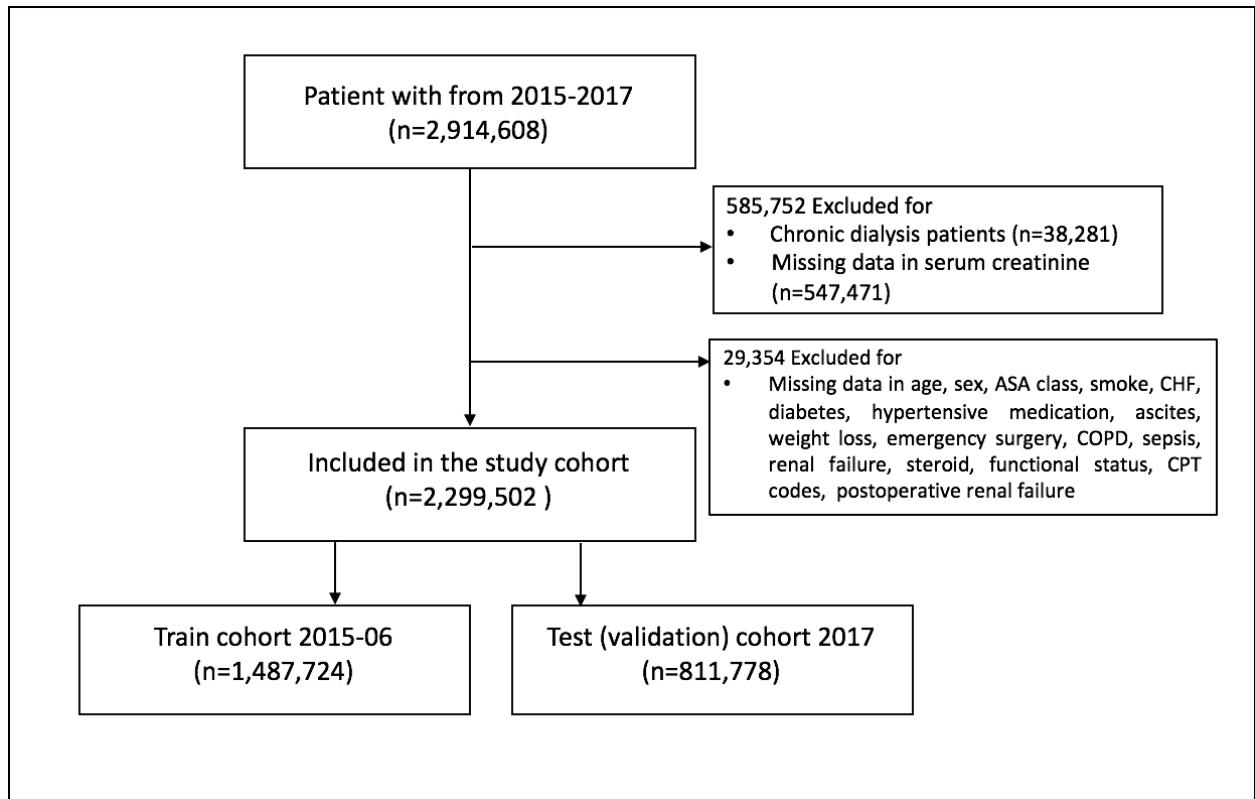
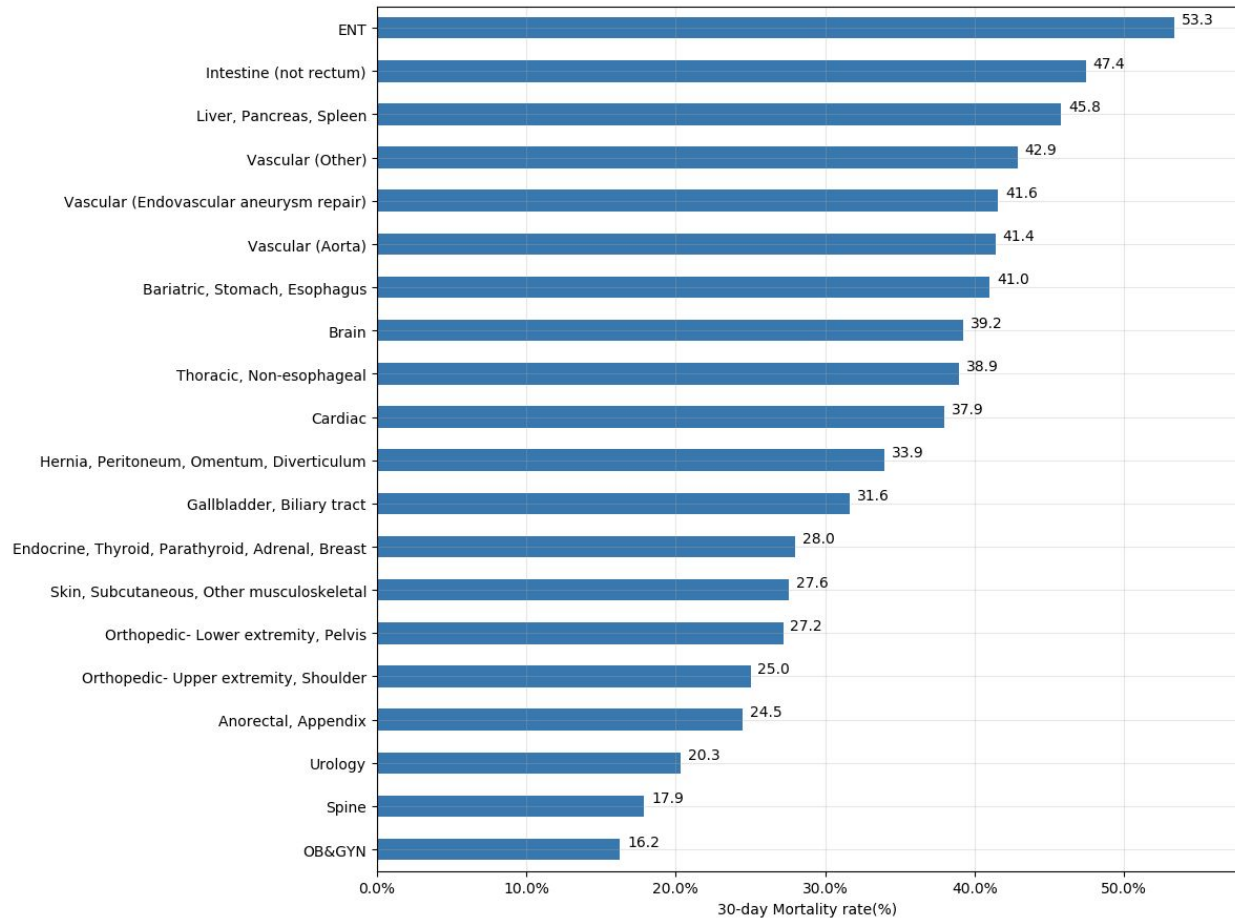


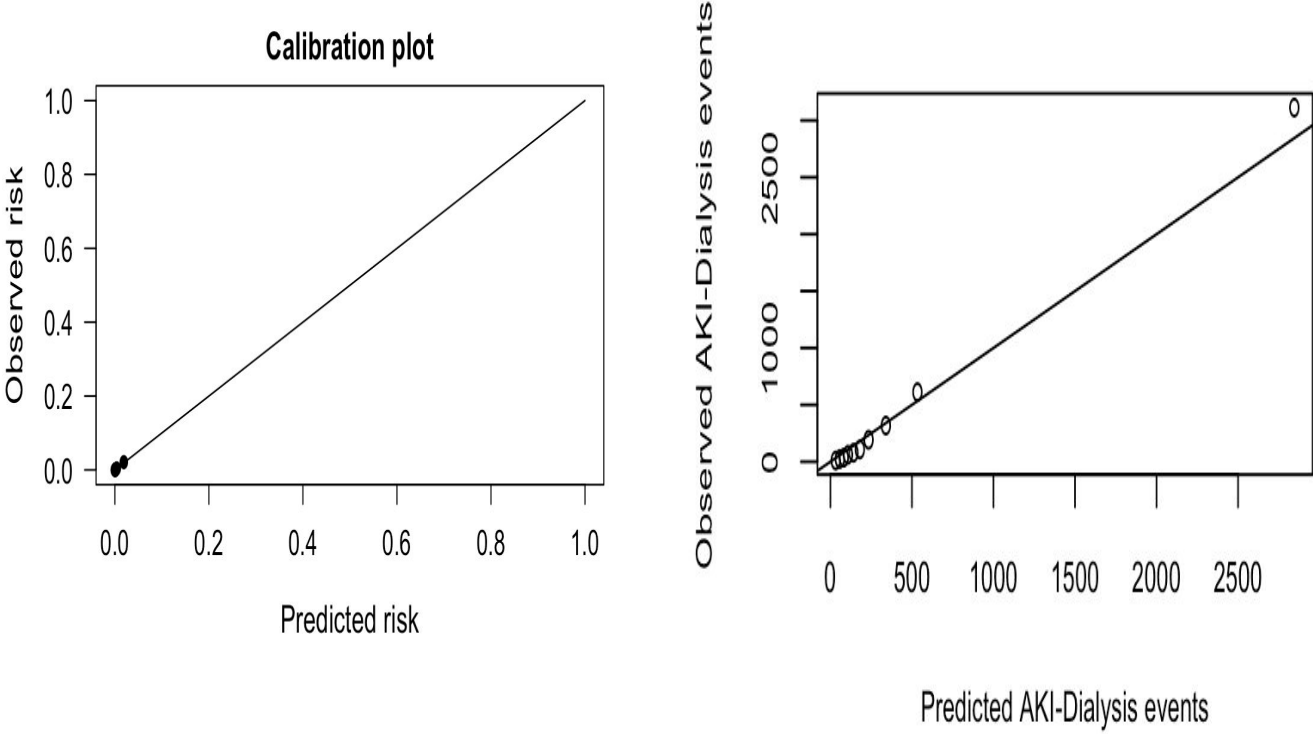
**eFigure 1. Study participant flow chart**



**eFigure 2.** 30-day postoperative unadjusted mortality rates of patients who developed AKI requiring dialysis according to surgery types

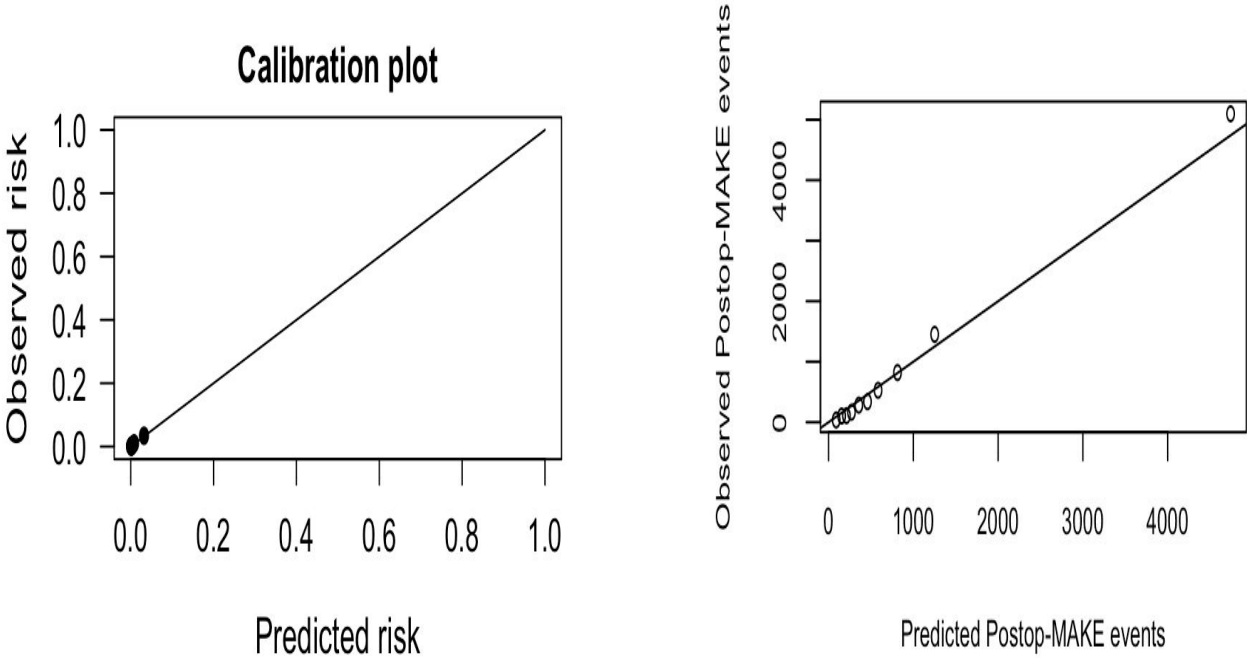


**eFigure 3-a Calibration plot for postoperative acute kidney injury requiring dialysis. Observed vs predicted AKI-Dialysis risk**



- Both plots include 10 risk groups from Hosmer-Lemeshow test

**eFigure 3-b Calibration plot for Postoperative major adverse kidney event (Postop-MAKE). Observed vs predicted Postop-MAKE risk**



- Both plots include 10 risk groups from Hosmer-Lemeshow test

**eFigure 4. Mobile web application of AKI risk model**

The image displays two screenshots of a mobile web application for an Acute Kidney Injury (AKI) risk model. The left screenshot shows the input form, and the right screenshot shows the results.

**Prediction Model**

### Acute Kidney Injury Risk Model

\* 30-day postoperative risk of AKI

Age:

History of Congestive Heart Failure:

History of Diabetes :

HTN requiring medication:

Ascites:

Emergency Surgery:

Sepsis prior to surgery:

Preop Serum Creatinine(mg/dL):

Preop Hematocrit(%):

Preop Serum Sodium (mEq/L) :

Surgery Type :

**Prediction Model**

### Result

30-day Risk of Postoperative Major Adverse Kidney Event: 18.32%

30-day Risk of AKI requiring dialysis: 14.77%

\* Postoperative Major Adverse Kidney Event (Postop-MAKE): AKI requiring dialysis, or a rise in creatinine of >2 mg/dl from preoperative value

*Hypothetical case 1*

67 year old male with a history of congestive heart failure, insulin dependent diabetes mellitus, hypertension requiring medication undergoing emergent hip replacement surgery. No ascites. Patient had preoperative SIRS (systemic inflammatory response syndrome). Preoperative laboratory values: serum creatinine 2.5 mg/dL, hematocrit 24%, sodium 128 mEq/L. Probability

of postoperative 30 day major adverse kidney event: 18.32%, AKI requiring dialysis (AKI-Dialysis) within 30 days after surgery: 14.77%,

*Hypothetical case 2*

67 year old male with a history of congestive heart failure, insulin dependent diabetes mellitus, hypertension requiring medications, undergoing liver (hepatectomy) surgery. Patient had no preoperative SIRS, or sepsis. He has ascites. This is an elective procedure. Preoperative laboratory values: serum creatinine 2.5 mg/dL, hematocrit 32%, sodium 133 mEq/L. Probability of postoperative 30 day major adverse kidney event: 26.93%, AKI-Dialysis within 30 days after surgery: 16.98 %,

**eTable 1. Training cohort patient characteristics (2015- 2016)**

	No AKI with Dialysis (n=1,483,169)	AKI with Dialysis (n=4,555)	p-value
Age(Mean±SD)	58.5(±16.4)	66.2(±13.6)	*
Sex (Male)	43.60	61.58	*
American Society of Anesthesiologists classASA Class 1 (%)	5.97	0.26	*
2	42.56	6.78	*
3	44.98	45.42	*
4	6.32	41.12	*
5	0.17	6.41	*
Diabetes (%)	17.19	34.23	*
Disseminated Cancer (%)	2.71	5.95	*
Smoker within one year(%)	18.04	24.13	*
Chronic obstructive pulmonary diseaseCOPD(%)	5.05	14.97	*
Ascites(%)	0.36	3.86	*
Congestive Heart Failure(%)	0.93	8.83	*
Hypertension on medication(%)	49.41	73.83	*

Steroid(%)	4.01	9.77	*
Weight Loss(%)	1.39	4.59	*
Bleeding disorder(%)	4.60	17.85	*
Emergency surgery(%)	10.39	37.78	*
Serum Sodium(mEq/L)	139.1	138.0	*
Serum creatinine(mg/dL)	0.92	1.96	*
White blood cell ( $\times 10^9/L$ )	8.2	11.4	*
Hematocrit(%)	39.8	35.3	*
Platelet( $\times 10^9/L$ )	249.2	233.1	*

**eTable 2. Validation cohort patient characteristics (2017)**

	No AKI with Dialysis (n=809,480)	AKI with Dialysis (n=2,298)	p-value
Age(Mean $\pm$ SD)	58.6( $\pm$ 16.4)	66.2 ( $\pm$ 13.8)	*
Sex (Male)(%)	43.36	61.84	*
American Society of Anesthesiologists class(ASA) Class 1 (%)	5.49	0.30	*
2	42.13	7.09	*
3	46.03	45.82	*
4	6.18	39.64	*



5	0.16	7.14	*
Diabetes (%)	17.29	34.33	*
Disseminated Cancer (%)	2.75	5.87	*
Smoker within one year(%)	17.27	24.33	*
Chronic obstructive pulmonary diseaseCOPD(%)	4.75	13.84	*
Ascites(%)	0.32	3.39	*
Congestive Heart Failure(%)	0.86	8.88	*
Hypertension on medication(%)	49.14	74.93	*
Steroid(%)	4.07	9.09	*
Weight Loss(%)	1.34	4.96	*
Bleeding disorder(%)	4.42	17.75	*
Emergency surgery(%)	9.52	37.95	*
Serum Sodium(mEq/L)	139.3	138.2	*
Serum creatinine(mg/dL)	0.92	1.92	*
White blood cell ( $\times 10^9/L$ )	8.2	11.3	*
Hematocrit(%)	39.7	35.3	*
Platelet( $\times 10^9/L$ )	249.9	232.6	*

**eTable 3. Predictors of postoperative major adverse kidney event (Postop-MAKE)**

	coefficient	SE	p-value	adjusted odds ratio
Intercept	-7.765	0.076	<0.001	
Age (per year)	0.011	0.001	<0.001	1.011 (1.009-1.013)
Ascites	1.032	0.070	<0.001	2.808 (2.446-3.223)
Congestive heart failure	0.776	0.047	<0.001	2.174 (1.982-2.384)
Emergency surgery	0.489	0.031	<0.001	1.631 (1.534-1.734)
Hypertensive medication use	0.553	0.027	<0.001	1.739 (1.648-1.835)
Diabetes (reference=No)				
Insulin dependent	0.636	0.031	<0.001	1.889 (1.776-2.008)
Non-insulin dependent	0.271	0.032	<0.001	1.312 (1.233-1.395)
Serum Sodium (reference="135.1-145")(mEq/L)				
0-130	0.243	0.057	<0.001	1.275 (1.14-1.426)
130.1-135	0.203	0.030	<0.001	1.225 (1.156-1.298)
>145	0.324	0.070	<0.001	1.383 (1.206-1.585)
missing	-0.246	0.125	0.050	0.782 (0.612-1)
Serum Hematocrit (%)				
0-24	0.715	0.059	<0.001	2.043 (1.82-2.294)
24.1-30	0.643	0.031	<0.001	1.902 (1.79-2.022)
missing	-0.564	0.110	<0.001	0.569 (0.459-0.705)
Preoperative Sepsis (reference = No)				
SIRS	0.868	0.041	<0.001	2.381 (2.196-2.582)

Sepsis	1.122	0.041	<0.001	3.071 (2.832-3.33)
Septic Shock	1.767	0.052	<0.001	5.852 (5.289-6.474)
Surgery type (reference = anorectal, appendix)				
ENT	-0.496	0.276	0.072	0.609 (0.355-1.045)
Bariatric, stomach, esophagus	0.803	0.081	<0.001	2.232 (1.903-2.619)
brain	0.484	0.135	<0.001	1.622 (1.246-2.112)
cardiac	1.967	0.098	<0.001	7.148 (5.895-8.667)
Endocrine, thyroid, parathyroid, adrenal, breast	-0.874	0.126	<0.001	0.417 (0.326-0.535)
Gallbladder, biliary tract	0.089	0.088	0.316	1.093 (0.919-1.299)
Hernia, peritoneum, omentum, diverticulum	0.374	0.076	<0.001	1.453 (1.253-1.686)
Intestine (not rectum)	1.364	0.067	<0.001	3.913 (3.434-4.459)
Liver, pancreas, spleen	1.819	0.081	<0.001	6.163 (5.26-7.222)
OBGYN	-0.050	0.102	0.626	0.952 (0.78-1.162)
Orthopedic lower extremity, pelvis	0.278	0.072	<0.001	1.32 (1.146-1.52)
Orthopedic upper extremity, shoulder	-0.334	0.162	0.038	0.716 (0.522-0.982)
Skin, subcutaneous, other musculoskeletal	0.538	0.081	<0.001	1.712 (1.462-2.006)
Spine	0.054	0.094	0.562	1.056 (0.879-1.268)
Thoracic (non-esophageal)	1.194	0.101	<0.001	3.3 (2.707-4.024)
Urology	1.184	0.075	<0.001	3.268 (2.82-3.786)
Vascular (Endovascular aneurysm repair)	1.547	0.104	<0.001	4.698 (3.83-5.763)
Vascular (open aorta surgery)	3.192	0.087	<0.001	24.337 (20.539-28.838)

Vascular (other)	0.965	0.075	<0.001	2.626 (2.266-3.043)
Preoperative serum creatinine (per mg/dL)	0.402	0.007	<0.001	1.495 (1.475-1.515)