

Acute kidney injury (AKI): use of medicines in people with or at increased risk of AKI

Key therapeutic topic

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www.nice.org.uk/guidance/ktt17

Key points

- Improving the care of people at risk of, or with, acute kidney injury (AKI) is one of the [Think Kidneys](#) national programmes.
- Medicines optimisation is important to reduce the risk of AKI and mitigate its severity if it occurs. An NHS Improvement [patient safety alert](#) has been issued to further raise awareness of AKI, signposting healthcare professionals to the [clinical resources](#) available on the Think Kidneys website.
- Options for local implementation:
 - Review and, if appropriate, optimise prescribing and local policies that relate to assessing the risk of AKI and preventing, identifying and managing it, to ensure these are in line with the NICE guideline on [AKI](#).

Evidence context

Renal function is vulnerable to quite modest reductions in blood pressure or blood volume, including dehydration arising from diarrhoea or vomiting. The NICE [full guideline](#) on acute kidney injury (AKI) notes that it is a common problem among people admitted to hospital (occurring in 13% to 18% of such people), especially older people. AKI is a feature of many severe illnesses, and patients are usually under the care of clinicians practising in specialties other than nephrology. In addition, AKI is seen increasingly in primary care in the absence of any acute illness.

Many drugs can be harmful to the kidneys especially in people with AKI or at risk of it for non-pharmacological reasons. In addition, other drugs – such as those with a narrow therapeutic range and those that are cleared by the kidneys – may cause toxicity in the setting of AKI and acute illness, requiring additional monitoring, dose adjustment and measurement of drug levels (see below for more details).

The NICE guideline on [AKI](#) gives guidance on the following areas:

- **Assessing the risk of AKI.** This includes investigating for AKI in people with acute illness who have predisposing risk factors, including recent use of drugs with nephrotoxic potential such as non-steroidal anti-inflammatory drugs (NSAIDs), aminoglycosides, renin-angiotensin system (RAS) drugs or diuretics, especially if the person is hypovolaemic. People with no clear acute component to their illness but certain other factors should also be investigated for AKI. People receiving iodinated contrast agents and people having surgery should have their risk of AKI assessed. The guideline notes that there is an increased risk of AKI if drugs with nephrotoxic potential are used in the perioperative period (in particular, NSAIDs after surgery).
- **Preventing AKI.** This includes following recommendations in the NICE guideline on [acutely ill patients in hospital](#) on using track and trigger systems (early warning scores) to identify adults who are at risk of AKI, and using similar systems for children and young people. The guideline recommends measures to reduce the risk of AKI in people receiving iodinated contrast agents who are at increased risk. It advises considering temporarily stopping RAS drugs in certain situations, and specifically advises health professionals to seek advice from a pharmacist about optimising medicines and drug dosing in all people with or at risk of AKI.
- **Detecting AKI and identifying its cause.** This includes monitoring serum creatinine in all people with or at risk of AKI.
- **Managing AKI.** The guideline makes specific recommendations about when loop diuretics may and may not be appropriate and recommends against using low-dose dopamine to treat AKI.
- **Information and support for patients and carers.** This includes discussing the risk of developing AKI with people at higher risk, particularly the risk associated with conditions leading to dehydration (for example, diarrhoea and vomiting) and drugs with nephrotoxic potential (including over-the-counter NSAIDs).

See the [guideline](#) for full details of the recommendations. NICE has also published a quality standard on [AKI](#), which is a concise set of prioritised statements designed to drive measurable quality improvements within this area. A NICE Pathway on [AKI](#) brings together everything NICE has said on AKI in an interactive flowchart.

The NHS programme to improve the care of people at risk of, or with, AKI is one of the [Think Kidneys](#) national programmes. Think Kidneys also includes the [Transforming Participation in Chronic Kidney Disease](#) programme and the [Kidney Quality Improvement Partnership](#). An NHS Improvement [patient safety alert](#) was issued in 2016 to further raise awareness of AKI, signposting healthcare professionals to [publications and tools](#) for different settings available on the Think Kidneys website. Among the tools are [guidelines for medicines optimisation in people with AKI](#), which include a list of high-risk medicines and appropriate related actions, and a checklist for medicines optimisation in people with AKI. There are also tools specifically addressing issues such as responding to AKI warning stage test results, drugs to be avoided or used with caution during an AKI episode and restarting drugs stopped during AKI.

An earlier NHS Improvement [patient safety alert](#) was issued in 2014 with the aim of standardising the early identification of AKI. It detailed how trusts in England should implement an automated laboratory algorithm to detect changes in serum creatinine concentration. Following this, Think Kidneys produced some [best practice guidance](#) on how this should be implemented and integrated in practice. The patient safety alert deliberately did not include urine output measures for the detection of AKI. In 2016, Think Kidneys issued a [position statement](#) detailing how a reduction in urine output (oliguria) may be used to detect AKI. Measuring oliguria may help to identify people with AKI earlier but requires urinary catheterisation, which poses its own risks, and as such the benefits should be weighed against the risks before implementation.

The [AKI section](#) of the Think Kidneys website also includes [educational resources](#) aimed at different health and social care professional groups, such as the Centre for Pharmacy Postgraduate Education's (CPPE) [learning campaign on acute kidney injury](#), and [information for the public](#). PrescQIPP has produced a bulletin on [CKD – implementing NICE guidance](#) that includes a section on AKI.

The Think Kidneys Programme Board issued an [interim position statement on sick day guidance](#) in July 2015, updated in 2018. The update notes that Think Kidneys no longer wishes to use the term 'sick day rules' but prefers the term 'sick day guidance'. This is because the former term may be unhelpful because it suggests a dogmatic approach to management instead of providing individualised advice. The interim position statement notes that although there is strong professional consensus that advice on sick day guidance should be given, the evidence that provision of such advice reduces net harm is very weak. It is possible that there are potential harms associated with widespread provision of sick day rules or guidance, particularly when people have not been clinically assessed and where it is unclear at what level of ill health the medicine should be discontinued. The Programme Board recommends that health professionals should discuss the possible causes of AKI with patients and carers including the need to maintain fluid balance during

episodes of acute illness. It advises that it is reasonable for clinicians to provide sick day guidance on temporary cessation of medicines to patients deemed at high risk of AKI based on an individual risk assessment. However, the Board considers that investment in a systematic approach to increase uptake of sick day guidance by patients should only be undertaken in the context of a formal evaluation.

The Think Kidneys Programme Board, together with the Renal Association and the British Society for Heart Failure, have also published a [position statement on changes in kidney function and serum potassium](#) during treatment with angiotensin-converting enzyme inhibitors, angiotensin receptor blockers and diuretics in primary care.

Practice examples and shared learning

There are several NICE [shared learning examples](#) relating to AKI, showing how NICE guidance and standards have been put into practice by some NHS organisations:

- [Linking NICE AKI quality standards with Think Kidneys resources.](#)
- [The establishment of an AKI service in a tertiary renal centre.](#)
- [Getting to the heart of AKI at Papworth.](#)
- [Delivering AKI education for nursing staff in the medical assessment unit, to support the earlier identification of AKI and to improve its initial management.](#)

Prescribing data, metrics or supporting resources

At this point, the following indicators have been identified to support this topic.

A [series of indicators](#) have been developed to inform safer prescribing practice to help pharmacists, clinicians and patients review prescribed medication and prevent harm. These include indicators about acute kidney injury.

Update information

September 2019: This topic was retained for the 2019 rapid update of medicines optimisation: key therapeutic topics. Minor editorial changes have been completed but no new content has been added.

About this key therapeutic topic

This document summarises the evidence base on this key therapeutic topic that has been identified to support medicines optimisation. **It is not formal NICE guidance.**

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