AKI Lab Alerts

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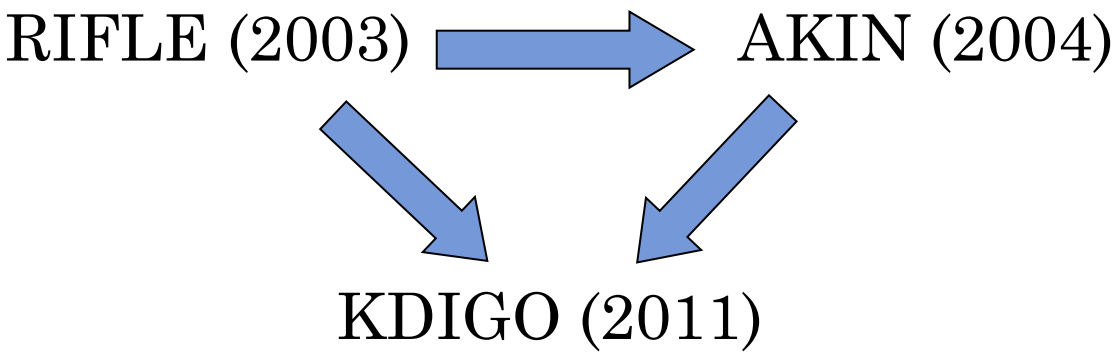
Diagnosis of AKI

- Acute = sudden decline in renal function
  - but how sudden?
  - how much of a decline?
- No clear consensus but recognition that early diagnosis and classification important
- Guidelines:



KDIGO – DEFINITION/STAGING

KDIGO (within 48 hours and 7 days)		
Stage	Serum creatinine (µmol/L)	Urine output
1	Crea ↑ 1.5x in 7 days Crea ↑ ≥ 26.5 µmol/L in 48 hrs	<0.5mL/kg/h for 6 hours
2	Crea ↑ 2x in 7 days	<0.5mL/kg/h for 12 hours
3	Crea ↑ 3x in 7 days Crea ≥ 354 and meets stage 1 criteria of acute injury. Initiation of RRT	<0.3mL/kg/h for 24 hours OR anuria for 12 hrs

National Kidney Programme

- Given early detection of AKI is important, and the poor performance in this area, a system was needed to alert Clinicians to developing AKI in real time
- NHS England developed a Nationally agreed algorithm for detecting AKI based on the KDIGO guidelines
- A Patient Safety Alert notice was issued stating that the NHS England algorithm must be implemented by 9th March 2015
  - For Secondary Care ONLY
- The Care Quality Commission (CQC) will enforce the use of the AKI warning algorithm

Algorithm summary

Stage	Serum Creatinine (µmol/L)
1	Crea ↑ ≥ 1.5x from baseline Crea ↑ ≥ 26 µmol/L in 48 hr
2	Crea ↑ ≥ 2x from baseline
3	Crea ↑ ≥ 3x from baseline Crea ≥ 354 and meets at least stage 1 criteria Crea > 3x Upper limit normal in <18 year old

Selecting baseline creatinine

- Algorithm looks at:
  1. Is there a previous creatinine within the last 0-7 days?
     - If yes, use the lowest creatinine in that time as the baseline for change

AND

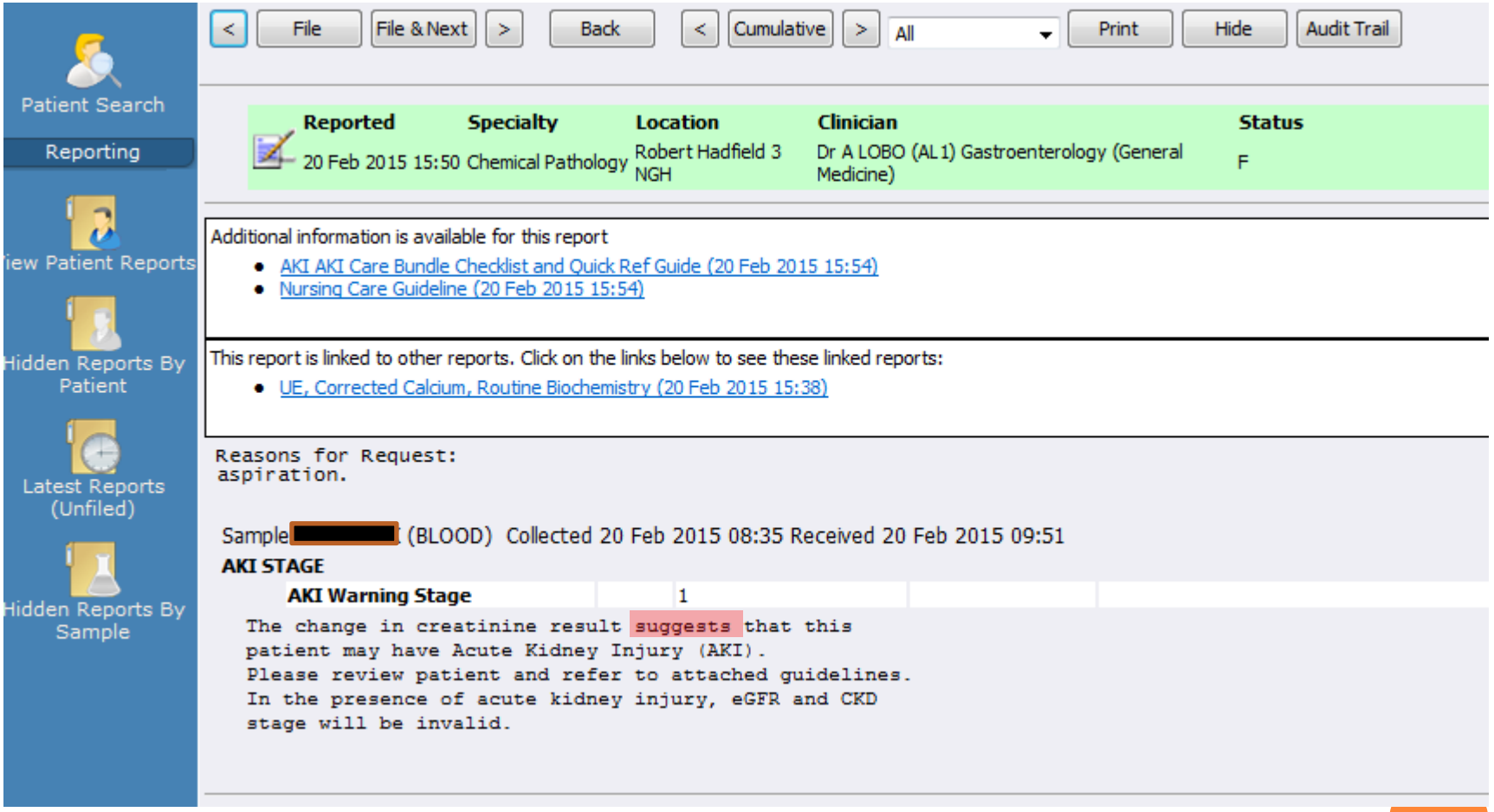
  2. Is there a previous creatinine within the last 8-365 days?
     - If yes, use the median creatinine over that time as the baseline for change

Report the highest (worst) stage generated from these 2 scenarios

Additional results

- AKI risk: AKI cannot be excluded as no baseline creatinine available within last year

What we report on ICE



Quick Reference AKI Summary Sheet and Referral Flow Chart

Risk of AKI

At risk patient = High Risk Group + Insult

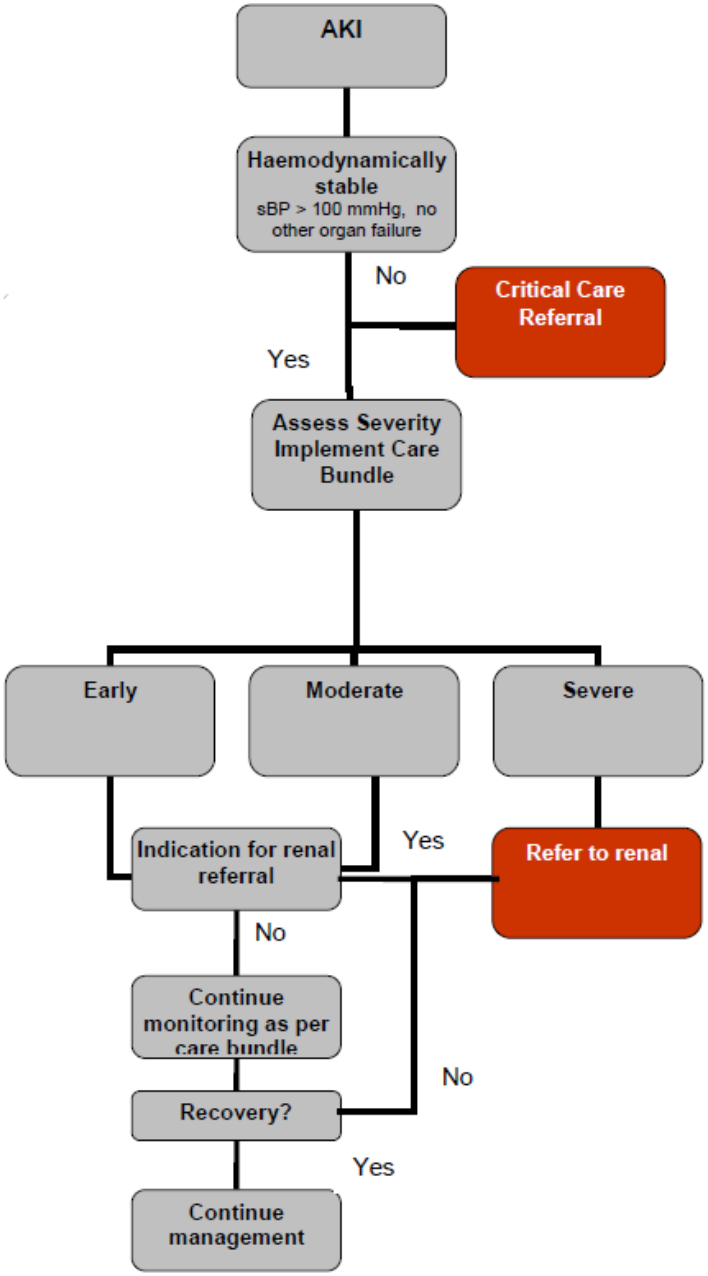
Those patients should be identified on admission or with every change in clinical status

High Risk Groups	Common Insults
CKD (especially diabetic and elderly)	Hypotension (absolute or relative)
CCF	Nephrotoxic medications
Multiple Myeloma	Iodinated contrast medium
	Sepsis

Risk increases with age, number of risk factors, number of insults / severity of acute illness and the presence of diabetes mellitus.

Defining AKI

Stage	Urine output	OR Relative Creatinine Rise	OR Absolute Creatinine / creatinine rise
I (Early)	less than 0.5 mL/kg/min for 6 hrs	1.5-2 fold rise	greater than 26 µmol/l
II (Moderate)	less than 0.5 mL/kg/min for 12 hours	2-3 fold rise	
III (Severe)	less than 0.5 mL/kg/min for 24 hours or anuria greater than 12 hr	greater than 3 fold rise	greater than 350 µmol/l (with a greater than 44 µmol/l acute increase)

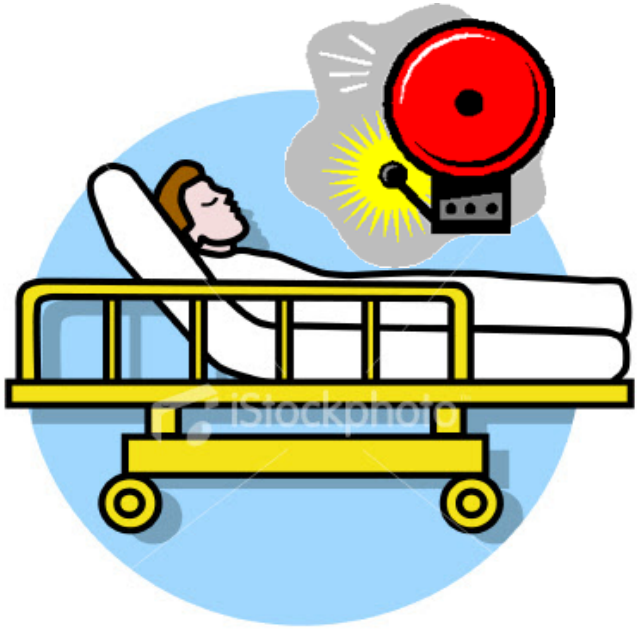


- False positives and negatives do occur but they are much much fewer than the true alerts
  - e.g. drip arm sample
- Alerts should always be acted upon!

- At STH a Renal profile is added on to all AKI 3's but if you need to add it to any others you can by using the clinical chemistry add-on online request form (on intranet)

- Generating e-alerts is a 2 step process:
  1. Detection of creatinine changes suggestive of AKI (using the algorithm)

  1. Alerting the clinicians to an AKI result
     - Results sent to hospitals' results reporting systems e.g. ICE
     - In the future we would like a more sophisticated electronic alert



More future plans

- Creatinine measurements outside of the lab
  - Point of care testing
    - A&E measure creatinine on their blood gas analysers and CT department on a point of care analyser
    - Ideally any creatinine measured on a patient would be included in the AKI algorithm
    - However, not all creatinine methods are comparable
    - Not always easy to get the results from these into the Lab IT system
  - Other hospital labs
    - Patients referred from outside Sheffield will have baseline creatinine levels at neighbouring labs
    - Similar issues as with POCT

Primary Care

- We don't currently report AKI alerts to GP's
- NHS England say this is part of phase 2 and should be in place by April 2016
- Education for GP's is required first

Thank you,
Any Questions?