Acute Kidney Injury

Safety Toolkit for Learning & Improvement

Case note review templates

Aims of the AKI Safety templates

- The templates are structured to identify patient safety issues and gaps in management processes, highlighting learning opportunities across care interfaces (Primary/Secondary; In/Out of Hours)
- Questions aim to promote learning from real-life AKI cases, rather than audit or criticise current practice
- AKI Safety Template 1 is designed to support case note review of patients who have generated an AKI Warning Stage Test Result in primary care
- AKI Safety Template 2 is designed to support case note review of patients who have had a hospital admission complicated by AKI
- The AKI Safety Template 3 is designed to aid reflection and learning through a summary of cases in order to create action plans for improvements in future care

AKI safety template 1: Recognition and Response to AKI occurring within Primary Care

Case review questions		Tick if Not documented	What went well? Any scope for improvement? (or further comments)
1. Ordering kidney function tests			
Why was the blood test taken?			
• Routine Chronic Disease monitoring	Yes ☐ No ☐	☐	
• Drug monitoring	Yes ☐ No ☐	☐	
• Assessment of acute illness	Yes ☐ No ☐	☐	
• Other (please specify)	.....		
Were there relevant co-morbidities?	Yes ☐ No ☐	☐	
• Any stage of CKD	Yes ☐ No ☐	☐	
• Diabetes	Yes ☐ No ☐	☐	
• Heart failure	Yes ☐ No ☐	☐	
• Other (please specify)	.....		
Any recent changes in medication or dosage?	Yes ☐ No ☐	☐	
• Any increase in ACEi, ARB or diuretic	Yes ☐ No ☐ N/A ☐	☐	
Did the test request need communicating to:	Yes ☐ No ☐ N/A ☐	☐	
• The practice team / Out of hours			
2. Obtaining a sample			
When was the blood test done?	.....	☐	
• Date & time			
Were there any problems with the sample?	Yes ☐ No ☐ N/A ☐	☐	
• e.g. lost, left too long or left overnight			
3. Recognition & response to AKI Warning Stage Test Results			
When & how was alert issued (Time point A)?			
• Date & time	.....	☐	
• Via telephone	Yes ☐ No ☐	☐	
• Via routine lab results	Yes ☐ No ☐	☐	
• Other	.....	☐	
When did the clinician respond to the alert (Time point B)?			
• Date & time	.....	☐	
What was the timeliness in response? (Time point B minus Time point A)?	.....	☐	
• Did it fit with Think Kidneys guidance?	Yes ☐ No☐	☐	
• If not, what were the reasons?	.....		
Was AKI confirmed? (If NOT AKI - finish here)	Yes ☐ No ☐	☐	
If 'true' AKI, did it get coded in GP records?	Yes ☐ No ☐	☐	
• If yes, was the AKI Read coded?	Yes ☐ No ☐ N/A ☐	☐	
• If yes, was the AKI ***stage*** Read coded?	Yes ☐ No ☐ N/A ☐	☐	
What was nature of response?			
• No action required (recorded in notes)	Yes ☐ No ☐	☐	
• Blood tests repeated	Yes ☐ No ☐	☐	
• Telephone call	Yes ☐ No ☐	☐	
• GP Consultation	Yes ☐ No ☐	☐	
• Home visit	Yes ☐ No ☐	☐	
• Other	.....		
Did response include:			
• Assessment of likely cause(s)	Yes ☐ No ☐ N/A ☐	☐	
• Urinalysis	Yes ☐ No ☐ N/A ☐	☐	
• Repeat blood tests	Yes ☐ No ☐ N/A ☐	☐	
• Review of medication	Yes ☐ No ☐ N/A ☐	☐	
• Review of fluid status	Yes ☐ No ☐ N/A ☐	☐	
• Review of carer requirements	Yes ☐ No ☐ N/A ☐	☐	
• Communication of AKI with patient/carer	Yes ☐ No ☐ N/A ☐	☐	
• Plan for follow up	Yes ☐ No ☐ N/A ☐	☐	
• Admission	Yes ☐ No ☐ N/A ☐	☐	
What was the outcome 3 months post alert?	.....	☐	
• E.g. death or reduced performance status	.....		
New CKD or Renal function at baseline	.....		

If 'True AKI' and patient admitted to hospital consider using case note review template 2

AKI safety template 2: Post AKI Care following hospital discharge

Case review questions		Tick if Not documented	What went well? Any scope for improvement? (or further comments)
1. Documentation and coding of inpatient Acute Kidney Injury (AKI) episode			
Was AKI on the discharge summary?	Yes ☐ No ☐ N/A☐	☐	
Was the patient given an AKI Read Code?	Yes ☐ No ☐ N/A☐	☐	
• If yes, was the AKI stage coded?	Yes ☐ No ☐ N/A☐	☐	
Was the cause(s) of the AKI documented?	Yes ☐ No ☐ N/A☐	☐	
• On the discharge summary?	Yes ☐ No ☐ N/A☐	☐	
• In the patient's GP records?	Yes ☐ No ☐ N/A☐	☐	
Did the patient require:			
• An admission to ITU?	Yes ☐ No ☐ N/A☐	☐	
• Renal replacement therapy?	Yes ☐ No ☐ N/A☐	☐	
2. Optimising medicines management post AKI			
Have medications been reviewed post-discharge?	Yes ☐ No ☐	☐	
• If yes, how long after the AKI episode?	.....	☐	
• If yes, was this a face to face review?	Yes ☐ No ☐		
Was the blood pressure (BP) checked?	Yes ☐ No ☐ N/A☐	☐	
Were any drugs stopped during admission? (e.g. antihypertensives or drugs that accumulate during AKI)	Yes ☐ No ☐ N/A☐	☐	
	Yes ☐ No ☐ N/A☐		
• Were any medications restarted?	.....	☐	
• If yes – please specify:	.....		
• Was this pre/post discharge?	Yes ☐ No ☐ N/A☐	☐	
• Were reason(s) for restarting/withholding drugs post-discharge documented?	.....	☐	
3. Monitoring Kidney Function post AKI			
Is the discharge serum creatinine:			
• Recorded in discharge summary?	Yes ☐ No ☐ N/A☐	☐	
• Recorded in the GP patient's records?	Yes ☐ No ☐ N/A☐	☐	
• Recorded as improving, stable or unstable?	Yes ☐ No ☐ N/A☐	☐	
Is there a plan for further blood monitoring:			
• In the discharge summary?	Yes ☐ No ☐ N/A☐	☐	
• In the patient's GP records?	Yes ☐ No ☐ N/A☐	☐	
If yes , do these plans stipulate:			
• Frequency of blood testing?	Yes ☐ No ☐ N/A☐	☐	
• Which blood tests are required?	Yes ☐ No ☐ N/A☐	☐	
• Duration of monitoring?	Yes ☐ No ☐ N/A☐	☐	
Has the patient had repeat:			
• Blood tests?	Yes ☐ No ☐ N/A☐		
(If yes – what was the date?)	.....	☐	
• Urinary ACR if appropriate?	Yes ☐ No ☐ N/A☐	☐	
(If yes – what was the date?)	.....		
4. Reducing AKI Risk and Promoting Kidney Health Post AKI			
Was patient informed of AKI episode &onward AKI risk?			
• Was this discussed prior to discharge?	Yes ☐ No ☐ N/A☐	☐	
• Was this discussed post-discharge?	Yes ☐ No ☐ N/A☐	☐	
• Was patient provided with written info?	Yes ☐ No ☐ N/A☐	☐	
Does the patient have a carer?	Yes ☐ No ☐	☐	
• Was the AKI episode & risk discussed with carer?	Yes ☐ No ☐ N/A☐	☐	
Has the patient been provided with a plan of care? (I.e. AKI as a marker of vulnerability/frailty)	Yes ☐ No ☐ N/A☐	☐	
Has informed consent to activate the enriched Summary Care Record (SCR) been discussed?	Yes ☐ No ☐ N/A☐	☐	
• Has the enriched SCR been activated?	Yes ☐ No ☐ N/A☐	☐	

AKI safety template3: Reflection from AKI case reviews

1. Review details		
Name of Reviewer:		
Profession:		
Name of practice:		
Date of review:		
Was this completed individually or as a team	Individually ☐	As a team ☐

2. Review of records		
Total number of records reviewed:		
What template was used (Both templates, AKI safety template 1 only or template 2 only):	Both templates	
	AKI Safety Template 2 only	
	AKI Safety Template 1 only	
Review period (e.g. 6 months):		
Approximately what length of time (in minutes) did it take to review all records:		

3. Reflection, action and improvement		
Please describe identified learning needs for the following factors: • Patient • Professional • Practice Team • Secondary Care • System	Patient	
	Professional	
	Practice Team	
	Secondary Care	
	System	
Develop an Action plan: • Specific • Measureable • Achievable • Relevant • Time-bounded		
What is the time frame for review of the Action plan?		

'THINK KIDNEYS'

Table1. Acute Kidney Injury: Recommended response times to AKI Warning Stage Test Results for Adults in Primary Care

AKI Warning Stage Test Result Confirm or refute automated AKI Test Result by comparing patient's current creatinine **within clinical context** against baseline creatinine	**Clinical Context Within Which Blood Test Taken#** If clinical context is unknown, then assume high pre-test probability until proven otherwise	
	LOW Pre-test Probability of AKI Stable Clinical Context	**HIGH Pre-test Probability of AKI** Context of Acute Illness
AKI Warning Stage 1 Current creatinine ≥1.5 x baseline level (or creatinine rise >26 µmol/L 48 hrs)	**Consider clinical review ≤ 72 hours of e-alert*** **If AKI confirmed** → manage as per table 2	**Consider clinical review ≤ 24 hours of e-alert*** **Likely Stage 1 AKI** → manage as per table 2
AKI Warning Stage 2 Current creatinine ≥2 x baseline level	**Consider clinical review ≤ 24 hours of e-alert*** **If AKI confirmed** → manage as per table 2	**Consider clinical review ≤ 6 hours of e-alert*** **Likely Stage 2 AKI** → manage as per table 2
AKI Warning Stage 3 Current creatinine ≥3 x baseline level (or creatinine 1.5 x baseline and >354 µmol/L)	**Consider clinical review ≤ 6 hours of e-alert*** **If AKI confirmed** → consider admission	**Consider Immediate Admission*** Likely Stage 3 AKI

#Clinical Context

Why was the blood test taken?

- Routine chronic disease monitoring
- Drug monitoring
- Assessment of acute illness

Creatinine rise within stable clinical context may reflect unstable CKD instead of AKI, especially if longer time period between current and baseline creatinine.

***AKI Risk Factors/Clinical Features Prompting Earlier Review**

- Poor oral intake/urine output
- Evidence of hyperkalaemia, especially if moderate(K+ 6.0-6.4) or severe (K+ ≥ 6.5)¥
- Known history of CKD stages 4 & 5 or history of kidney transplant
- Deficient Immunity
- Frail with co-morbidities (CKD, diabetes, heart failure, liver disease, neurological or cognitive impairment)
- Past history of AKI
- Suspected intrinsic kidney disease
- Suspected urinary tract obstruction

¥ UK Renal Association Clinical Practice Guidelines (2014) recommends emergency assessment and treatment of severe hyperkalaemia (K+≥6.5mmol/l) – click here
Refer to main guidance document – Responding to AKI Warning Stage Test Results for Adults in Primary Care

The table is a guide to support an initial response to an AKI Warning Stage Test Result but clinical judgement must prevail.
The table does not apply to children and young people (<18 years) or patients receiving end of life care.

Appendix one

Appendix Two

Table 2: Recognising and Responding to Acute Kidney Injury for Adults in Primary Care*

"Think" Cause	"Think" Medication#	"Think" Fluids	"Think" Review¥
History of acute Illness? • Think Sepsis • Think Hypotension Intrinsic kidney disease? (E.g. vasculitis) • Think Urinalysis Urinary tract obstruction?	Any medication which could exacerbate AKI? Consider withholding: • NSAIDs • Diuretics • Antihypertensive medication Any medication which may accumulate and cause harm during AKI? Any new medication that may cause AKI?(E.g. drug induced tubulo-interstitial nephritis)	What is the patient's volume status? If hypovolemia present: • When did patient last pass urine? • Can the patient increase fluid intake? • Is admission for IV fluid replacement and monitoring required? Does the patient have and/or need carer support?	Does the patient need acute admission? If not, when will you review? Have you ensured handover?¥

*Refer to main guidance document – Responding to AKI Warning Stage Test Results in Primary Care

Refer to medicines optimisation toolkit for primary care http://www.thinkkidneys.nhs.uk/aki/medicines-optimisation-for-aki

¥ Refer to overarching principles in communication of diagnostic test results https://www.england.nhs.uk/patientsafety/discharge

The table is a guide to support recognition and response to AKI in primary care
The table does not apply to children and young people (<18 years) or patients receiving end of life care

Appendix Three

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When or if to re-start ACEI, ARB, diuretics and other antihypertensive drugs after an episode of Acute Kidney Injury

During acute illness, particularly involving sepsis, hypovolaemia or hypotension, renal blood flow is often reduced, resulting in Acute Kidney Injury (AKI). Clinicians managing patients with AKI therefore frequently stop drugs that lower blood pressure (particularly ACEI and ARBs, which selectively reduce glomerular pressure) and diuretics. ACEIs, ARBs and potassium-sparing diuretics may also be stopped because of hyperkalaemia. This document gives guidance on when these drugs should be re-started after an episode of AKI.

1. The original indication for the use of the drug should be reviewed.

2. If a specific contraindication to the use of an ARB/ACEI has been identified (e.g. severe bilateral renal artery stenosis), an alternative drug should be used.

3. For patients previously stabilized on drugs for the treatment of heart failure, these drugs should be re-started as soon as clinically reasonable, and re-titrated to achieve the best control of fluid balance and blood pressure, unless there is a specific contraindication. These medicines will often be recommenced in the hospital setting before discharge but will require titration in the community to get an optimal effect. In general, if the patient is under the continuing care of a specialist heart failure service, then that service should be involved in this drug titration; otherwise, the GP can take responsibility.

4. Follow existing guidelines to identify high-risk patients whose ACEI or ARB should be re-started in secondary care.

5. Patients previously stabilized on ACEI or ARB for chronic kidney disease with albuminuria (diabetes with albumin:creatinine ratio > 3 mg/mmol; hypertension with albumin:creatinine ratio >30 mg/mmol; albumin:creatinine ratio > 70 mg/mmol irrespective of hypertension or cardiovascular disease) should be re-started on these drugs unless there is a new contra-indication, for instance pre-treatment serum potassium > 5 mmol/L (NICE CG182).

6. For patients previously stabilized on drugs for the treatment of essential hypertension, the episode of AKI should prompt review of the antihypertensive strategy. All patients should attend their GP's surgery for review within 6 weeks of discharge. Blood pressure should be re-checked, ideally with home or ambulatory blood pressure monitoring, to inform decisions about whether resumption of antihypertensive therapy is required.

    a. For patients previously stabilized on a single BP-lowering drug, therapy should be brought into line with NICE/BHS guidance CG127 as applied to patients being started on BP-lowering treatment:

        i. Patients over the age of 55 and black people of African or Afro- Caribbean family origin should be offered a calcium channel blocker as first line treatment, even if they were previously stabilized on an ACEI or ARB.

        ii. All other patients previously on an ACEI or ARB for hypertension should be re-started on their original drug treatment unless they have serum potassium > 5 mmol;/l, or are at risk of recurrent hypovolaemia (e.g. high volume ileostomy) in which case alternatives should be considered. Serum creatinine and potassium should be re-measured 1-2 weeks after re-starting and any subsequent dose titration, as for use in other settings.

    b. If a patient is left off treatment (for instance, if clinic BP is <140/90 or home BP <130/85), further follow-up should be offered for at least 12 months, as it may take some time for blood pressure to return to previous levels after recovery from acute illness.

7. All of the above should be applied in a holistic manner, taking into account the overall functional status of the patient. As in other settings, patients and carers should be involved in decisions about drug treatment and given the best available information about the risks and benefits of each option.

For more information on AKI and for resources on its prevention, detection, treatment and management created specifically for primary care visit https://www.thinkkidneys.nhs.uk/aki/resources/primary-care

Appendix Four

Acute Kidney Injury: Resources for Primary Care

The resources designed to help primary care manage AKI are all online and can be accessed by clicking on the document titles below, which are hyperlinks

- **Best Practice Guidance - Responding to AKI Warning Stage Test Results in Primary Care** Highlighting key factors to consider when responding to results for adults in primary care, covering for example the stages of AKI, history of acute illness, co-morbidities and risk factors. https://www.thinkkidneys.nhs.uk/aki/resources/primary-care/responding-aki-warning-stage-test-results-primary-care/

- **Recommended Response Times to AKI Warning Stage Test Results for Adults in Primary Care – Table 1.** This at-a-glance resource explains what actions to take when, when to treat or when to refer. https://www.thinkkidneys.nhs.uk/aki/resources/primary-care/recommended-response-times-aki-warning-stage-test-results-adults-primary-care-table-1/

- **Recognising and Responding to AKI in Primary Care – Table 2** Understanding cause, possible medication factors, fluid volume status and options for review https://www.thinkkidneys.nhs.uk/aki/resources/primary-care/recognising-responding-aki-primary-care-table-2/

- **Guidelines for Medicines Optimisation in Patients with AKI** Points to note and factors to consider in the medicines management of patients either with, or at risk of AKI. For example, which medications should or should not be suspended, which may be used with caution and alternative therapeutic options. https://www.thinkkidneys.nhs.uk/aki/medicines-optimisation-for-aki/

- **Quick Guide to Potentially Problematic Drugs and Actions to Take in Primary Care https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2016/07/Primary-Care-Advice-for-medication-review-in-AKI-.pdf**

- **When or if to re-start drugs after an episode of AKI https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2016/02/When-to-restart-drugs-stopped-during-AKI-final.pdf**

- **Changes in kidney function and serum potassium during ACEI/ARB/diuretic treatment in primary care** Advice to monitoring of pharmacotherapy in clinically stable patients - changes in kidney function and serum potassium during ACEI/ARB/diuretic treatment in primary care https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2016/02/Changes-in-kidney-function-during-ACEI-ARB-diuretic.pdf

- **Patient Leaflets** – for 1) patients at risk of AKI, and 2) a patient who has had an episode of AKI https://www.thinkkidneys.nhs.uk/aki/resources/primary-care/

- **A short film on AKI and primary care https://www.thinkkidneys.nhs.uk/aki/videos/acute-kidney-injury-in-primary-care/**

- **Statement on 'Sick Day Guidance' from Think Kidneys https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2015/07/Think-Kidneys-Sick-Day-Guidance-v8-131115.pdf**

- **Communities at Risk of Developing AKI – publication detailing those most at risk of AKI https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2015/07/Communities-at-risk-v16.pdf**

- **Understanding what the public know about their kidneys –** report of low awareness and understanding of kidneys, their function and how to keep them healthy https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2015/01/Think-Kidneys-Report-Understanding-what-the-public-know-Nov-15.pdf

- **Why measure AKI data?** Background to the patient safety alert for AKI and prevalence https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2015/07/Why-measure1.pdf

Other resources

- The NIH National Kidney Disease Education Program, US has developed various resources including the following animation: **https://www.youtube.com/embed/dXegerFJgCs?autoplay=1**

- NHS Wessex Strategic Clinical Networks, Acute Kidney Injury Primary Care Top Ten Tips: **http://www.wessexscn.nhs.uk/files/2814/3556/8667/CS40977_Wessex_AKI_Primary_Care_Top_Ten_Tips_A4_FINAL_WEB.pdf**