (%)	7,513 (10)	4,618 (17) [a]	3,368 (39) [a,b,c]	414 (7) [a]	836 (6) [a]	2,895 (6)
One-year mortality, n (%)	15,488 (20)	8,437 (30) [a]	4,535 (53) [a,b,c]	1,453 (25) [a,b]	2,449 (18) [a]	7,051 (14)
Three-year mortality, n (%)	19,146 (24)	9,868 (36) [a]	4,818 (56) [a,b,c]	1,817 (31) [a,b]	3,233 (24) [a]	9,278 (18)

Abbreviations. SD, standard deviation; IQR, interquartile range; RRT, renal replacement therapy; ICU, intensive care unit; LTAC, long-term acute care hospital; SNF, skilled nursing facility; NA, not applicable.
[a] $p<0.05$ compared to no AKI
[b] $p<0.05$ compared to Rapidly Reversed AKI
[c] $p<0.05$ compared to Persistent AKI with renal recovery

Supplemental Table 11. Renal characteristics, resource utilization, and hospital outcomes during entire hospitalization by trajectories of AKI in hospitalized adult patients who have not been admitted to ICU any time during hospitalization.

Variables	All Cohort (N=276,909)	AKI (N=26,501, 10%)	Persistent AKI without renal recovery (5,549, 2%)	Persistent AKI with renal recovery (2,730, 1%)	Rapidly Reversed AKI (18,222, 7%)	No AKI (250,408, 90%)
Renal characteristics during entire hospitalization						
Worst AKI Staging, n (%)						
Stage 1	19,849 (7)	19,849 (75) [a]	2,658 (48) [a,b,c]	1,555 (57) [a,b]	15,636 (86) [a]	0 (0)
Stage 2	4,059 (1)	4,059 (15) [a]	1,556 (28) [a,b,c]	680 (25) [a,b]	1,823 (10) [a]	0 (0)
Stage 3	2,456 (1)	2,456 (9) [a]	1,215 (22) [a,b,c]	488 (18) [a,b]	753 (4) [a]	0 (0)
Stage 3 with RRT	137 (0)	137 (1) [a]	120 (2) [a,b,c]	7 (0) [a,b]	10 (0) [a]	0 (0)
Renal replacement therapy, n (%)	137 (0)	137 (1) [a]	120 (2) [a,b,c]	7 (0) [a,b]	10 (0) [a]	0 (0)
AKI duration, days, median (IQR)	2 (1, 3)	2 (1, 3)	4 (3, 6) [b]	4 (3, 5) [b]	1 (1, 2)	NA
Recurrent AKI, n (%)	1,473 (1)	1,473 (6) [a]	333 (6) [a,b,c]	334 (12) [a,b]	806 (4) [a]	0 (0)
No renal recovery at discharge/death, n (%)	11,998 (4)	11,998 (45) [a]	5,549 (100) [a,b,c]	0 (0) [b]	6,449 (35) [a]	0 (0)
Resource utilization during entire hospitalization						
Hospital days, median (IQR)	2 (1, 4)	5 (3, 8) [a]	5 (3, 9) [a,b,c]	9 (6, 14) [a,b]	4 (2, 7) [a]	2 (1, 4)
Vasopressor or inotropes used, n (%)	25,517 (9)	3,610 (14) [a]	903 (16) [a,b]	478 (18) [a,b]	2,229 (12) [a]	21,907 (9)
Hospital disposition, n(%)						
Hospital mortality	1,310 (0)	555 (2) [a]	430 (8) [a,b,c]	30 (1) [a,b]	95 (1) [a]	755 (0)
Another hospital, LTAC, SNF, Hospice	19,197 (7)	3,303 (12) [a]	1,116 (20) [a,b]	505 (18) [a,b]	1,682 (9) [a]	15,894 (6)
Home/Rehab	256,402 (93)	22,643 (85) [a]	4,003 (72) [a,b,c]	2,195 (80) [a,b]	16,445 (90) [a]	233,759 (93)
30-day outcomes (among survivors), n (%)	275,599	25,946 (9)	5,119 (2)	2,700 (1)	18,127 (7)	249,653 (91)
Death in 30 days of discharge	2,693 (1)	658 (3) [a]	220 (4) [a,b]	108 (4) [a,b]	330 (2) [a]	2,035 (1)
Readmission in 30 days of discharge	68,390 (25)	7,051 (27) [a]	1,312 (26) [c]	861 (32) [a,b]	4,878 (27) [a]	61,339 (25)
Group among readmitted encounter, n(%)						
Persistent AKI without renal recovery	1,736 (3)	661 (9) [a]	255 (19) [a,b,c]	71 (8) [a]	335 (7) [a]	1,075 (2)

Variables	All Cohort (N=276,909)	AKI (N=26,501, 10%)	Persistent AKI without renal recovery (5,549, 2%)	Persistent AKI with renal recovery (2,730, 1%)	Rapidly Reversed AKI (18,222, 7%)	No AKI (250,408, 90%)
Persistent AKI with renal recovery	1,369 (2)	491 (7) [a]	118 (9) [a,b]	96 (11) [a,b]	277 (6) [a]	878 (1)
Rapidly Reversed AKI	5,382 (8)	1,470 (21) [a]	273 (21) [a]	192 (22) [a]	1,005 (21) [a]	3,912 (6)
No AKI	49,266 (72)	3,911 (55) [a]	582 (44) [a,b,c]	467 (54) [a]	2,862 (59) [a]	45,355 (74)
Unknown	10,637 (16)	518 (7) [a]	84 (6) [a]	35 (4) [a,b]	399 (8) [a]	10,119 (16)
Other complications during entire hospitalization						
Venous Thromboembolism, n (%)	8,386 (3)	1,389 (5) [a]	291 (5) [a,c]	210 (8) [a,b]	888 (5) [a]	6,997 (3)
Sepsis, n (%)	9,740 (4)	2,302 (9) [a]	635 (11) [a,b,c]	376 (14) [a,b]	1,291 (7) [a]	7,438 (3)
Cardiovascular complication, n (%)	10,955 (4)	3,082 (12) [a]	748 (13) [a,b,c]	460 (17) [a,b]	1,874 (10) [a]	7,873 (3)
Thirty-day mortality, n (%)	3,569 (1)	1,037 (4) [a]	594 (11) [a,b,c]	92 (3) [a,b]	351 (2) [a]	2,532 (1)
One-year mortality, n (%)	19,199 (7)	4,133 (16) [a]	1,267 (23) [a,b]	601 (22) [a,b]	2,265 (12) [a]	15,066 (6)
Three-year mortality, n (%)	29,998 (11)	5,835 (22) [a]	1,596 (29) [a,b]	852 (31) [a,b]	3,387 (19) [a]	24,163 (10)

Abbreviations. SD, standard deviation; IQR, interquartile range; RRT, renal replacement therapy; ICU, intensive care unit; LTAC, long-term acute care hospital; SNF, skilled nursing facility; NA, not applicable.

[a] $p<0.05$ compared to no AKI

[b] $p<0.05$ compared to Rapidly Reversed AKI

[c] $p<0.05$ compared to Persistent AKI with renal recovery

Supplemental Table 12. Association between AKI trajectory groups and hospital mortality in all cohort, ICU cohort, and non-ICU cohorts.

	Unadjusted Odds Ratio (95% Confidence Interval)	Model A Adjusted Odds Ratio (95% Confidence Interval)	Model B Adjusted Odds Ratio (95% Confidence Interval)	Model C Adjusted Odds Ratio (95% Confidence Interval)
All cohort				
No AKI	1	1	1	1
Rapidly Reversed AKI	2.33 (2.14, 2.53)	2.08 (1.91, 2.27)	1.84 (1.69, 2.01)	1.98 (1.82, 2.16)
Persistent AKI with Recovery	4.83 (4.33, 5.40)	4.22 (3.78, 4.71)	2.86 (2.53, 3.22)	3.33 (2.97, 3.73)
Persistent AKI without Recovery	40.59 (38.52, 42.76)	37.23 (35.29, 39.26)	24.00 (22.32, 25.81)	26.75 (25.15, 28.46)
ICU cohort				
No AKI	1	1	1	1
Rapidly Reversed AKI	1.04 (0.94, 1.14)	1.04 (0.94, 1.14)	0.97 (0.87, 1.07)	1.01 (0.91, 1.11)
Persistent AKI with recovery	1.36 (1.20, 1.53)	1.37 (1.21, 1.54)	1.06 (0.93, 1.21)	1.17 (1.03, 1.32)
Persistent AKI without recovery	15.90 (14.93, 16.94)	16.30 (15.29,17.38)	12.01 (11.00, 13.12)	12.50 (11.59, 13.47)
Non-ICU cohort				
No AKI	1	1	1	1
Rapidly Reversed AKI	2.22 (1.85, 2.66)	1.84 (1.53, 2.22)	1.67 (1.39, 2.02)	1.80 (1.50, 2.17)
Persistent AKI with recovery	4.75 (3.55, 6.35)	3.81 (2.84, 5.11)	2.86 (2.09, 3.89)	3.40 (2.53, 4.59)
Persistent AKI without recovery	26.57 (23.62, 29.87)	21.85 (19.38, 24.63)	15.87 (13.49, 18.66)	19.19 (16.78, 21.95)

C is adjusted for age, gender, ethnicity, Charlson comorbidity score, and indicator of AKI stage 3.

Model A is adjusted for age, gender, ethnicity, and Charlson comorbidity score. Model B is adjusted for age, gender, ethnicity, Charlson comorbidity score, and severe AKI (AKI stage≥ 2). Model

Supplemental Table 13. Hazard ratios for all-cause mortality by AKI trajectories in all cohort, ICU cohort, and non-ICU cohorts.

	Unadjusted Hazard Ratio (95% Confidence Interval)	Model A Adjusted Hazard Ratio (95% Confidence Interval) [d]	Model B Adjusted Hazard Ratio (95% Confidence Interval) [d]	Model C Adjusted Hazard Ratio (95% Confidence Interval) [d]
All cohort				
No AKI	1	1	1	1
Rapidly Reversed AKI	2.2 (2.1, 2.3)	1.60 (1.50, 1.67)	1.56 (1.50, 1.63)	1.59 (1.50, 1.67)
Persistent AKI with Recovery	3.8 (3.5, 4.0)	1.90 (1.80, 2.03)	1.72 (1.60, 1.85)	1.85 (1.70, 1.98)
Persistent AKI without Recovery	9.7 (9.4, 10.0)	5.63 (5.40, 5.86)	4.95 (4.70, 5.21)	5.24 (5.0, 5.48)
C-index	0.67	0.77	0.77	0.77
ICU cohort				
No AKI	1	1	1	1
Rapidly Reversed AKI	1.4 (1.4, 1.5)	1.30 (1.22, 1.38)	1.29 (1.21, 1.38)	1.30 (1.22, 1.38)
Persistent AKI with Recovery	2.0 (1.8, 2.1)	1.50 (1.39, 1.63)	1.45 (1.33, 1.58)	1.49 (1.38, 1.62)
Persistent AKI without Recovery	6.6 (6.3, 6.9)	5.10 (4.86, 5.35)	4.87 (4.56, 5.19)	4.99 (4.72, 5.28)
C-index	0.68	0.74	0.74	0.74
Non-ICU cohort				
No AKI	1	1	1	1
Rapidly Reversed AKI	2.3 (2.1, 2.4)	1.90 (1.77, 2.02)	1.8 (1.64, 1.89)	1.85 (1.73, 1.97)
Persistent AKI with Recovery	4.4 (4.0, 4.9)	3.60 (3.23, 4.04)	2.9 (2.60, 3.32)	3.25 (2.89, 3.65)
Persistent AKI without Recovery	5.7 (5.3, 6.1)	4.70 (4.35, 4.98)	3.7 (3.39, 4.04)	4.12 (3.81, 4.45)
C-index	0.59	0.72	0.72	0.72

Model A is adjusted for age, gender, ethnicity, and Charlson comorbidity score, need for mechanical ventilation for more than two days and need for intensive care unit admission for more than two days.
Model B is adjusted for variables as adjusted by Model A and severe AKI (AKI stage≥2).
Model C is adjusted for variables as adjusted by Model A and indicator of AKI stage 3.

Supplemental Table 14. Renal outcomes after hospital discharge by trajectories of AKI in all cohort who discharged alive.

Variables	All Cohort (N=347,879)	AKI (N=49,238, 14%)	Persistent AKI without renal recovery (N=10,204, 3%)	Persistent AKI with renal recovery (N=8,214, 2%)	Rapidly Reversed AKI (N=30,820, 9%)	No AKI (N=298,641, 86%)
Ninety-day outcomes						
Dead, n (%)	12,023 (3)	3,862 (8) [a]	1,069 (10) [a,b]	896 (11) [a,b]	1,897 (6) [a]	8,161 (3)
Readmission, n (%)	136,190 (39)	20,809 (42) [a]	4,072 (40) [b,c]	3,755 (46) [a,b]	12,982 (42) [a]	115,381 (39)
No RRT, n (%)	346,755 (100)	48,114 (98) [a]	9,357 (92) [a,b,c]	7,947 (97) [a,b]	30,810 (100) [a]	298,641 (100)
New RRT, n (%)	1,035 (0)	537 (1) [a]	168 (2) [a,b]	121 (2) [a,b]	248 (1) [a]	498 (0)
No CKD, n (%)	264,676 (76)	29,841 (61) [a]	6,352 (62) [a,c]	4,528 (55) [a,b]	18,961 (62) [a]	234,835 (79)
New CKD/ESRD, n (%)	5,430 (2)	2,332 (8) [a]	694 (11) [a,b,c]	422 (9) [a,b]	1,216 (6) [a]	3,098 (1)
One-year outcomes						
Dead, n (%)	27,110 (8)	7,699 (16) [a]	1,907 (19) [a,b,c]	1,720 (21) [a,b]	4,072 (13) [a]	19,411 (6)
Readmission, n (%)	199,601 (57)	28,291 (57)	5,439 (53) [a,b,c]	4,841 (59) [a]	18,011 (58) [a]	171,310 (57)
No RRT on index admission, n (%)	346,755 (100)	48,114 (98) [a]	9,357 (92) [a,b,c]	7,947 (97) [a,b]	30,810 (100) [a]	298,641 (100)
New RRT, n (%)	2,585 (1)	1,220 (3) [a]	360 (4) [a,b]	261 (3) [a,b]	599 (2) [a]	1,365 (0)
No CKD on index admission, n (%)	264,676 (76)	29,841 (61) [a]	6,352 (62) [a,c]	4,528 (55) [a,b]	18,961 (62) [a]	234,835 (79)
New CKD/ESRD, n (%)	14,500 (5)	4,715 (16) [a]	1,173 (18) [a,b]	813 (18) [a,b]	2,729 (14) [a]	9,785 (4)
CKD on index admission, n (%)	83,203 (24)	19,397 (39) [a]	3,852 (38) [a,c]	3,686 (45) [a,b]	11,859 (38) [a]	63,806 (21)
CKD progression, n (%)	10,524 (13)	3,574 (18) [a]	792 (21) [a,b]	737 (20) [a,b]	2,045 (17) [a]	6,950 (11)

Abbreviations. CKD, chronic kidney disease; RRT, renal replacement therapy; ESRD, end stage of renal disease.
[a] p<0.05 compared to no AKI
[b] p<0.05 compared to Rapidly Reversed AKI
[c] p<0.05 compared to Persistent AKI with renal recovery

Supplemental Table 15. Renal outcomes after hospital discharge by trajectories of AKI in hospitalized adult patients who have been admitted to ICU during hospitalization and discharged alive.

Variables	All Cohort (N=72,280)	AKI (N=23,292, 32%)	Persistent AKI without renal recovery (N=5,085, 7%)	Persistent AKI with renal recovery (N=5,514, 8%)	Rapidly Reversed AKI (N=12,693, 18%)	No AKI (N=48,988, 68%)
Ninety-day outcomes						
Dead, n (%)	4,715 (7)	2,241 (10) [a]	635 (12) [a,b]	633 (11) [a,b]	973 (8) [a]	2,474 (5)
Readmission, n (%)	24,843 (34)	9,274 (40) [a]	1,935 (38) [a,c]	2,412 (44) [a,b]	4,927 (39) [a]	15,569 (32)
No RRT, n (%)	71,270 (99)	22,282 (96) [a]	4,335 (85) [a,b,c]	5,254 (95) [a,b]	12,693 (100)	48,988 (100)
New RRT, n (%)	356 (0)	245 (1) [a]	70 (2) [a,b]	78 (1) [a,b]	97 (1) [a]	111 (0)
No CKD, n (%)	53,137 (74)	14,191 (61) [a]	3,125 (61) [a,c]	3,156 (57) [a,b]	7,910 (62) [a]	38,946 (80)
New CKD/ESRD, n (%)	1,548 (3)	998 (7) [a]	324 (10) [a,b]	290 (9) [a,b]	384 (5) [a]	550 (1)
One-year outcomes						
Dead, n (%)	9,107 (13)	4,085 (18) [a]	1,062 (21) [a,b]	1,135 (21) [a,b]	1,888 (15) [a]	5,022 (10)
Readmission, n (%)	34,602 (48)	12,355 (53) [a]	2,519 (50) [a,b,c]	3,093 (56) [a,b]	6,743 (53) [a]	22,247 (45)
No RRT on index admission, n (%)	71,270 (99)	22,282 (96) [a]	4,335 (85) [a,b,c]	5,254 (95) [a,b]	12,693 (100)	48,988 (100)
New RRT, n (%)	770 (1)	495 (2) [a]	136 (3) [a,b]	155 (3) [a,b]	204 (2) [a]	275 (1)
No CKD on index admission, n (%)	53,137 (74)	14,191 (61) [a]	3,125 (61) [a,c]	3,156 (57) [a,b]	7,910 (62) [a]	38,946 (80)
New CKD/ESRD, n (%)	3,502 (7)	1,945 (14) [a]	535 (17) [a,b]	551 (17) [a,b]	859 (11) [a]	1,557 (4)
CKD on index admission, n (%)	19,143 (26)	9,101 (39) [a]	1,960 (39) [a,c]	2,358 (43) [a,b]	4,783 (38) [a]	10,042 (20)
CKD progression, n (%)	2,497 (13)	1,418 (16) [a]	326 (17) [a]	417 (18) [a,b]	675 (14) [a]	1,079 (11)

Abbreviations. CKD, chronic kidney disease; RRT, renal replacement therapy; ESRD, end stage of renal disease.
[a] p<0.05 compared to no AKI
[b] p<0.05 compared to Rapidly Reversed AKI
[c] p<0.05 compared to Persistent AKI with renal recovery

Supplemental Table 16. Renal outcomes after hospital discharge by trajectories of AKI in hospitalized adult patients who have not been admitted to ICU at any time during hospitalization and discharged alive.

Variables	All Cohort (N=275,599)	AKI (N=25,946, 9%)	Persistent AKI without renal recovery (N=5,119, 2%)	Persistent AKI with renal recovery (N=2,700, 1%)	Rapidly Reversed AKI (N=18,127, 7%)	No AKI (N=249,653, 91%)
Ninety-day outcomes						
Dead, n (%)	7,308 (3)	1,621 (6) [a]	434 (8) [a,b]	263 (10) [a,b]	924 (5) [a]	5,687 (2)
Readmission, n (%)	111,347 (40)	11,535 (44) [a]	2,137 (42) [b,c]	1,343 (50) [a,b]	8,055 (44) [a]	99,812 (40)
No RRT, n (%)	275,485 (100)	25,832 (100) [a]	5,022 (98) [a,b,c]	2,693 (100) [a,b]	18,117 (100) [a]	249,653 (100)
New RRT, n (%)	679 (0)	292 (1) [a]	98 (2) [a,b]	43 (2) [a,b]	151 (1) [a]	387 (0)
No CKD, n (%)	211,539 (77)	15,650 (60) [a]	3,227 (63) [a,b,c]	1,372 (51) [a,b]	11,051 (61) [a]	195,889 (78)
New CKD/ESRD, n (%)	3,882 (2)	1,334 (9) [a]	370 (11) [a,b]	132 (10) [a,b]	832 (8) [a]	2,548 (1)
One-year outcomes						
Dead, n (%)	18,003 (7)	3,614 (14) [a]	845 (17) [a,b,c]	585 (22) [a,b]	2,184 (12) [a]	14,389 (6)
Readmission, n (%)	164,999 (60)	15,936 (61) [a]	2,920 (57) [a,b,c]	1,748 (65) [a]	11,268 (62) [a]	149,063 (60)
No RRT on index admission, n (%)	275,485 (100)	25,832 (100) [a]	5,022 (98) [a,b,c]	2,693 (100) [a,b]	18,117 (100) [a]	249,653 (100)
New RRT, n (%)	1,815 (1)	725 (3) [a]	224 (4) [a,b]	106 (4) [a,b]	395 (2) [a]	1,090 (0)
No CKD on index admission, n (%)	211,539 (77)	15,650 (60) [a]	3,227 (63) [a,b,c]	1,372 (51) [a,b]	11,051 (61) [a]	195,889 (78)
New CKD/ESRD, n (%)	10,998 (5)	2,770 (18) [a]	638 (20) [a,b]	262 (19) [a]	1,870 (17) [a]	8,228 (4)
CKD on index admission, n (%)	64,060 (23)	10,296 (40) [a]	1,892 (37) [a,b,c]	1,328 (49) [a,b]	7,076 (39) [a]	53,764 (22)
CKD progression, n (%)	8,027 (13)	2,156 (21) [a]	466 (25) [a,b]	320 (24) [a,b]	1,370 (19) [a]	5,871 (11)

Abbreviations. CKD, chronic kidney disease; RRT, renal replacement therapy; ESRD, end stage of renal disease.
[a] p<0.05 compared to no AKI
[b] p<0.05 compared to Rapidly Reversed AKI
[c] p<0.05 compared to Persistent AKI with renal recovery

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