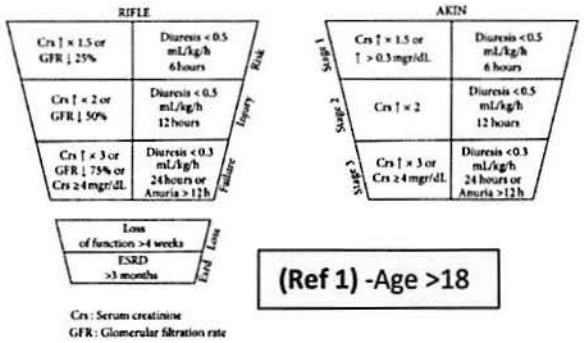
# Evaluation of children with elevated creatinine in ER, PICU, NICU, Pediatric wards




Crs : Serum creatinine
GFR : Glomerular filtration rate

**(Ref 1)** -Age >18

| pRIFLE scale | Estimated Creatinine Clearance (eCCl) | Urine Output |
|---|---|---|
| **Risk** | eCCl decrease by 25% | < 0.5 ml/ Kg / h for 8 h |
| **Injury** | eCCl decrease by 50% | < 0.5 ml/ Kg / h for 16 h. |
| **Failure** | eCCl decrease by 75% or < 35 ml/ min / 1.73 m2 | < 0.3 ml/ kg / h for 24 h. Anuric for 12 h. |
| **Loss** | Persistent failure > 4 weeks | |
| **End Stage** | End Stage Renal disease Persistent failure > 3 months | |

**(Ref 2)** -Age <18

eCCl : estimated Creatinine Clearance. From Kidney Int. 2007; 71:1028–35 (Ref 3)

**Elevated creatinine (>1.5 times or >0.3 mg/dL above baseline)**
**Estimate GFR (Schwartz' formula - 0.41xHt/Scr; Ht in cm) - if below 75 mL/min/1.73 m² (when baseline creatinine is not known)**
***https://www.kidney.org/professionals/KDOQI/gfr***

**Obtain NGAL** (ER, PICU, NICU, Pediatric wards)
**if age 1-18 yo, AND Cystatin C in 0-1 yo (Ref 3,4)**

***"STOP" - causes of AKI* (Ref 5*):***
***S***epsis and hypoperfusion - obtain hemodynamics and rule out infections
***T***oxicity - drugs, contrast - present to establish cause-effect, and avoid
***O***bstruction - imaging - ultrasound preferred, non-contrast studies, avoid MRI
***P***arenchymal kidney disease - UTI, HUS, Nephritis, rhabdomyolysis, etc.

\+ -

**NGAL+/creatinine+** (may need RRT in near future) **(Ref 4)**

**NGAL-/creatinine+** (transient or reversible AKI) **(Ref 4)**

Assess perfusion, blood pressure, heart rate, neuro status
Chemistries, Urinalysis - discuss with nephrology about further labs (i.e., serologies)
Renal and bladder ultrasound

***Management - - prevent AKI progression* (Ref 5*) ("ROAD")***
***R***estore euvolemia (with PICU, nephrology, as needed)
relieve ***O***bstruction (urology if needed)
***A***void nephrotoxic agents (pharmacy to assist)
***D***iagnose primary renal disease (nephrology - biopsy, may be)

***Management - prevent AKI - the 4 "M" (Ref 5)***
***M***onitor patient (i.e., pathology, microbiology, I/O, urine output, weight)
***M***aintain circulation (i.e., hydration, oxygenation, hemodynamics)
***M***inimize kidney insults (i.e., nephrotoxic agents, diuretics, contrast, infections)
***M***anage the acute illness (i.e., sepsis, heart failure, liver failure)


1. Huber W, et al. Validation of RIFLE, AKIN, and a modified AKIN definition ("backward classification") of acute kidney injury in a general ICU: Analysis of a 1-year period. Medicine (Baltimore). 2018 Sep;97(38):e12465.
2. Akcan-Arikan A, et al. Modified RIFLE criteria in critically ill children with Acute Kidney Injury. Kidney Int. 2007; 71:1028–1035.
3. Katsoufis K, et al. Risk assessment of severe congenital anomalies of the kidney and urinary tract (CAKUT): A birth cohort. Frontiers in Pediatrics, 2019, 7:1-10.
4. Stanski N, Menon S, Goldstein SL, Basu RK. Integration of urinary neutrophil-gelatinase-associated lipocalin with serum creatinine delineates acute kidney injury phenotypes in critically ill children. Journal of Critical Care, 2019, 53:1-7.
5. London AKI network – National Institute for Clinical Excellence (NICE) Quality standard – 2014 - https://pathways.nice.org.uk/pathways/acute-kidney-injury


*This clinical guideline is intended as an evidence-based guide for clinical care and not as a replacement for clinical decision making*

Memorial Physician Group

# New Pediatric Clinical Guideline Setup Checklist

## Guideline Name: Acute Kidney Injury - AKI

## Goal of Clinical Guideline: uniform management – awareness, prevention and Rx

***Does the proposed guideline meet the below four criteria?***

- ☑ The intervention is a structured **multidisciplinary** plan of care
- ☑ The intervention is used to translate guidelines or evidence into local structures
- ☑ The intervention details the steps in a course of treatment or care in a plan, pathway, algorithm, guideline, protocol or other 'inventory of actions' (i.e. the intervention had time-frames or criteria-based progression)
- ☑ The intervention aims to standardize care for a specific population

*(Lawal et al. What is a clinical pathway? Refinement of an operational definition to identify clinical pathway studies for a Cochrane systematic Review. BMC Medicine (2016) 14:35)*

## CHECKLIST

- ☑ Physician (or an alternate author) submitting the clinical guideline must be able (directly or through virtual meeting) to attend Clinical Guidelines Meeting
- ☑ All participants in the clinical guideline development should be listed and primary author identified
- ☑ Participants who are submitting clinical guideline should sign off and include the division chief(s) from all involved specialties (for purposes of disseminating to entire division)
- ☑ All clinical guidelines should include a disclaimer ...*"this clinical guideline is intended as an evidence-based guide for clinical care and not as a replacement for clinical decision making"*
- ☑ Clinical guideline authors should submit an estimated revision schedule, i.e. every 3 years.
- ☑ References must be included in the submission.
- ☑ Authors of the guideline must identify 1-2 quality metrics that can be measured to gauge impact on care

awareness of AKI - place dx on problem list, and use of guideline

Signature of Contributing Pathway Developers:

| Dept. Name | MD Developer Name | Signature |
|---|---|---|
| Pediatric Nephrology | Alex Constantinescu, MD | |
| Pediatric ER | Deanna Soloway, MD | |
| Pediatric ICU | Jason L Adler, MD | |
| Neonatal ICU | Doron Kahn, MD | |
| Pediatric Hospital Medicine | Angelique Martinez, MD | |

Date_____

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## Clinical Improvement Team Members

**APPROVED BY**

| | |
|---|---|
| **MANUAL/DEPARTMENT** | |
| **ORIGINATION DATE** | |
| **LAST DATE OF REVIEW OR REVISION** | |
| **REVIEWED BY** | |
| **APPROVAL BY** | |

**REVIEW/REVISION SCHEDULE**