

Patient Safety Indicator 10 (PSI 10) Postoperative Acute Kidney Injury Requiring Dialysis Rate

July 2019

Provider-Level Indicator

Type of Score: Rate

Prepared by:

Agency for Healthcare Research and Quality

U.S. Department of Health and Human Services

www.qualityindicators.ahrq.gov

DESCRIPTION

Postoperative acute kidney failure requiring dialysis per 1,000 elective surgical discharges for patients ages 18 years and older. Excludes cases with principal diagnosis of acute kidney failure; cases with secondary diagnosis of acute kidney failure present on admission; cases with secondary diagnosis of acute kidney failure and dialysis procedure before or on the same day as the first operating room procedure; cases with acute kidney failure, cardiac arrest, severe cardiac dysrhythmia, cardiac shock, chronic kidney failure; a principal diagnosis of urinary tract obstruction and obstetric cases.

[NOTE: The software provides the rate per hospital discharge. However, common practice reports the measure as per 1,000 discharges. The user must multiply the rate obtained from the software by 1,000 to report events per 1,000 hospital discharges.]

NUMERATOR

Discharges, among cases meeting the inclusion and exclusion rules for the denominator, with:

- any secondary ICD-10-CM diagnosis codes for acute kidney failure (**PHYSIDB***) and any listed ICD-10-PCS procedure codes for dialysis (**DIALYIP***)

DENOMINATOR

Elective surgical discharges (**Appendix E: SURGI2R**), for patients ages 18 years and older, with any listed ICD-10-PCS procedure codes for an operating room procedure (**Appendix A: ORPROC**). Elective surgical discharges are defined by specific MS-DRG codes with admission type recorded as elective (ATYPE=3).

[Appendix A - Operating Room Procedure Codes](#)

[Appendix E - Surgical Discharge MS-DRGs](#)

DENOMINATOR EXCLUSIONS

Exclude cases:

- with a principal ICD-10-CM diagnosis code (or secondary diagnosis present on admission) for acute kidney failure (**PHYSIDB**^{*}), among patients otherwise qualifying for numerator
- with any dialysis procedure that occurs before or on the same day as the first operating room procedure** (**DIALYIP**^{*})
- with any dialysis access procedure occurring before or on the same day as the first operating room procedure** (**DIALY2P**^{*})
- with a principal ICD-10-CM diagnosis code (or secondary diagnosis present on admission) for cardiac arrest (**CARDIID**^{*}), among patients otherwise qualifying for numerator
- with a principal ICD-10-CM diagnosis code (or secondary diagnosis code present on admission) for cardiac dysrhythmia (**CARDRID**^{*}), among patients otherwise qualifying for numerator
- with a principal ICD-10-CM diagnosis code (or secondary diagnosis present on admission) for shock (**SHOCKID**^{*}), among patients otherwise qualifying for numerator
- with a principal ICD-10-CM diagnosis code (or secondary diagnosis present on admission) for chronic kidney failure (**CRENLFD**^{*}), and among patients otherwise qualifying for numerator
- with a principal ICD-10-CM diagnosis code for urinary tract obstruction (**URINARYOBSID**^{*})
- with any ICD-10-CM diagnosis present on admission of solitary kidney disease (**SOLKIDD**^{*}) and any ICD-10-PCS procedure code for partial nephrectomy (**PNEPHREP**^{*})
- MDC 14 (pregnancy, childbirth and the puerperium)
- with missing gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing), or principal diagnosis (DX1=missing)

**If day of procedure is not available in the input data file, the rate may be slightly lower than if the information were available.

* See below for code list

Acute kidney (renal) failure diagnosis codes: (PHYSIDB)

N170	Acute kidney failure with tubular necrosis	N179	Acute kidney failure, unspecified
N171	Acute kidney failure with acute cortical necrosis	N19	Unspecified kidney failure
N172	Acute kidney failure with medullary necrosis	N990	Postprocedural (acute) (chronic) kidney failure
N178	Other acute kidney failure		

Dialysis access procedure codes: (DIALY2P)

031509D	Bypass Right Axillary Artery to Upper Arm Vein with Autologous Venous Tissue, Open Approach	031809F	Bypass Left Brachial Artery to Lower Arm Vein with Autologous Venous Tissue, Open Approach
031509F	Bypass Right Axillary Artery to Lower Arm Vein with Autologous Venous Tissue, Open Approach	031809V	Bypass Left Brachial Artery to Superior Vena Cava with Autologous Venous Tissue, Open Approach
031509V	Bypass Right Axillary Artery to Superior Vena Cava with Autologous Venous Tissue, Open Approach	03180AD	Bypass Left Brachial Artery to Upper Arm Vein with Autologous Arterial Tissue, Open Approach
03150AD	Bypass Right Axillary Artery to Upper Arm Vein with Autologous Arterial Tissue, Open Approach	03180AF	Bypass Left Brachial Artery to Lower Arm Vein with Autologous Arterial Tissue, Open Approach
03150AF	Bypass Right Axillary Artery to Lower Arm Vein with Autologous Arterial Tissue, Open Approach	03180AV	Bypass Left Brachial Artery to Superior Vena Cava with Autologous Arterial Tissue, Open Approach
03150AV	Bypass Right Axillary Artery to Superior Vena Cava with Autologous Arterial Tissue, Open Approach	03180JD	Bypass Left Brachial Artery to Upper Arm Vein with Synthetic Substitute, Open Approach
03150JD	Bypass Right Axillary Artery to Upper Arm Vein with Synthetic Substitute, Open Approach	03180JF	Bypass Left Brachial Artery to Lower Arm Vein with Synthetic Substitute, Open Approach
03150JF	Bypass Right Axillary Artery to Lower Arm Vein with Synthetic Substitute, Open Approach	03180JV	Bypass Left Brachial Artery to Superior Vena Cava with Synthetic Substitute, Open Approach
03150JV	Bypass Right Axillary Artery to Superior Vena Cava with Synthetic Substitute, Open Approach	03180KD	Bypass Left Brachial Artery to Upper Arm Vein with Nonautologous Tissue Substitute, Open Approach
03150KD	Bypass Right Axillary Artery to Upper Arm Vein with Nonautologous Tissue Substitute, Open Approach	03180KF	Bypass Left Brachial Artery to Lower Arm Vein with Nonautologous Tissue Substitute, Open Approach
03150KF	Bypass Right Axillary Artery to Lower Arm Vein with Nonautologous Tissue Substitute, Open Approach	03180KV	Bypass Left Brachial Artery to Superior Vena Cava with Nonautologous Tissue Substitute, Open Approach
03150KV	Bypass Right Axillary Artery to Superior Vena Cava with Nonautologous Tissue Substitute, Open Approach	03180ZD	Bypass Left Brachial Artery to Upper Arm Vein, Open Approach
03150ZD	Bypass Right Axillary Artery to Upper Arm Vein, Open Approach	03180ZF	Bypass Left Brachial Artery to Lower Arm Vein, Open Approach
03150ZF	Bypass Right Axillary Artery to Lower Arm Vein, Open Approach	03180ZV	Bypass Left Brachial Artery to Superior Vena Cava, Open Approach

03150ZV	Bypass Right Axillary Artery to Superior Vena Cava, Open Approach	031909F	Bypass Right Ulnar Artery to Lower Arm Vein with Autologous Venous Tissue, Open Approach
031609D	Bypass Left Axillary Artery to Upper Arm Vein with Autologous Venous Tissue, Open Approach	03190AF	Bypass Right Ulnar Artery to Lower Arm Vein with Autologous Arterial Tissue, Open Approach
031609F	Bypass Left Axillary Artery to Lower Arm Vein with Autologous Venous Tissue, Open Approach	03190JF	Bypass Right Ulnar Artery to Lower Arm Vein with Synthetic Substitute, Open Approach
031609V	Bypass Left Axillary Artery to Superior Vena Cava with Autologous Venous Tissue, Open Approach	03190KF	Bypass Right Ulnar Artery to Lower Arm Vein with Nonautologous Tissue Substitute, Open Approach
03160AD	Bypass Left Axillary Artery to Upper Arm Vein with Autologous Arterial Tissue, Open Approach	03190ZF	Bypass Right Ulnar Artery to Lower Arm Vein, Open Approach
03160AF	Bypass Left Axillary Artery to Lower Arm Vein with Autologous Arterial Tissue, Open Approach	031A09F	Bypass Left Ulnar Artery to Lower Arm Vein with Autologous Venous Tissue, Open Approach
03160AV	Bypass Left Axillary Artery to Superior Vena Cava with Autologous Arterial Tissue, Open Approach	031A0AF	Bypass Left Ulnar Artery to Lower Arm Vein with Autologous Arterial Tissue, Open Approach
03160JD	Bypass Left Axillary Artery to Upper Arm Vein with Synthetic Substitute, Open Approach	031A0JF	Bypass Left Ulnar Artery to Lower Arm Vein with Synthetic Substitute, Open Approach
03160JF	Bypass Left Axillary Artery to Lower Arm Vein with Synthetic Substitute, Open Approach	031A0KF	Bypass Left Ulnar Artery to Lower Arm Vein with Nonautologous Tissue Substitute, Open Approach
03160JV	Bypass Left Axillary Artery to Superior Vena Cava with Synthetic Substitute, Open Approach	031A0ZF	Bypass Left Ulnar Artery to Lower Arm Vein, Open Approach
03160KD	Bypass Left Axillary Artery to Upper Arm Vein with Nonautologous Tissue Substitute, Open Approach	031B09F	Bypass Right Radial Artery to Lower Arm Vein with Autologous Venous Tissue, Open Approach
03160KF	Bypass Left Axillary Artery to Lower Arm Vein with Nonautologous Tissue Substitute, Open Approach	031B0AF	Bypass Right Radial Artery to Lower Arm Vein with Autologous Arterial Tissue, Open Approach
03160KV	Bypass Left Axillary Artery to Superior Vena Cava with Nonautologous Tissue Substitute, Open Approach	031B0JF	Bypass Right Radial Artery to Lower Arm Vein with Synthetic Substitute, Open Approach
03160ZD	Bypass Left Axillary Artery to Upper Arm Vein, Open Approach	031B0KF	Bypass Right Radial Artery to Lower Arm Vein with Nonautologous Tissue Substitute, Open Approach

03160ZF	Bypass Left Axillary Artery to Lower Arm Vein, Open Approach	031B0ZF	Bypass Right Radial Artery to Lower Arm Vein, Open Approach
03160ZV	Bypass Left Axillary Artery to Superior Vena Cava, Open Approach	031C09F	Bypass Left Radial Artery to Lower Arm Vein with Autologous Venous Tissue, Open Approach
031709D	Bypass Right Brachial Artery to Upper Arm Vein with Autologous Venous Tissue, Open Approach	031C0AF	Bypass Left Radial Artery to Lower Arm Vein with Autologous Arterial Tissue, Open Approach
031709F	Bypass Right Brachial Artery to Lower Arm Vein with Autologous Venous Tissue, Open Approach	031C0JF	Bypass Left Radial Artery to Lower Arm Vein with Synthetic Substitute, Open Approach
031709V	Bypass Right Brachial Artery to Superior Vena Cava with Autologous Venous Tissue, Open Approach	031C0KF	Bypass Left Radial Artery to Lower Arm Vein with Nonautologous Tissue Substitute, Open Approach
03170AD	Bypass Right Brachial Artery to Upper Arm Vein with Autologous Arterial Tissue, Open Approach	031C0ZF	Bypass Left Radial Artery to Lower Arm Vein, Open Approach
03170AF	Bypass Right Brachial Artery to Lower Arm Vein with Autologous Arterial Tissue, Open Approach	041K09S	Bypass Right Femoral Artery to Lower Extremity Vein with Autologous Venous Tissue, Open Approach
03170AV	Bypass Right Brachial Artery to Superior Vena Cava with Autologous Arterial Tissue, Open Approach	041K0AS	Bypass Right Femoral Artery to Lower Extremity Vein with Autologous Arterial Tissue, Open Approach
03170JD	Bypass Right Brachial Artery to Upper Arm Vein with Synthetic Substitute, Open Approach	041K0JS	Bypass Right Femoral Artery to Lower Extremity Vein with Synthetic Substitute, Open Approach
03170JF	Bypass Right Brachial Artery to Lower Arm Vein with Synthetic Substitute, Open Approach	041K0KS	Bypass Right Femoral Artery to Lower Extremity Vein with Nonautologous Tissue Substitute, Open Approach
03170JV	Bypass Right Brachial Artery to Superior Vena Cava with Synthetic Substitute, Open Approach	041K0ZS	Bypass Right Femoral Artery to Lower Extremity Vein, Open Approach
03170KD	Bypass Right Brachial Artery to Upper Arm Vein with Nonautologous Tissue Substitute, Open Approach	041K3JS	Bypass Right Femoral Artery to Lower Extremity Vein with Synthetic Substitute, Percutaneous Approach
03170KF	Bypass Right Brachial Artery to Lower Arm Vein with Nonautologous Tissue Substitute, Open Approach	041L09S	Bypass Left Femoral Artery to Lower Extremity Vein with Autologous Venous Tissue, Open Approach

03170KV	Bypass Right Brachial Artery to Superior Vena Cava with Nonautologous Tissue Substitute, Open Approach	041L0AS	Bypass Left Femoral Artery to Lower Extremity Vein with Autologous Arterial Tissue, Open Approach
03170ZD	Bypass Right Brachial Artery to Upper Arm Vein, Open Approach	041L0JS	Bypass Left Femoral Artery to Lower Extremity Vein with Synthetic Substitute, Open Approach
03170ZF	Bypass Right Brachial Artery to Lower Arm Vein, Open Approach	041L0KS	Bypass Left Femoral Artery to Lower Extremity Vein with Nonautologous Tissue Substitute, Open Approach
03170ZV	Bypass Right Brachial Artery to Superior Vena Cava, Open Approach	041L0ZS	Bypass Left Femoral Artery to Lower Extremity Vein, Open Approach
031809D	Bypass Left Brachial Artery to Upper Arm Vein with Autologous Venous Tissue, Open Approach	041L3JS	Bypass Left Femoral Artery to Lower Extremity Vein with Synthetic Substitute, Percutaneous Approach

Dialysis procedure codes: (DIALYIP)

3E1M39Z	Irrigation of Peritoneal Cavity using Dialysate, Percutaneous Approach	5A1D70Z	Performance of Urinary Filtration, Intermittent, Less than 6 Hours Per Day
5A1D00Z	Performance of Urinary Filtration, Single	5A1D80Z	Performance of Urinary Filtration, Prolonged Intermittent, 6-18 hours Per
5A1D60Z	Performance of Urinary Filtration, Multiple	5A1D90Z	Performance of Urinary Filtration, Continuous, Greater than 18 hours Per Day

Cardiac arrest diagnosis codes: (CARDIID)

I462	Cardiac arrest due to underlying cardiac condition	I469	Cardiac arrest, cause unspecified
I468	Cardiac arrest due to other underlying condition		

Cardiac arrhythmia diagnosis codes: (CARDRID)

I442	Atrioventricular block, complete	I4901	Ventricular fibrillation
I470	Re-entry ventricular arrhythmia	I4902	Ventricular flutter
I472	Ventricular tachycardia		

Shock diagnosis codes: (SHOCKID)

O0331	Shock following incomplete spontaneous abortion	T782XXA	Anaphylactic shock, unspecified, initial encounter
O0381	Shock following complete or unspecified spontaneous abortion	T8051XA	Anaphylactic reaction due to administration of blood and blood products, initial encounter
O0481	Shock following (induced) termination of pregnancy	T8052XA	Anaphylactic reaction due to vaccination, initial encounter
O0731	Shock following failed attempted termination of pregnancy	T8059XA	Anaphylactic reaction due to other serum, initial encounter
O083	Shock following ectopic and molar pregnancy	T8110XA	Postprocedural shock unspecified, initial encounter
O751	Shock during or following labor and delivery	T8111XA	Postprocedural cardiogenic shock, initial encounter
R570	Cardiogenic shock	T8112XA	Postprocedural septic shock, initial encounter
R571	Hypovolemic shock	T8119XA	Other postprocedural shock, initial encounter
R578	Other shock	T882XXA	Shock due to anesthesia, initial encounter
R579	Shock, unspecified	T886XXA	Anaphylactic reaction due to adverse effect of correct drug or medicament properly administered, initial encounter
R6521	Severe sepsis with septic shock		

Chronic kidney (renal) failure diagnosis codes: (CRENLFD)

I120	Hypertensive chronic kidney disease with stage 5 chronic kidney disease or end stage renal disease	N185	Chronic kidney disease, stage 5
I1311	Hypertensive heart and chronic kidney disease without heart failure, with stage 5 chronic kidney disease, or end stage renal disease	N186	End stage renal disease
I132	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease		

Urinary tract obstruction codes: (URINARYOBSID)

N13721	Vesicoureteral-reflux with reflux nephropathy without hydroureter, unilateral	N35814	Other anterior urethral stricture, male, anterior
N13722	Vesicoureteral-reflux with reflux nephropathy without hydroureter, bilateral	N35816	Other urethral stricture, male, overlapping sites
N13729	Vesicoureteral-reflux with reflux nephropathy without hydroureter, unspecified	N35819	Other urethral stricture, male, unspecified site
N13731	Vesicoureteral-reflux with reflux nephropathy with hydroureter, unilateral	N3582	Other urethral stricture, female
N13732	Vesicoureteral-reflux with reflux nephropathy with hydroureter, bilateral	N359	Urethral stricture, unspecified
N13739	Vesicoureteral-reflux with reflux nephropathy with hydroureter, unspecified	N35911	Unspecified urethral stricture, male, meatal
N138	Other obstructive and reflux uropathy	N35912	Unspecified bulbous urethral stricture, male
N139	Obstructive and reflux uropathy, unspecified	N35913	Unspecified membranous urethral stricture, male
N320	Bladder-neck obstruction	N35914	Unspecified anterior urethral stricture, male
N35010	Post-traumatic urethral stricture, male, meatal	N35916	Unspecified urethral stricture, male, overlapping sites
N35011	Post-traumatic bulbous urethral stricture	N35919	Unspecified urethral stricture, male, unspecified site
N35012	Post-traumatic membranous urethral stricture	N3592	Unspecified urethral stricture, female
N35013	Post-traumatic anterior urethral stricture	N401	Benign prostatic hyperplasia with lower urinary tract symptoms
N35014	Post-traumatic urethral stricture, male, unspecified	N403	Nodular prostate with lower urinary tract symptoms
N35016	Post-traumatic urethral stricture, male, overlapping sites	N99110	Postprocedural urethral stricture, male, meatal
N35021	Urethral stricture due to childbirth	N99111	Postprocedural bulbous urethral stricture, male
N35028	Other post-traumatic urethral stricture, female	N99112	Postprocedural membranous urethral stricture, male

N35111	Post infective bulbous urethral stricture, not elsewhere classified, male	N99113	Postprocedural anterior urethral stricture, male
N35112	Post infective membranous urethral stricture, not elsewhere classified, male	N99114	Postprocedural urethral stricture, male, unspecified
N35113	Post infective anterior urethral stricture, not elsewhere classified, male	N99115	Postprocedural fossa navicularis urethral stricture
N35114	Post infective anterior urethral stricture, not elsewhere classified	N99116	Postprocedural urethral stricture, male, overlapping sites
N35116	Post infective urethral stricture, not elsewhere classified, male, overlapping sites	N9912	Postprocedural urethral stricture, female
N35119	Post infective urethral stricture, not elsewhere classified, male, unspecified	Q642	Congenital posterior urethral valves
N3512	Post infective urethral stricture, not elsewhere classified, female	Q6431	Congenital bladder neck obstruction
N358	Other urethral stricture	Q6432	Congenital stricture of urethra
N35811	Other urethral stricture, male, meatal	Q6433	Congenital stricture of urinary meatus
N35812	Other urethral bulbous stricture, male	Q6439	Other atresia and stenosis of urethra and bladder neck
N35813	Other membranous urethral stricture, male		

Solitary kidney disease: (SOLKIDD)

Q600	Renal agenesis, unilateral	Q606	Potter's syndrome (i.e. Unilateral Renal Agenesis type)
Q602	Renal agenesis, unspecified (i.e. whether unilateral or bilateral)	Z905	Acquired absence of kidney

Partial nephrectomy procedure codes: (PNEPHREP)

0TB00ZZ	Excision of Right Kidney, Open Approach	0TB10ZZ	Excision of Left Kidney, Open Approach
0TB04ZZ	Excision of Right Kidney, Percutaneous Endoscopic Approach	0TB14ZZ	Excision of Left Kidney, Percutaneous Endoscopic Approach