

Acute kidney injury

Quality standard

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This standard is based on NG148.

This standard should be read in conjunction with QS72, QS5, QS15, QS66, QS9, QS195 and NG107.

Quality statements

Statement 1 Children, young people and adults who are at risk of acute kidney injury are given advice on maintaining kidney health. **[2014, updated 2023]**

Statement 2 Children, young people and adults admitted to hospital who are at risk of acute kidney injury have their serum creatinine level monitored. **[2014, updated 2023]**

Statement 3 Adults with an acute kidney injury warning stage 2 test result have a clinical review within 6 hours if they are acutely ill or admitted to hospital, or within 24 hours if they are clinically stable. **[new 2023]**

Statement 4 Adults with an acute kidney injury warning stage 3 test result have a clinical review within 6 hours or, if they are acutely ill in the community, an immediate review to consider admission to hospital. **[new 2023]**

Statement 5 Children, young people and adults with acute kidney injury who meet the criteria for renal replacement therapy are referred immediately to a nephrologist or, if appropriate, a critical care specialist. **[2014, updated 2023]**

Statement 6 Adults discharged from hospital after acute kidney injury have a clinical review within 3 months, or sooner if they are at higher risk of poor outcomes. **[new 2023]**

In 2023, this quality standard was updated, and statements prioritised in 2014 were updated (2014, updated 2023) or replaced (new 2023). For more information, see [update information](#).

The [previous version of the quality standard for acute kidney injury](#) is available as a pdf.

Quality statement 1: Raising awareness in people at risk

Quality statement

Children, young people and adults who are at risk of acute kidney injury are given advice on maintaining kidney health. **[2014, updated 2023]**

Rationale

Many people at risk of acute kidney injury do not know about the potential causes or what they can do to reduce their risk. If people are aware of the risks and how to maintain their kidney health, they may be able to prevent acute kidney injury. Providing advice to people who are at risk of acute kidney injury, and their families and carers, may help to reduce the number of people developing acute kidney injury (both in the community and while in hospital) and admitted to hospital with it.

Quality measures

The following pragmatic measure is suggested to help assess the quality of care or service provision specified in the statement. It is an example of how the statement can be measured, and can be adapted and used flexibly.

Process

Proportion of people with chronic kidney disease (estimated glomerular filtration rate [eGFR] less than 60 ml/min/1.73 m²), diabetes, heart failure, dementia, a learning disability or a previous episode of acute kidney injury who were given advice on maintaining kidney health at their most recent annual health review.

Numerator – the number in the denominator who were given advice on maintaining kidney health at their most recent annual health review.

Denominator – the number of people with chronic kidney disease (eGFR less than 60 ml/

min/1.73 m²), diabetes, heart failure, dementia, a learning disability or a previous episode of acute kidney injury.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records.

What the quality statement means for different audiences

Service providers (such as GP practices, pharmacies and hospitals) ensure that processes are in place for people who are at risk of acute kidney injury, and their families and carers if appropriate, to be given advice on maintaining kidney health. This could be included as part of annual health reviews for people with chronic kidney disease, diabetes, heart failure, dementia, a learning disability or a previous episode of acute kidney injury.

Healthcare professionals (such as GPs, pharmacists, nurses and advanced clinical practitioners) provide advice on maintaining kidney health to people at risk of acute kidney injury, and their families and carers if appropriate. This can be done at annual health reviews for people with chronic kidney disease, diabetes, heart failure, dementia, a learning disability or a previous episode of acute kidney injury.

Commissioners (integrated care boards and NHS England) ensure that they commission services that provide advice on maintaining kidney health to people at risk of acute kidney injury, and their families and carers if appropriate.

People who are at risk of acute kidney injury, and their family and carers if appropriate, are given advice about how to keep their kidneys healthy. This should include explaining possible causes of acute kidney injury (for example, dehydration caused by diarrhoea and vomiting, and certain drugs that can affect the kidneys) and what they can do to avoid it.

Source guidance

Acute kidney injury: prevention, detection and management. NICE guideline NG148 (2019), recommendation 1.6.4

Definitions of terms used in this quality statement

People at risk of acute kidney injury

An increased risk of acute kidney injury is associated with a range of chronic and acute conditions, medicines and social factors. Risk factors for adults are identified in the [NICE clinical knowledge summary on acute kidney injury, risk factors](#). Risk factors for children are identified in [Think Kidneys' guidance for clinicians managing children at risk of, or with, acute kidney injury](#), section 5.

Advice on maintaining kidney health

Healthcare professionals should discuss the potential causes of acute kidney injury and how people at risk can maintain their kidney health. The potentially preventable causes of acute kidney injury include conditions leading to dehydration (for example, diarrhoea and vomiting) and drugs that can cause or exacerbate kidney injury (including over-the-counter NSAIDs [non-steroidal anti-inflammatory drugs]). Healthcare professionals should offer written information such as [Kidney Care UK's leaflet, At risk of kidney disease? Keeping your kidneys safe](#). [[NICE's guideline on acute kidney injury](#), recommendation 1.6.4, and [NICE's clinical knowledge summary on acute kidney injury](#), prevention of acute kidney injury]

Equality and diversity considerations

Healthcare professionals should be aware that some groups of people are at higher risk of dehydration because of their reliance on others to maintain adequate fluid intake. This may include young children, frail older people, people with neurological or cognitive impairment or disability, and people with physical disabilities. Healthcare professionals should share advice on maintaining kidney health with families and carers where appropriate.

People should be given information that they can easily access and understand themselves, or with support, so they can communicate effectively with healthcare services. Clear language should be used, and the content and delivery of information should be tailored to individual needs and preferences. It should be accessible to people who do not speak or read English, and it should be culturally appropriate. For people with additional needs related to a disability, impairment or sensory loss, information should be provided as set out in [NHS England's Accessible Information Standard](#) or the equivalent

standards for the devolved nations.

Quality statement 2: Identifying acute kidney injury in people admitted to hospital

Quality statement

Children, young people and adults at risk of acute kidney injury who are admitted to hospital have their serum creatinine level monitored. **[2014, updated 2023]**

Rationale

Acute kidney injury is a clinical syndrome with multiple causes. People with acute kidney injury may have no external signs or symptoms, and their kidney function can deteriorate rapidly, so identifying people who are at risk and monitoring their clinical condition is important. Early assessment for acute kidney injury in people at risk who are admitted to hospital may prevent delays in providing effective care, leading to improved outcomes. Monitoring serum creatinine levels in people who are likely to need blood tests for other reasons is inexpensive and easy to do with rapidly available results.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Process

a) Proportion of hospital stays for children, young people and adults at risk of acute kidney injury in which serum creatinine level is measured on admission.

Numerator – the number in the denominator in which serum creatinine level is measured on admission.

Denominator – the number of hospital stays for children, young people and adults at risk of acute kidney injury.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records.

b) Proportion of hospital stays for children, young people and adults at risk of acute kidney injury in which serum creatinine level is rechecked following admission.

Numerator – the number in the denominator in which serum creatinine level is rechecked following admission.

Denominator – the number of hospital stays for children, young people and adults at risk of acute kidney injury.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records.

Outcome

Length of hospital stay with an episode of acute kidney injury.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records. [NHS Digital's Hospital Episode Statistics](#) includes length of stay.

What the quality statement means for different audiences

Service providers (hospitals) ensure that systems are in place for children, young people and adults at risk of acute kidney injury who are admitted to hospital to have their serum creatinine level measured on admission and rechecked at a frequency appropriate to their individual clinical need.

Healthcare professionals (such as doctors, nurses and pharmacists) measure the serum creatinine level in children, young people and adults at risk of acute kidney injury who are admitted to hospital and recheck it at a frequency appropriate to their individual clinical

need.

Commissioners (integrated care boards) ensure that they commission services that monitor the serum creatinine level in children, young people and adults at risk of acute kidney injury who are admitted to hospital.

Children, young people and adults at risk of acute kidney injury who are admitted to hospital have a blood test when they are admitted to measure the amount of creatinine in their blood. This shows how well their kidneys are working. This is repeated during their stay so that healthcare professionals can take action if any changes are found.

Source guidance

Acute kidney injury: prevention, detection and management. NICE guideline NG148 (2019), recommendations 1.1.1, 1.1.2 and 1.3.2

Definitions of terms used in this quality statement

Children, young people and adults at risk of acute kidney injury who are admitted to hospital

Adults at risk of acute kidney injury who are admitted to hospital include those:

- who have non-elective admissions
- who have any major planned interventions, such as interventional radiological procedures (including coronary angiography) and grade 3 or grade 4 surgery, neurosurgery or cardiovascular surgery (see NICE's guideline on routine preoperative tests for elective surgery for definitions of surgery grades).

[Expert opinion]

Additionally, people with acute illness in hospital are at risk of acute kidney injury if any of the following are likely or present:

- chronic kidney disease (adults with an estimated glomerular filtration rate [eGFR] less than 60 ml/min/1.73 m² are at particular risk)

- heart failure
- liver disease
- diabetes
- history of acute kidney injury
- oliguria (urine output less than 0.5 ml/kg/hour)
- young age, neurological or cognitive impairment or disability, which may mean limited access to fluids because of reliance on a parent or carer
- hypovolaemia
- use of drugs that can cause or exacerbate kidney injury (such as non-steroidal anti-inflammatory drugs [NSAIDs], aminoglycosides, angiotensin-converting enzyme [ACE] inhibitors, angiotensin II receptor antagonists [ARBs] and diuretics) within the past week, especially if the person is hypovolaemic. For further information on high-risk medicines, see [Think Kidneys' guidelines on medicines optimisation for AKI](#), section 3.
- use of iodine-based contrast media within the past week in adults
- symptoms or history of urological obstruction, or conditions that may lead to obstruction
- sepsis
- deteriorating paediatric or adult early warning scores
- age 65 years or over.

There is also a risk of acute kidney injury if any of the following are likely or present in children and young people with acute illness:

- severe diarrhoea (children and young people with bloody diarrhoea are at particular risk)
- symptoms or signs of nephritis (such as oedema or haematuria)
- haematological malignancy
- hypotension.

[[NICE's guideline on acute kidney injury](#), recommendations 1.1.1 and 1.1.2]

Monitoring serum creatinine level

Monitor serum creatinine regularly using a blood test for all adults, children and young people at risk of acute kidney injury. Frequency of repeat monitoring should be tailored to individual clinical need. [Adapted from [NICE's guideline on acute kidney injury](#), recommendation 1.3.2]

Clinical laboratories should use creatinine assays that are specific (for example, enzymatic assays) and zero-biased compared with isotope dilution mass spectrometry (IDMS). [[NICE's guideline on chronic kidney disease](#), recommendation 1.1.2]

NHS England has mandated a [national acute kidney injury algorithm](#) which, when integrated within laboratory information management systems, identifies potential cases of acute kidney injury using laboratory data in real time and produces an acute kidney injury warning stage test result to inform clinical teams.

Quality statement 3: Response to acute kidney injury warning stage 2 test result

Quality statement

Adults with an acute kidney injury warning stage 2 test result have a clinical review within 6 hours if they are acutely ill or admitted to hospital, or within 24 hours if they are clinically stable.**[new 2023]**

Rationale

NHS England has mandated a [national acute kidney injury algorithm](#) which, when integrated within laboratory information management systems, identifies potential cases of acute kidney injury using laboratory data in real time and produces an acute kidney injury warning stage test result to inform clinical teams. Timely and effective communication of and response to an acute kidney injury warning stage 2 test result (current creatinine is 2 or more times the baseline level) will prevent delays in treatment and improve outcomes. An acute kidney injury warning stage 2 test result should prompt an urgent clinical review to determine the management approach. The precise timing of the review should be tailored to the clinical context.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are included for quality improvement purposes only; in practice some patients may require a more rapid response based on acute kidney injury risk factors and clinical features. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence of processes for pathology providers to communicate acute kidney injury warning stage test results urgently to primary and secondary care clinicians.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example, service protocols.

Process

The time frames included in these measures are dependent on timely communication of acute kidney injury warning stage test results to clinicians responsible for follow-up.

a) Proportion of acute kidney injury warning stage 2 test results for adults admitted to hospital that are followed up by a clinical review within 6 hours of the reported result.

Numerator – the number in the denominator that are followed up by a clinical review within 6 hours of the reported result.

Denominator – the number of acute kidney injury warning stage 2 test results for adults admitted to hospital.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records or local monitoring systems.

b) Proportion of acute kidney injury warning stage 2 test results for adults who are acutely ill in the community that are followed up by a clinical review within 6 hours of the reported result.

Numerator – the number in the denominator that are followed up by a clinical review within 6 hours of the reported result.

Denominator – the number of acute kidney injury warning stage 2 test results for adults who are acutely ill in the community.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records or local monitoring systems.

c) Proportion of acute kidney injury warning stage 2 test results for adults who are clinically stable in the community that are followed up by a clinical review within 24 hours of the reported result.

Numerator – the number in the denominator that are followed up by a clinical review within 24 hours of the reported result.

Denominator – the number of acute kidney injury warning stage 2 test results for adults who are clinically stable in the community.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records or local monitoring systems.

Outcome

a) Progression of acute kidney injury.

Data source: UK Renal Registry data portal includes the number of acute kidney injury episodes by stage at start and end of episode.

b) 30-day mortality associated with acute kidney injury.

Data source: Mortality statistics from the Office for National Statistics.

What the quality statement means for different audiences

Service providers (such as laboratories, hospitals, GP practices, out-of-hours services and community pharmacists) ensure systems are in place to communicate acute kidney injury warning stage test results urgently to primary and secondary care clinicians. Providers ensure processes are in place for adults with an acute kidney injury warning stage 2 test result to have a clinical review within 6 hours if they are acutely ill or admitted to hospital, or within 24 hours if they are clinically stable.

Healthcare professionals (such as doctors, pharmacists and nurses) carry out a clinical review for adults with an acute kidney injury warning stage 2 test result within 6 hours if they are acutely ill or admitted to hospital, or within 24 hours if they are clinically stable.

Commissioners (integrated care boards and NHS England) ensure that the services they commission have agreed processes for urgent communication of acute kidney injury

warning stage test results. They also have follow-up processes and time frames for clinical review of adults with an acute kidney injury warning stage 2 test result.

Adults with blood test results that show an acute kidney injury warning stage 2 are seen by a healthcare professional urgently for further assessment and to plan how to manage their condition.

Source guidance

- [Acute kidney injury toolkit. Royal College of General Practitioners](#) [accessed March 2023]
- [Acute kidney injury. NICE clinical knowledge summary](#) (2021), diagnosis: responding to AKI warning stage test results
- [Acute kidney injury. The UK Kidney Association \(formerly the Renal Association\) clinical practice guideline](#) (2019), guideline 5.1 and audit measures 12 to 14
- [Acute kidney injury: Responding to AKI warning stage test results for adults in primary care. Think Kidneys best practice guidance](#) (2018)

Definitions of terms used in this quality statement

Clinical review

The [UK Kidney Association's \(formerly the Renal Association\) guideline on acute kidney injury](#), audit measures 12 to 14, identify physiological assessment, documented volume assessment and documented medication review as priorities following an acute kidney injury warning stage test result in secondary care.

The approach to clinical review in primary care is described in [Think Kidneys' resource on responding to AKI warning stage test results in primary care](#).

For specific information on medication review for adults with acute kidney injury see [Think Kidneys' documents on acute kidney injury - potentially problematic drugs and actions to take in primary care](#) and [guidelines for medicines optimisation in patients with acute kidney injury](#). Information on dose adjustment in renal impairment is available from the [British National Formulary \(BNF\)](#) or the manufacturers' summary of product characteristics

(available at www.medicines.org.uk/emc). Healthcare professionals should seek specialist advice if unsure. [[NICE's clinical knowledge summary on acute kidney injury](#), management of acute kidney injury]

Equality and diversity considerations

Healthcare professionals should be aware that acute kidney injury is less likely to be identified in young adults under 30 and some minority ethnic groups. A timely and effective response to an acute kidney injury warning stage 2 test result will help to improve detection in these groups.

Quality statement 4: Response to acute kidney injury warning stage 3 test result

Quality statement

Adults with an acute kidney injury warning stage 3 test result have a clinical review within 6 hours or, if they are acutely ill in the community, an immediate review to consider admission to hospital. **[new 2023]**

Rationale

NHS England has mandated a [national acute kidney injury algorithm](#) which, when integrated within laboratory information management systems, identifies potential cases of acute kidney injury using laboratory data in real time and produces an acute kidney injury warning stage test result to inform clinical teams. Timely and effective communication of and response to an acute kidney injury warning stage 3 test result (current creatinine 3 or more times the baseline level, or creatinine 1.5 times baseline and more than 354 micromol/litre) will prevent delays in treatment and improve outcomes. An acute kidney injury warning stage 3 test result should prompt an urgent clinical review to determine the management approach or an immediate review to consider hospitalisation. The precise timing of the review should be tailored to the clinical context.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are included for quality improvement purposes only; in practice some patients may require a more rapid response based on acute kidney injury risk factors and clinical features. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence of processes for pathology providers to communicate acute kidney injury warning stage test results urgently to primary and secondary care clinicians.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example, service protocols.

Process

The time frames included in these measures are dependent on timely communication of acute kidney injury warning stage test results to clinicians responsible for follow-up.

a) Proportion of acute kidney injury warning stage 3 test results for adults who are admitted to hospital or clinically stable in the community that are followed up by a clinical review within 6 hours of the reported result.

Numerator – the number in the denominator that are followed up by a clinical review within 6 hours of the reported result.

Denominator – the number of acute kidney injury warning stage 3 test results for adults who are admitted to hospital or clinically stable in the community.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records or local monitoring systems.

b) Proportion of acute kidney injury warning stage 3 test results for adults who are acutely ill in the community that are followed up by an immediate review to consider admission to hospital.

Numerator – the number in the denominator that are followed up by an immediate review to consider admission to hospital.

Denominator – the number of acute kidney injury warning stage 3 test results for adults who are acutely ill in the community.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records or local monitoring systems.

Outcome

30-day mortality associated with acute kidney injury.

Data source: Mortality statistics from the Office for National Statistics.

What the quality statement means for different audiences

Service providers (such as laboratories, hospitals, GP practices, out-of-hours services and community pharmacists) ensure systems are in place to communicate acute kidney injury warning stage test results urgently to primary and secondary care clinicians. Providers ensure processes are in place for adults with an acute kidney injury warning stage 3 test result to have a clinical review within 6 hours or, if they are acutely ill in the community, an immediate review to consider admission to hospital.

Healthcare professionals (such as doctors, pharmacists and nurses) carry out clinical reviews for adults with an acute kidney injury warning stage 3 test result within 6 hours. If the person is acutely ill in the community, healthcare professionals carry out an immediate review to consider admission to hospital.

Commissioners (integrated care boards and NHS England) ensure that the services they commission have agreed processes for urgent communication of acute kidney injury warning stage test results. They also have follow-up processes and time frames for clinical review for adults with an acute kidney injury warning stage 3 test result.

Adults with blood test results that show an acute kidney injury warning stage 3 are seen by a healthcare professional urgently for further assessment and to plan how to manage their condition.

Source guidance

- Acute kidney injury toolkit. Royal College of General Practitioners [accessed March 2023]
- Acute kidney injury. NICE clinical knowledge summary (2021), diagnosis: responding to AKI warning stage test results

- [Acute kidney injury. The UK Kidney Association \(formerly the Renal Association\) clinical practice guideline \(2019\)](#), guideline 5.1 and audit measures 12 to 14
- [Acute kidney injury: Responding to AKI warning stage test results for adults in primary care. Think Kidneys best practice guidance \(2018\)](#)

Definitions of terms used in this quality statement

Clinical review

The [UK Kidney Association's \(formerly the Renal Association\) guideline on acute kidney injury](#), audit measures 12 to 14, identify physiological assessment, documented volume assessment and documented medication review as priorities following an acute kidney injury warning stage test result in secondary care.

The approach to clinical review in primary care is described in [Think Kidneys' resource on responding to AKI warning stage test results in primary care](#).

For specific information on medication review for adults with acute kidney injury see [Think Kidneys' documents on acute kidney injury - potentially problematic drugs and actions to take in primary care](#) and [guidelines for medicines optimisation in patients with acute kidney injury](#). Information on dose adjustment in renal impairment is available from the [British National Formulary \(BNF\)](#) or the manufacturers' summary of product characteristics (available at www.medicines.org.uk/emc). Healthcare professionals should seek specialist advice if unsure. [[NICE's clinical knowledge summary on acute kidney injury](#), management of acute kidney injury]

Equality and diversity considerations

Healthcare professionals should be aware that acute kidney injury is less likely to be identified in young adults under 30 and some minority ethnic groups. A timely and effective response to an acute kidney injury warning stage 3 test result will help to improve detection in these groups.

Quality statement 5: Referral for renal replacement therapy

Quality statement

Children, young people and adults with acute kidney injury who meet the criteria for renal replacement therapy are referred immediately to a nephrologist or, if appropriate, a critical care specialist. **[2014, updated 2023]**

Rationale

It is important that people with acute kidney injury who need and wish to have renal replacement therapy, receive it in the right care setting, at the right time and that delays are avoided. This can be achieved by immediate referral to a nephrologist, or to a critical care specialist if intensive care is needed. Having effective referral and transfer protocols that prioritise people with the greatest need will help ensure that people receive timely treatment. Prompt access to renal replacement therapy offers potential benefits, including shorter hospital stays, reduced mortality and improved long-term outcomes.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence that there is an agreed inter-hospital transfer standard in place to avoid delays in the transfer of people with acute kidney injury from referring hospitals to renal centres (where required).

Data source: Data can be collected from information recorded locally, such as a written transfer protocol.

Process

Proportion of children, young people and adults with acute kidney injury who meet the criteria for renal replacement therapy who are referred immediately to a nephrologist or critical care specialist.

Numerator – the number in the denominator who are referred immediately to a nephrologist or critical care specialist.

Denominator – the number of children, young people and adults with acute kidney injury who meet the criteria for renal replacement therapy.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records. Local areas may wish to add an exclusion for people who are in their last days of life.

Outcome

a) Time from referral of children, young people and adults with acute kidney injury who meet the criteria for renal replacement therapy to be seen by a nephrologist or critical care specialist.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records.

b) 30-day mortality associated with acute kidney injury.

Data source: Mortality statistics from the Office for National Statistics.

What the quality statement means for different audiences

Service providers (such as district general hospitals and specialised renal centres) ensure that clear referral pathways and transfer protocols are in place for the immediate referral of children, young people and adults with acute kidney injury who meet the criteria for renal replacement therapy to a nephrologist or, if appropriate, a critical care specialist.

Healthcare professionals (such as doctors) immediately refer children, young people and adults with acute kidney injury who meet the criteria for renal replacement therapy to a nephrologist or, if appropriate, a critical care specialist, and transfer them according to local protocols. Before referral, they discuss and agree with the person, and their family and carers if appropriate, that renal replacement therapy is a suitable treatment for them.

Commissioners (integrated care boards and NHS England) ensure that secondary care providers have clear referral pathways and transfer protocols in place for the immediate referral of children, young people and adults with acute kidney injury who meet the criteria for renal replacement therapy to a nephrologist or critical care specialist. Commissioners should work with NHS England, when necessary, to ensure that there is enough capacity within specialist nephrology teams for referrals.

Children, young people and adults with acute kidney injury who need renal replacement therapy (such as dialysis) discuss if it is suitable for them with their healthcare professional. If it is suitable and they wish to have the treatment, they are referred immediately to specialist services to avoid a delay in starting treatment.

Source guidance

Acute kidney injury: prevention, detection and management. NICE guideline NG148 (2019), recommendations 1.5.8 and 1.5.11

Definitions of terms used in this quality statement

Children, young people and adults with acute kidney injury

Acute kidney injury is detected in line with the (p)RIFLE (paediatric classification: risk, injury, failure, loss, end-stage renal disease), AKIN (Acute Kidney Injury Network) or KDIGO (Kidney Disease: Improving Global Outcomes) definitions, by using any of the following criteria:

- a rise in serum creatinine of 26 micromol/litre or greater within 48 hours
- a 50% or greater rise in serum creatinine known or presumed to have occurred within the past 7 days

- a fall in urine output to less than 0.5 ml/kg/hour for more than 6 hours in adults and more than 8 hours in children and young people
- a 25% or greater fall in estimated glomerular filtration rate (eGFR) in children and young people within the past 7 days.

[[NICE's guideline on acute kidney injury](#), recommendation 1.3.1]

An [NHS England endorsed algorithm for acute kidney injury](#) standardises the definition of acute kidney injury.

Criteria for renal replacement therapy

If any of the following are not responding to medical management:

- hyperkalaemia
- metabolic acidosis
- symptoms or complications of uraemia (for example, pericarditis or encephalopathy)
- fluid overload
- pulmonary oedema.

[[NICE's guideline on acute kidney injury](#), recommendation 1.5.8]

Immediate referral

Immediate referral by healthcare professionals is needed to ensure timely initiation of therapy. Effective and timely referral should be made using locally developed referral and transfer protocols. These protocols should be based on the [National Early Warning Score \(NEWS\) 2](#) to ensure that people who meet the criteria for renal replacement therapy are seen by a suitable specialist and that there is appropriate triage of people with acute kidney injury, including those arriving from other hospitals. [Expert opinion]

Quality statement 6: Clinical review after hospital discharge

Quality statement

Adults discharged from hospital after acute kidney injury have a clinical review within 3 months, or sooner if they are at higher risk of poor outcomes. **[new 2023]**

Rationale

Adults discharged from hospital after acute kidney injury are at risk of serious ongoing health problems. A follow-up clinical review in primary or secondary care will help identify any issues and may prevent hospital readmission. Adults with a higher risk of poor outcomes may need an earlier review, for example, those with heart failure and poor kidney recovery may need a review within a few days of discharge.

Using a coordinated follow-up system across primary and secondary care can help ensure that it is clear where and when the review will take place. The timing of the review should take into account any other long-term conditions, and reflect the causes of the acute kidney injury, its severity and duration, and the degree of kidney recovery at discharge.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence that hospital discharge plans clearly identify an episode of acute kidney injury and include recommendations on timing and responsibility for follow-up clinical review.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example, service protocols and discharge

plans.

Process

Proportion of people discharged from hospital after acute kidney injury who have a clinical review within 3 months of discharge.

Numerator – the number in the denominator who have a clinical review within 3 months of discharge.

Denominator – the number of people discharged from hospital after acute kidney injury.

Data source: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example from patient records.

Outcome

a) Emergency readmissions to hospital within 30 days of discharge after acute kidney injury.

Data source: [NHS Digital's Hospital Episode Statistics](#).

b) Emergency readmissions to hospital within 90 days of discharge after acute kidney injury.

Data source: [NHS Digital's Hospital Episode Statistics](#).

What the quality statement means for different audiences

Service providers (hospitals and GP practices) ensure that hospital discharge procedures for adults after an episode of acute kidney injury include risk assessment and discharge plans with clear actions for the timing and setting for clinical review. Providers ensure that people discharged from hospital after acute kidney injury have a follow-up clinical review within 3 months of discharge or sooner if they are at higher risk of poor outcomes.

Healthcare professionals (such as doctors, nurses and pharmacists) carry out clinical

reviews for people discharged from hospital after acute kidney injury within 3 months of discharge or sooner if they are at higher risk of poor outcomes.

Commissioners (integrated care boards) ensure that the services they commission carry out clinical reviews for people discharged from hospital after acute kidney injury within 3 months of discharge or sooner if they are at higher risk of poor outcomes.

People discharged from hospital after acute kidney injury have a review with their healthcare professional within 3 months of leaving hospital. Some people may be seen sooner, depending on their other health problems and how well their kidneys have recovered. The review will include assessing their medication, checking their kidney function and discussing how to maintain their kidney health.

Source guidance

- [Acute kidney injury. The UK Kidney Association \(formerly the Renal Association\) clinical practice guideline \(2019\), guideline 10.1](#)
- [Acute kidney injury toolkit. Royal College of General Practitioners \[accessed March 2023\]](#)

Definitions of terms used in this quality statement

People discharged from hospital after acute kidney injury

All people discharged from hospital after an episode of acute kidney injury that occurred during their hospital stay, including those who were admitted to hospital for another reason. [Expert opinion]

Clinical review within 3 months or sooner

The review should include:

- A medication review, including reviewing the need for long-term medications stopped during an episode of acute kidney injury. For more information see [Think Kidneys' When or if to restart ACEI, ARB, diuretics and other antihypertensive drugs after an episode of AKI](#).

- Starting the plan for ongoing monitoring of kidney function.
- Providing information and advice on maintaining kidney health (see [statement 1 definitions](#)).

[[Royal College of General Practitioners' Acute Kidney Injury toolkit](#), post-AKI care and [NICE's clinical knowledge summary on acute kidney injury](#), management of acute kidney injury]

Suggested time frames for general practice clinical review following acute kidney injury are included in the [Royal College of GPs' Acute Kidney Injury toolkit](#), post-AKI care, table 3.

A secondary care nephrology clinical review following acute kidney injury should be arranged:

- within 90 days for those with residual chronic kidney disease stage G4 at hospital discharge
- within 30 days for those with residual chronic kidney disease stage G5 (non-dialysis-requiring) at hospital discharge
- within 30 days for those with ongoing dialysis requirements at the time of hospital discharge.

[The [UK Kidney Association's \(formerly the Renal Association\) guideline on acute kidney injury](#), guideline 10.1. See table 1 in [NICE's guideline on chronic kidney disease](#) for details of the classification of chronic kidney disease]

Higher risk of poor outcomes

A higher risk of poor outcomes is associated with:

- heart failure
- chronic kidney disease
- cardiovascular risks including diabetes, hypertension and established cardiovascular disease
- indicators of vulnerability including recurrent acute kidney injury, cancer treatment, sepsis, critical care

- frailty (as defined in [NHS England's toolkit for general practice in supporting older people living with frailty](#))
- poor kidney recovery.

[[Royal College of GPs' Acute Kidney Injury toolkit](#), post-AKI care, table 3]

Equality and diversity considerations

Adults should be given information that they can easily access and understand themselves, or with support, so they can communicate effectively with healthcare services. Clear language should be used, and the content and delivery of information should be tailored to individual needs and preferences. It should be accessible to people who do not speak or read English, and it should be culturally appropriate. For people with additional needs related to a disability, impairment or sensory loss, information should be provided as set out in [NHS England's Accessible Information Standard](#) or the equivalent standards for the devolved nations.

Update information

March 2023: This quality standard was updated, and statements prioritised in 2014 were replaced. The topic was identified for update following discussion with NHS England's Renal Services Transformation Programme and the UK Kidney Association, which identified changes in the priority areas for improvement.

Statements are marked as:

- **[new 2023]** if the statement covers a new area for quality improvement
- **[2014, updated 2023]** if the statement covers an area for quality improvement included in the 2014 quality standard and has been updated.

The [previous version of the quality standard for acute kidney injury](#) is available as a pdf.

About this quality standard

NICE quality standards describe high-priority areas for quality improvement in a defined care or service area. Each standard consists of a prioritised set of specific, concise and measurable statements. NICE quality standards draw on existing NICE or NICE-accredited guidance that provides an underpinning, comprehensive set of recommendations, and are designed to support the measurement of improvement.

Expected levels of achievement for quality measures are not specified. Quality standards are intended to drive up the quality of care, and so achievement levels of 100% should be aspired to (or 0% if the quality statement states that something should not be done). However, this may not always be appropriate in practice. Taking account of safety, shared decision-making, choice and professional judgement, desired levels of achievement should be defined locally.

Information about [how NICE quality standards are developed](#) is available from the NICE website.

See our [webpage on quality standards advisory committees](#) for details about our standing committees. Information about the topic experts invited to join the standing members is available from the [webpage for this quality standard](#).

NICE has produced a [quality standard service improvement template](#) to help providers make an initial assessment of their service compared with a selection of quality statements. This tool is updated monthly to include new quality standards.

NICE guidance and quality standards apply in England and Wales. Decisions on how they apply in Scotland and Northern Ireland are made by the Scottish government and Northern Ireland Executive. NICE quality standards may include references to organisations or people responsible for commissioning or providing care that may be relevant only to England.

Resource impact

NICE quality standards should be achievable by local services. The potential resource impact is considered by the quality standards advisory committee, drawing on resource

impact work for the source guidance. Organisations are encouraged to use the [resource impact statement for the NICE guideline on acute kidney injury](#) to help estimate local costs.

Diversity, equality and language

Equality issues were considered during development and [equality assessments for this quality standard](#) are available. Any specific issues identified during development of the quality statements are highlighted in each statement.

Commissioners and providers should aim to achieve the quality standard in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity and foster good relations. Nothing in this quality standard should be interpreted in a way that would be inconsistent with compliance with those duties.

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Endorsing organisation

This quality standard has been endorsed by NHS England, as required by the Health and Social Care Act (2012)

Supporting organisations

Many organisations share NICE's commitment to quality improvement using evidence-based guidance. The following supporting organisations have recognised the benefit of the quality standard in improving care for patients, carers, service users and members of the public. They have agreed to work with NICE to ensure that those commissioning or providing services are made aware of and encouraged to use the quality standard.

- [Institute of Biomedical Science \(IBMS\)](#)
- [Royal College of Paediatrics and Child Health](#)
- [British Association for Paediatric Nephrology \(BAPN\)](#)
- [Society for Acute Medicine \(SAM\)](#)
- [Kidney Care UK](#)
- [UK Kidney Association](#)