



Maryland
Hospital Association

Final Document

Recommendations of the Acute Renal Failure (ARF) / Acute Kidney Injury (AKI) Workgroup

Background

The 30% reduction in complications required under the new hospital waiver and the annual targets outlined within the Maryland Hospital Acquired Condition (MHAC) payment policy¹ are based on 65 Potentially Preventable Complications (PPCs).² Because PPCs are based on administrative data, the assignment of a PPC is derived from clinical documentation and coding. While hospitals have dedicated significant resources to improving clinical documentation and coding, it has become apparent that variability in the criteria used to define the occurrence of specific clinical conditions across hospitals is hindering our ability to accurately quantify complications and collaborate to prevent them. The premise of this work is that use of consistent criteria to define specific conditions will provide the necessary 'level setting' from which to truly measure performance and support collaboration on quality improvement opportunities. For these reasons, hospital leaders requested that MHA convene a group of clinical and quality representatives to consider criteria currently used across hospitals, review evidence, relevant literature and guidelines, and work to develop consensus definitions.³

Process

Informed by data analyses of PPC performance, hospital medical and quality leaders identified a subset of diagnoses that were widely agreed upon as having varied diagnostic and documentation patterns. The diagnoses were then prioritized based on volume and variability in performance and grouped into four categories: urinary tract infections, obstetric hemorrhages and lacerations, pneumonia/respiratory failure and acute renal failure/kidney injury. A workgroup was convened around each of the four

¹ The statewide reduction target for 2015 is 7% comparing FY2014 to CY2015 risk adjusted PPC rates; The amount at risk for the MHAC program is 3% of inpatient revenue

² 3M Health Information Systems developed PPCs; The PPC software relies on present on admission indicators from administrative data to calculate the actual versus expected number of complications for each hospital

³ This activity was approved by MHA's Council on Clinical Quality Issues as well as the Executive Committee

categories and was comprised of physicians, non-physician clinicians, infection preventionists and documentation and coding professionals from a cross-section of Maryland's community and teaching hospitals and health systems.⁴ Over a series of meetings each workgroup was charged with developing a proposed definition informed by published criteria and existing practice. Hospitals were engaged in the process through submission of hospital-based definitions as well as offering comment on the workgroups' proposed definitions. The workgroups' recommendations account for inpatient coding guidelines⁵ and apply to any occurrence of the diagnosis, not only scenarios that would trigger a PPC under the MHAC policy.

Each workgroup's proposed criterion are intended to serve as a guideline for provider and coder consideration and are not intended to restrict provider judgment when diagnosing a patient or alter coder assignment based on established guidelines. This clinical definition will not supplant the need for providers to clearly document a diagnosis. Provider documentation will continue to be the basis for inpatient coding of diagnoses as is required by coding guidelines. Coders will continue to use provider documentation as the source of the coded diagnosis. The workgroup encourages hospitals to utilize approved definitions to guide coders and clinical documentation specialists to query physicians when the documented diagnoses lack the respective supporting clinical indicators.

Acute Renal Failure / Acute Kidney Injury (ARF/AKI)⁶ WorkGroup Deliberations

To arrive at a proposed definition, the workgroup, over a series of meetings, based their deliberations on the following:

- *Current practice at Maryland hospitals*
 - Medical and Quality leads at all Maryland acute care hospitals were asked to submit the policies used at their facilities to define ARF/AKI

⁴ Workgroup meeting material and rosters available at <http://www.mhaonline.org/quality/complications-work-groups>

⁵ ICD-9 Official Coding Guidelines, approved by four organization that make up the Cooperating Parties for the ICD-9-CM: the American Hospital Association (AHA), the American Health Information Management Association (AHIMA), the Centers for Medicare and Medicaid Services (CMS) and the National Center for Health Statistics

⁶ For purposes of this workgroup, the terms Acute Renal Failure and Acute Kidney Injury are used synonymously and abbreviated (ARF/AKI)

- *Relevant literature and published guidelines by respected bodies, including the Acute Dialysis Quality Initiative (ADQI), the Acute Kidney Injury Network (AKIN), and the Kidney Disease Improving Global Outcomes (KDIGO) organization*
- *Expertise of workgroup members*

The workgroups recognize that any definition or guideline will not apply to every patient, and therefore each hospital and/or provider is expected to use appropriate professional judgment when applying this guideline. While the workgroup strongly encourages the use of standardized criteria within and across hospitals, any guideline that is adopted will not negate the use of the provider's documentation, which is the basis for inpatient coding.

Proposed ARF/AKI Definition Criterion

The workgroup concluded that the defining criterion for ARF/AKI for adult patients is:

Defining Criteria for ARF/AKI
A Greater Than 100% (2X) Rise in Serum Creatinine from Baseline* Occurring During the Course of a Single Hospital Stay

*Baseline as determined by the provider's judgment and consideration of previous lab values and other documentation, if available

The workgroup reached this conclusion by considering the three principal definitions for ARF/AKI accepted by providers. These definitions include:

- 1) *The RIFLE criteria (Risk, Injury, Failure, Loss and End Stage Renal Disease)*⁷
- 2) *The AKIN criteria*⁸
- 3) *The KDIGO criteria*⁹

⁷ Bellomo R, Ronoco C, Kellum JA, et al. Acute renal failure definition, outcome measures, animal models, fluid therapy and information technology needs: the Second International Consensus Conference of the Acute Dialysis Quality Initiative (ADQI) Group. Crit Care 2004; 8:R204

⁸ Mehta RL, Kellum JA, Shah SV, et al. Acute Kidney Injury Network: Report of an initiative to improve outcomes in acute kidney injury. Crit Care 2007; 11:R31

⁹ KDIGO Clinical Practice Guideline for Acute Kidney Injury. Kidney Int Suppl 2012; 2:8

A greater than 100% (2X) rise in serum creatinine is a common element to all three criteria, and corresponds to the “injury” phase of the RIFLE criteria. The MHA workgroup refrained from recommending that the RIFLE, AKIN or KDIGO criteria be wholly adopted by practitioners in Maryland hospitals as these criteria are most relevant when determining consistent inclusion standards or endpoints for epidemiologic studies.^{10,11} The workgroup instead determined that it would be more appropriate to adopt this single element from within these guidelines as it is simpler (which will aid adoption) and more clinically relevant. This definition may need to be revisited in the future as new, more reliable testing of kidney function is widely available. The group also notes that in the presence of volume overload in a critically ill patient, especially one with reduced urine output, creatinine may be a poor marker of renal function and may delay the diagnosis of progressive AKI due to dilutional features.

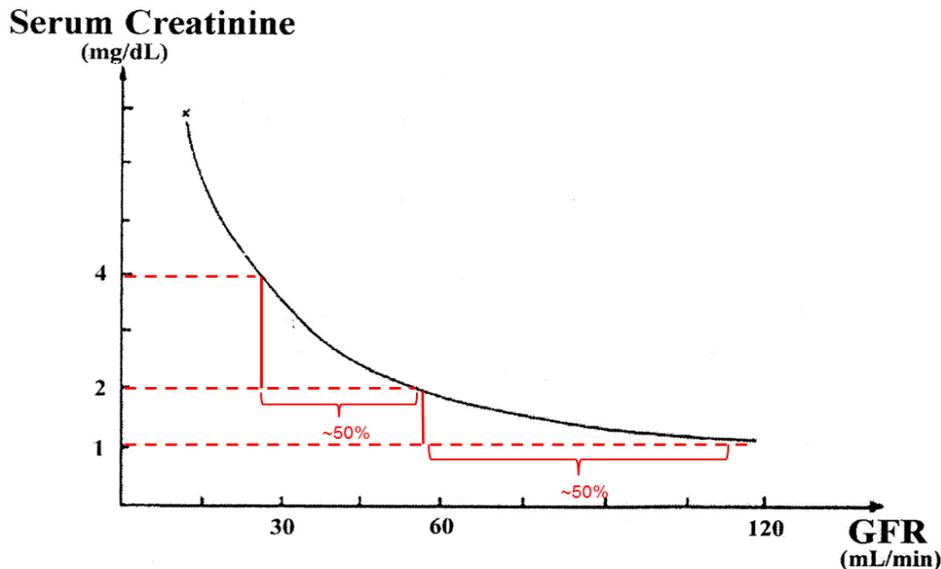
Applicability

The workgroup felt the definition for ARF/AKI detailed above should be used even for those patients who have a consistently elevated serum creatinine due to chronic kidney disease. The only population for which this definition will not apply is the pediatric patient population. The rationale for consistent application is that for any starting creatinine level, a 100% (2X) rise consistently indicates an approximately 50% decrease in the Glomerular Filtration Rate (GFR), a clinically significant loss of renal function. The relationship between serum creatinine and GFR is depicted in the graph below.¹²

¹⁰ Palevsky PM, Liu KD, Brophy PD, et al. KDOQI US commentary on the 2012 KDIGO clinical practice guideline for acute kidney injury. *American Journal of Kidney Disease* 2013; 61:649

¹¹ James M, Bouchard J, Ho J, et al. Canadian Society of Nephrology commentary on the 2012 KDIGO clinical practice guideline for acute kidney injury. *American Journal of Kidney Disease* 2013; 61:673

¹² Salomon, L., et al. Assessing Residents' Prescribing Behavior in Renal Impairment. *The International Society for Quality in Health Care* 2003; 15:3



The workgroup considered, and purposefully omitted, including specific mg/dL shifts in creatinine (e.g. a 0.3 mg/dL increase) and instead decided to only utilize rates of change (e.g. a 100% (2X) increase) in its definition. The workgroup's rationale was that a rate of change better relates the measure of serum creatinine levels to a patient's baseline. For example, a 0.4 mg/dL increase in a patient with a baseline creatinine of 2 mg/dL only represents a 20% increase while a 0.4 mg/dL increase is a 50% increase for a patient with a baseline of 0.8 mg/dL. Additionally, incorporating a 0.3 mg/dL increase as a definitional element, such as used in AKIN and KDIGO, would create too sensitive a definition for those patients with chronically elevated creatinine levels and likely lead to some patients being improperly diagnosed with ARF/AKI. Because it only considers the rate of change, this workgroup's definition is relevant for those patients with baseline kidney dysfunction, including chronic kidney disease.

Urinary Output

The workgroup also considered, and purposefully omitted, consideration of urinary output as a necessary part of the definition for ARF/AKI because many hospitalized patients do not have an indwelling catheter, and the accurate measurement of urinary output is often impractical and not consistently measured. Though urinary output is not a component of this proposed definition, a provider may choose to consider this component, if available, as an element for decision making.

Time Period

The workgroup purposefully refrained from defining ARF/AKI such that a greater than 100% (2X) rise in serum creatinine must take place over a specific number of days. The workgroup's rationale, based on the expertise and experience of workgroup members, is that an incidence of ARF/AKI may evolve over several days or possibly even longer than a week. The workgroup therefore concluded that a rise in creatinine over the threshold taking place during any time within a single hospital stay be considered ARF/AKI.

Appendix A – Appropriateness of ARF/AKI for Quality-Based Payments

The workgroup had considerable discussion around use of ARF/AKI for quality based payment programs because not all incidences of ARF/AKI are avoidable or preventable. In some instances, patients may experience an unavoidable kidney injury and associated increase in serum creatinine over the 100% (2X) threshold secondary to an underlying disease or condition. In other circumstances, patients may experience an unavoidable kidney injury and associated increase in serum creatinine secondary to an appropriate, necessary and timely treatment for another disease or condition. MHA will continue to collaborate with this workgroup to bring these concerns to HSCRC and 3M.

The workgroup suggested that, for patients diagnosed with one of the conditions or requiring one of the treatments enumerated in the list below, a subsequently appropriate diagnosis of ARF/AKI may not be preventable. The list includes:

- Primary renal disease, Including acute glomerulonephritis and acute interstitial nephritis
- Sickle Cell Anemia
- Shock of any etiology
- Hypertensive crisis
- Sepsis or septicemia
- Congestive heart failure and treatment (diuretic therapy)
- Preeclampsia
- Emergent studies using contrast dye
- Renal surgery
- Hemorrhage
- Burns
- Liver failure
- Trauma
- Renal transplant
- Hypotension

On behalf of the workgroup MHA has requested that 3M and HSCRC consider this list as exclusions to ARF/AKI given that many instances of ARF/AKI may be inherent to these conditions or treatments.

Appendix B – Response to Comments on the Workgroup’s Draft

The workgroup would like to thank all who submitted comments on its draft. The workgroup carefully considered each commenter’s submission. Commenters touched on many of the same points, and the workgroup’s responses to those points are detailed below.

The workgroup received numerous comments that its definitional criterion of 50% (1.5X) rise in serum creatinine is too low and would capture an inappropriate number of cases. After further deliberation, the workgroup agreed with commenters and adjusted its definition to require a 100% (2X) rise. The workgroup adjusted its definition, in part, to align its criterion with the ‘Injury’ stage of the RIFLE criteria. The group also adjusted its definition to address points raised by commenters regarding time frames. Specifically, some commenters suggested the workgroup incorporate a requirement that patients have an elevated creatinine above the required threshold for longer than 48-72 hours before being diagnosed with ARF/AKI. Other commenters suggested the workgroup require a rise in creatinine to occur within a given number of days. The workgroup believes that by increasing the serum creatinine threshold from 50% (1.5X) to 100% (2X), its definition will better define ARF/AKI occurring within any duration of the hospital stay. Members also favored a straightforward metric that would define ARF/AKI regardless of a patient’s length-of-stay.

Some commenters highlighted the fact that the Society of Thoracic Surgeons (STS), for purposes of data collection for its National Database, defines renal failure as a 3X rise in serum creatinine level from baseline for cardiac surgery patients. These commenters encouraged the workgroup to adopt this criterion for this population. After deliberations the workgroup did not agree to endorse separate guidelines for post cardiac surgery patients for two reasons. First, members concluded the definition of kidney injury should be consistent among all patient populations. A rise in creatinine above a 100% (2X) threshold is a clinically significant injury regardless of underlying cause. Second, members noted that though STS distinguishes between renal failure and renal injury, coding convention uses these terms synonymously (both acute kidney injury and acute kidney failure, when written by a provider in a chart, map to ICD-9-CM code 584.9) as do many providers. The RIFLE criteria used by STS states that renal

injury occurs when there is a 100% (2X) rise in serum creatinine and this is the criterion the workgroup endorsed for all patients.¹³

Commenters suggested several additions that they felt should be included in the appendix listing conditions and treatments for which a subsequent diagnose of ARF/AKI may not be preventable (Appendix A). Suggested conditions included rhabdomyolysis, sickle cell anemia, chronic kidney disease (CKD) renal transplant and trauma. The workgroup agreed to include sickle cell anemia, renal transplant and trauma in the appendix, but will not include CKD and rhabdomyolysis. It is the experience of the work group members that rhabdomyolysis rarely occurs to a patient as a new onset during a hospital stay and disagrees that an instance of ARF/AKI is inherent to the presence of this condition. Workgroup members do not believe that an acute episode of renal failure is a natural or unavoidable progression of CKD. Members noted that patients with later stage CKD are excluded from ARF/AKI PPCs (24 & 25).

Some commenters encouraged the workgroup to define what constitutes a patient's baseline creatinine. Workgroup members considered this suggestion, and amended the group's definition to state 'baseline' is "determined by the provider's judgment and consideration of previous lab values and other documentation, if available." Members noted the challenge providers have with inconsistent degrees of familiarity with the patient's underlying health as well as variable access to prior clinical documentation and lab data. Members decided that crafting a specific definition for 'baseline' that could reasonably encompass all of these possibilities was untenable. The definition of baseline will therefore be kept sufficiently vague and defer to provider discretion.

Several commenters suggested that the workgroup attach a minimum serum creatinine level to its definition before a patient can be considered to have ARF/AKI. These commenters suggested that, for patients with very low creatinine levels, small increases may constitute a large relative rise and yet not be indicative of ARF/AKI (e.g. a patient admitted with a creatinine level of 0.5 mg/dL that increases to 1.0 mg/dL over the hospital stay). The workgroup considered this suggestion, but decided to refrain from including a baseline threshold. The group's rationale was that even for patients with low baseline serum creatinine, a 100% rise is significant and may be indicative of ARF/AKI.

¹³ Society of Thoracic Surgery. *Adult Cardiac Surgery Database v.2.8.1, Training Manual*, effective July 1, 2014

Whether or not a patient with a serum creatinine under 1.0 mg/dL should be considered to have ARF/AKI will be determined by providers on a case-by-case basis.

Some commenters asked that the group consider distinguishing between community-acquired and hospital-acquired ARF/AKI. Group members deliberated on these suggestions, but decided to refrain from making this distinction noting the potential delay between the onset of injury to the kidneys and a corresponding rise in serum creatinine, which make the distinction between community-acquired and hospital-acquired ARF/AKI difficult. Members also noted that the workgroup's charge was to create a definition for ARF/AKI apart from PPC consideration under the MHAC program. The distinction between present-on-admission (POA) and hospital-acquired ARF/AKI is one that providers will need to make on a case-by-case basis in accordance with allowable practices.

Finally, several commenters suggested that the workgroup consider adopting a 0.3 mg/dL rise in serum creatinine in addition to a relative rise in creatinine level as indicative of ARF/AKI. The workgroup agreed that inclusion of this element in the proposed definition would reduce the criterion's applicability to those patients with elevated serum creatinine levels at baseline. The rationale for this exclusion is detailed on page 5 of the work group's document:

“...incorporating a 0.3 mg/dL increase as a definitional element, such as used in AKIN and KDIGO, would create too sensitive a definition for those patients with chronically elevated creatinine levels and likely lead to some patients being improperly diagnosed with ARF/AKI. Because it only considers the rate of change, this workgroup's definition is relevant for those patients with baseline kidney dysfunction, including chronic kidney disease.”