

HCA LABORATORIES:

ACUTE KIDNEY INJURY (AKI) USER GUIDE

AKI & THE AKI ALGORITHM

Acute kidney injury (AKI) is a sudden decline in renal function that affects fluid, electrolyte, and acid-base homeostasis which presents as elevated creatinine levels or reduced urine output. Early identification of AKI and its causes, followed by effective treatment, is essential for limiting clinical complications, preventing further kidney damage, and reducing kidney-related mortality.

The NHS AKI warning alert algorithm helps to identify potential cases of AKI at an early stage. It is not a diagnostic tool. The algorithm is an automated system programmed into the laboratory computer system which reviews historical serum creatinine results from the last 365 days to assess for changes in creatinine levels. Depending on the magnitude of the rise in serum creatinine, the algorithm will highlight potential cases of AKI Stage 1, 2 or 3. Detailed information on how the algorithm works is provided later in this document.

2025 UPDATE FOLLOWING TRANSITION TO NEW ELECTRONIC HEALTHCARE RECORD (EHR)

Due to a replacement of the EHR system (transition from Meditech Magic to Meditech Expanse) on 01/11/2025, a full creatinine result history from the last 365 days may not be available for all patients, due to limitations with data transfer to Expanse. If there is no full history available, the AKI algorithm may not work as intended.

The risks are as follows:

- (1) False positives – an AKI alert will generate but may be incorrect. The patient and their renal function should be reviewed.
- (2) False negatives – no AKI alert will generate: patient risk of AKI may be underestimated.

In people with acute illness, there may be risk of AKI. When reviewing creatinine results for your patients, please take note of the comments above and always examine results carefully, considering historical results to assess for any significant changes and review risk of AKI clinically.

In someone with no obvious acute illness, risk of AKI is low, but a diagnosis should be considered if someone presents with an illness with no clear acute component but who also has chronic kidney disease; new onset/significantly worsening urological symptoms; symptoms suggesting AKI; or symptoms/signs of a multi-system disease affecting the kidneys and other organ systems.

Note that after 01/11/2026, a full creatinine history (365 days) will be available and from this point, the AKI algorithm will work as expected.

HOW THE AKI ALGORITHM WORKS

- When creatinine is requested, the algorithm looks for the lowest creatinine value within the last week, as well as the median creatinine value in the previous 1 week - 1 year. No creatinine results >365 days are assessed by the algorithm. The lowest creatinine (from the last week, or from the median) is then used as the baseline value to compare with the current creatinine.
 - If the current creatinine has increased by **≥1.5x baseline** **or** by >26 µmol/L within 48 hours, then a reflex test Acute Kidney Injury Warning is automatically added to the patient report and automatically resulted as **STAGE 1**.
 - If current creatinine has increased by **≥2.0x** baseline then a reflex test Acute Kidney Injury Warning is automatically added and automatically resulted as **STAGE 2**.
 - If creatinine has increased by **≥3.0x** baseline then a reflex test Acute Kidney Injury Warning is automatically added and automatically resulted as **STAGE 3**.
 - A result can also be flagged as **STAGE 3** if creatinine has increased >1.5x baseline to >354 µmol/L.
 - In those <18 years, a result can be flagged as **STAGE 3** if the current creatinine result is >3x the age-related upper limit of the reference range.
- All Stage 1, 2 and 3 results are automatically highlighted as abnormal and the AKI flag attached to the report.
- If the current creatinine does not meet any of the criteria for AKI, then no AKI Warning test result is reported.

WHAT TO DO IF YOU RECEIVE AN ALERT

- If you receive a warning it is advisable to review the patient and their renal function – causes of AKI to consider include Sepsis/dehydration, Toxicity, Obstruction and Parenchymal renal disease – this is the **STOP** acronym used in the original Think Kidneys guidance. For further information on risk factors for AKI, please review the resources provided at the bottom of this page.
- Please note that the AKI Warning result is not diagnostic: false positives and false negatives can occur. It is simply a warning system to trigger a review of the patient.
- Sometimes the AKI warning is triggered in patients on haemodialysis or peritoneal dialysis depending on the timing of samples – the AKI warning is irrelevant in dialysis patients.

RESOURCES

- Further useful information can be found at:

NHS England information	https://www.england.nhs.uk/akiprogramme/
NICE guidance on AKI	https://www.nice.org.uk/guidance/ng148
Royal College of GPs AKI toolkit	https://www.rcgp.org.uk/aki
UK Kidney Association AKI resources	https://www.ukkidney.org/health-professionals/information-resources/acute-kidney-injury-resources
	https://education.ukkidney.org/course/aki-1