Understanding recovery after acute kidney injury

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Acute kidney injury (AKI) is not an isolated event, however is often the start of a long-term risk trajectory for patients. While in many cases kidney function improves, dysfunction is common and carries a heightened risk of chronic kidney disease (CKD), as well as cardiovascular morbidity and mortality. Central to improving outcomes is a clear, practical understanding of what constitutes true 'recovery' from AKI. Yet, current definitions are inconsistent, ranging from simplistic biochemical thresholds to more nuanced, qualitative judgments.

To better understand how AKI recovery is defined in practice within the UK, the UK Kidney Association (UKKA) Special Interest Group and the Association of Nephrology Nurses UK (ANN UK) AKI Community of Practice surveyed nurses working in specialist AKI roles. The survey was sent to all AKI nurses from the ANN UK AKI CoP group via email. This group were chosen as a convenience sample of specialist practitioners who were caring for people with AKI and aimed to gain an insight into how nurses working in AKI care viewed and used AKI recovery.

The survey received responses from 18 AKI nurses across 16 NHS Trusts within the UK. The survey explored how these clinicians define baseline renal function, assess recovery and approach follow-up, while also reviewing awareness and use of terms such as acute kidney disease.

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Defining the starting line: establishing baseline serum creatinine

Accurate assessment of recovery requires a reliable estimate of pre-AKI baseline function. While Kidney Disease: Improving Global Outcomes (2012) define baseline SCr as the most recent stable value, using the lowest serum creatinine (SCr) measurement within the 7 preceding days, or the mean of all SCr measurements over the preceding 365 days, this is not universally employed to define baseline for renal recovery. Variability in available data, reliance on retrospective estimations and the limitations of SCr as a biomarker–particularly in patients with reduced muscle mass can all contribute to inconsistencies in practice (Forni et al, 2017).

In this survey, when asked 'How do you define pre-AKI baseline?' a total of 55% of respondents identified the lowest serum creatinine (SCr) value within the 90 days prior to AKI as their baseline reference, aligning with KDIGO (2012) recommendations. Meanwhile, 15% used the most recent pre-AKI SCr, and 30% relied on individualised methods, including:

- Mean outpatient SCr over a 12-month period
- Lowest SCr from the last 3–12 months
- Context-specific case review, particularly in complex or chronically unwell patients.

Siew et al (2016) argued that SCr can lag behind true glomerular filtration rate (GFR) recovery, is influenced by non-renal factors such as muscle mass, fluid shifts and tubular injury, and may not reflect structural kidney recovery. This underscores the critical interpretive role of AKI nurses and the need for complementary biomarkers to assess kidney health more accurately.

How is AKI recovery defined in practice?

When asked 'How do you define recovery?', responses again varied widely with 39% of respondents reporting using a 25% threshold.

The remaining 22% applied 'other' methods including:

- Recovery to within 1.5x baseline (mirroring a

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reversal of KDIGO criteria)
- Qualitative categories, such as 'good,' 'moderate,' or 'poor' recovery
- Return to pre-AKI function within 90 days.

This widespread variation highlights the absence of a standardised approach to defining AKI recovery in clinical practice and reflects a continued reliance on SCR, despite its well-recognised limitations. Previous work has cautioned against over-reliance on SCr alone due to its known confounders (Macedo and Mehta, 2016). Instead, Siew and Kellum (2016) advocated for recovery definitions that encompass structural, functional and clinical criteria, acknowledging that subclinical injury may persist even when SCr appears normal. Notably, none of the nurses surveyed incorporated either proteinuria or albuminuria into their definitions of recovery, despite national guidance, such as the Royal College of General Practitioners AKI follow-up toolkit endorsing urinary albumin as a key marker of kidney function. A reliance on serum creatinine alone is also possibly indicated by the fact that there was not a specific question about AKI recovery and urinary albumin within the survey.

Respondents also reported wide variation in the time points used to assess recovery. This inconsistency highlights the lack of a unified framework for determining when and how recovery should be evaluated. Siew and Kellum (2016) advocated for a model that incorporates time-based definitions specifically 7 days, 14 days, 90 days to assess whether persistent biochemical abnormalities remain and identify markers of structural kidney damage such as proteinuria. Building on this, Kellum et al (2017) proposed a phenotype-based classification, categorising AKI patients into five distinct recovery trajectories within the first week of injury. These phenotypes have been shown to strongly predict long-term outcomes and offer a potentially valuable tool for informing follow-up strategies and personalised care planning.

Acute kidney disease and its role in acute kidney injury recovery

A total of 45% of respondents reported using the term acute kidney disease (AKD) in clinical practice, most commonly to describe persistent kidney dysfunction lasting beyond 7 days after an AKI event. Among the remaining respondents, some were unfamiliar with the term, while others viewed it as clinically irrelevant or unnecessary for guiding decision making.

AKD, a concept introduced by the Acute Disease Quality Initiative (ADQI) in 2017, was designed to bridge the gap between AKI and CKD. It promotes a more nuanced, stage-based continuum of kidney disease, recognising that not all patients recover immediately and that prolonged dysfunction even if partial, carries prognostic significance. AKD is formally defined as kidney dysfunction that persists beyond 7 days ,but does not yet meet the 90-day threshold for CKD.

However, findings from this survey suggest that the concept of AKD remains poorly embedded in nursing-led clinical practice. This could reflect a lack of awareness, limited perceived utility or potential confusion surrounding terminology. There may also be uncertainty about whether the introduction of a new label meaningfully alters management or outcomes.



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Further work is needed to explore whether embedding AKD terminology into post-AKI care pathways would support more accurate risk stratification and targeted follow-up, or whether the focus should shift instead to recognising the duration of kidney injury as a risk factor regardless of what it is labelled as. Understanding whether this conceptual framework enhances clinical decision-making and patient outcomes will be key to its future adoption.

Does recovery influence follow-up?

When asked the question 'Do you use AKI recovery to decide if that patient receives AKI follow-up?' respondents stated:

- 78% offer structured post-AKI follow-up
- 55.5% use recovery status to guide eligibility
- 22% reported no follow-up infrastructure

Timing of follow-up was variable. Early follow-up (within 2 weeks of discharge) was common for unrecovered patients, while others used standardised time points (e.g. 3 months for CKD stratification). The triggers for AKI following timing was influenced by poor recovery of renal function, medication needs (e.g. RAASi reintroduction) and patient complexity.

This variation is consistent with current evidence. Kellum et al (2017) showed that recovery status at discharge correlates with long-term mortality. National Institute for Health and Care Excellence (NICE, 2021) now recommends assessment for CKD at 3 years for all post-AKI patients, regardless of apparent recovery.

This variability highlights the need for a more consistent yet adaptable approach to post-AKI care. While Kellum et al (2017) demonstrated that recovery status at discharge is a strong predictor of long-term mortality, this does not necessarily imply a rigid, standardised protocol. Instead, there may be value in developing a framework that sets out core principles for AKI follow-up, while allowing local services the flexibility to tailor models to their specific context and resources. This approach could help reduce unwarranted variation without compromising relevance or feasibility. Additionally, NICE guidance (2021) recommends that all patients who have experienced AKI be assessed for CKD up to 3 years post-injury, reinforcing the importance of structured, long-term monitoring regardless of apparent short-term recovery.

Conclusion

This survey highlights that while awareness of the importance of post-AKI care is growing, the lack of a national framework continues to result in significant variability across clinical practice. Key areas of inconsistency include:

- Biochemical thresholds: Most teams rely on serum creatinine (SCr), yet the thresholds for defining recovery vary (e.g. 10%, 25% or 1.5× baseline), with some using qualitative clinical judgement instead
- Timing of follow-up: Follow-up intervals range from 2 weeks to 3 months, often shaped by local policy, staffing capacity, or clinical discretion.

AKI nurses play a crucial role in synthesising clinical data, supporting patient engagement and coordinating recovery pathways. However, their efforts are often hampered by a lack of consistency in definitions, documentation and risk assessment. A nationally endorsed framework providing flexible guidance rather than rigid rules could support clinical judgement while reducing unwarranted variation. Tools such as standardised templates, recovery definitions, and risk stratification algorithms would help to align practice with evidence, bridging the gap between policy and frontline care.

Recovery from AKI is not a fixed point but a variable trajectory. This survey reflects both the innovation and fragmentation currently seen in post-AKI care. AKI nurses are uniquely positioned to lead the development of a more coherent, patient-centred model of post-AKI care. With the right support through national guidance, clear terminology, and evidence-based tools the profession can drive a shared, consistent approach that better meets the needs of AKI survivors and improves long-term kidney health outcomes across the UK.

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