The role of the clinical lab in AKI

The role of the clinical laboratory in the detection and monitoring of acute kidney injury

- Establish a biochemical definition of AKI, to complement or assist clinical diagnosis.
- Help clinicians correctly interpret changes in laboratory test results and also to highlight test limitations.
- Creation of electronic alerts as the infrastructure (LIS) to implement them is available.

Makris K. The role of the clinical laboratory in the detection and monitoring of acute kidney injury. J Lab Precis Med 2018;3:69 doi: 10.21037/jlpm.2018.07.06

Acute kidney injury in real time: prediction, alerts, and clinical decision support

There are multiple points in the care of patients at risk of or greatly affected by AKI where real-time EHR-driven interventions may be appropriate.

- Providing actionable clinical decision support before the development of AKI.
- Development of 'best practice' guidelines and intelligent alerts that provide specific recommendations that take into account dynamic patient factors.
- EHR-based clinical support can help guide appropriate outpatient follow-up and monitor for a long-term renal recovery after AKI.

Wilson F, P, Greenberg J, H. Acute Kidney Injury in Real Time: Prediction, Alerts, and Clinical Decision Support. Nephron 2018;140:116-119. doi: 10.1159/000492064

Impact of electronic acute kidney injury (AKI) alerts with automated nephrologist consultation on detection and severity of AKI: a quality improvement study

After the implementation of the alert system:

- Overlooked AKI events reduced by 12%.
- Early consultation with a nephrologist increased 21%.
- Incidence of severe AKI decreased 4.5%.
- AKI recovery improved 24.7%.

Park S, Baek SH, Ahn S, Lee KH, et al. Impact of Electronic Acute Kidney Injury (AKI) Alerts With Automated Nephrologist Consultation on Detection and Severity of AKI: A Quality Improvement Study. Am J Kidney Dis. 2018;71(1):9-19. doi: 10.1053/j.ajkd.2017.06.008.

Electronic health record identification of nephrotoxin exposure and associated acute kidney injury

- AKI occurred in 31% exposure admissions.
- The EHR-driven SCr nephrotoxin-AKI surveillance process was associated with a 42% reduction in AKI intensity.

Goldstein SL, Kirkendall E, Nguyen H, et al. Electronic health record identification of nephrotoxin exposure and associated acute kidney injury. Pediatrics. 2013;132(3) e756-67. doi: 10.1542/peds.2013-0794

Urinary biomarker incorporation into the renal angina index early in intensive care unit admission optimizes acute kidney injury prediction in critically ill children: a prospective cohort study.

- Incorporation of urinary biomarkers into the RAI model predicts severe and persistent AKI with an AUC-ROC of 0.97

	SN	SP	AUC-ROC
RAI only	80	72	.80
uNGAL + RAI	86	85	.97

- Day_3 AKI is associated with worse clinical outcomes including ICU mortality, increased duration of ICU LOS, prolonged mechanical ventilation and was associated with a greater number of organ failure days than the absence of AKI.
- Testing of a biomarker in a targeted, risk-stratified patient (i.e. renal angina positive) offers a real-time predictive advantage for a treating clinician.

Menon S, Goldstein SL, Mottes T, et al. Urinary biomarker incorporation into the renal angina index early in intensive care unit admission optimizes acute kidney injury prediction in critically ill children: a prospective cohort study. Nephrol Dial Transplant. 2016;31(4):586–594. doi:10.1093/ndt/gfv457 | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6281075/