

A discussion about developments in AKI (Acute kidney injury) care

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We have an Information leaflet, Consent form,
Questionnaire and some Post Its for you!

Agenda

- **Today is a mixture of CPD and Focus group**
- **The ‘Focus group’ is to ask what you want from our AKI services – this is part of our research**
- **We will record the discussion (anonymously) and would be grateful for your signed consent**
- Alerting for acute kidney injury will be introduced for HEFT lab GP users in April.
- Telephone advice (as always) and online guidance (new) will be available.
- From June for 5 months only we are piloting a dedicated AKI outreach service [we will phone you] for patients in the Heartlands area only as part of the NIHR sponsored AKORDD study.

Focus group

- The aim is to find out how best to assist you as GPs in managing AKI patients
- We have a very short 4 question questionnaire about the 'mechanics' of contacting you
- The group is recorded – any discussion is anonymised
- Participant information leaflet
- Please sign and date your Consent – initial boxes

Introduction: AKI in the community

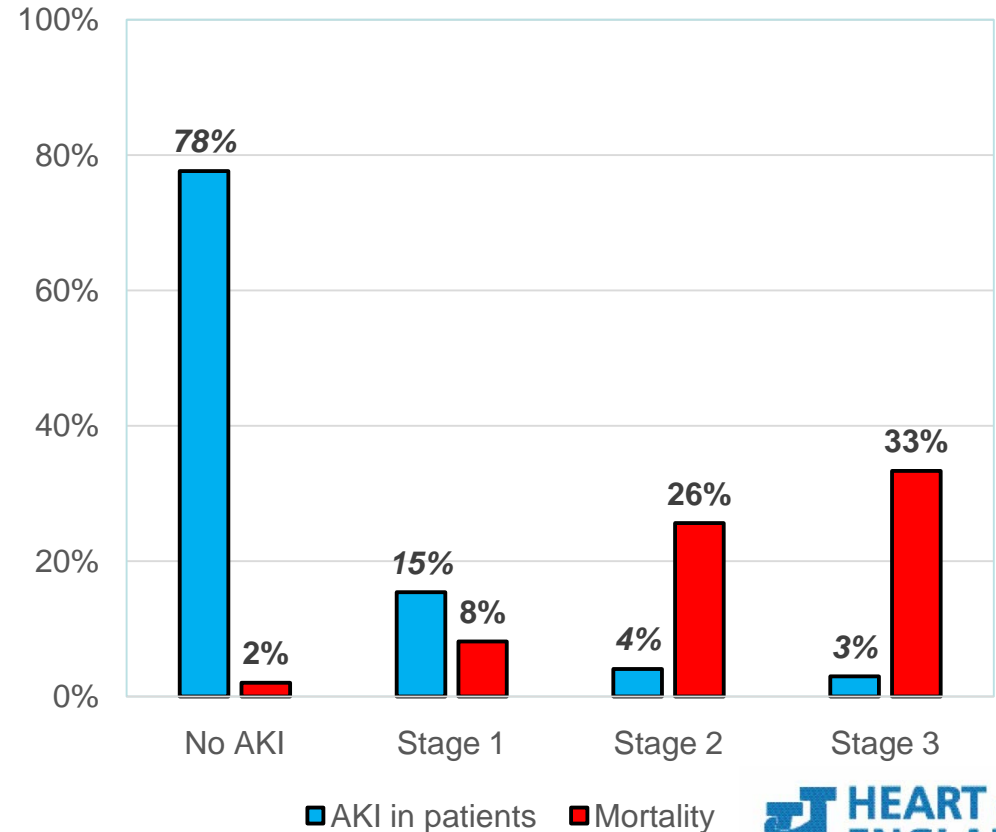
- About 20% of all adult emergency admissions to hospital develop some degree of AKI
- About 25% of those will die
- Many of the cases will start in the community
- It is the largest Cinderella condition in the NHS
- We need to catch and treat it early
- We want to talk to you briefly about this today:
 - plus a very short questionnaire and Post-It exercise

AKI in the UK

Bedford et al *BMC Nephrol* 2014; Kerr et al *Nephrol Dial Transplant* 2014

- About 40,000 excess deaths per year in England
 - compare with 35,000 deaths from lung cancer in UK
- E Kent data
 - replot of data
 - adults
 - 6 months in 2009
 - excluded maternity & day case
 - 22% with AKI
 - marked rise in mortality with increasing stage

AKI amongst patients with data



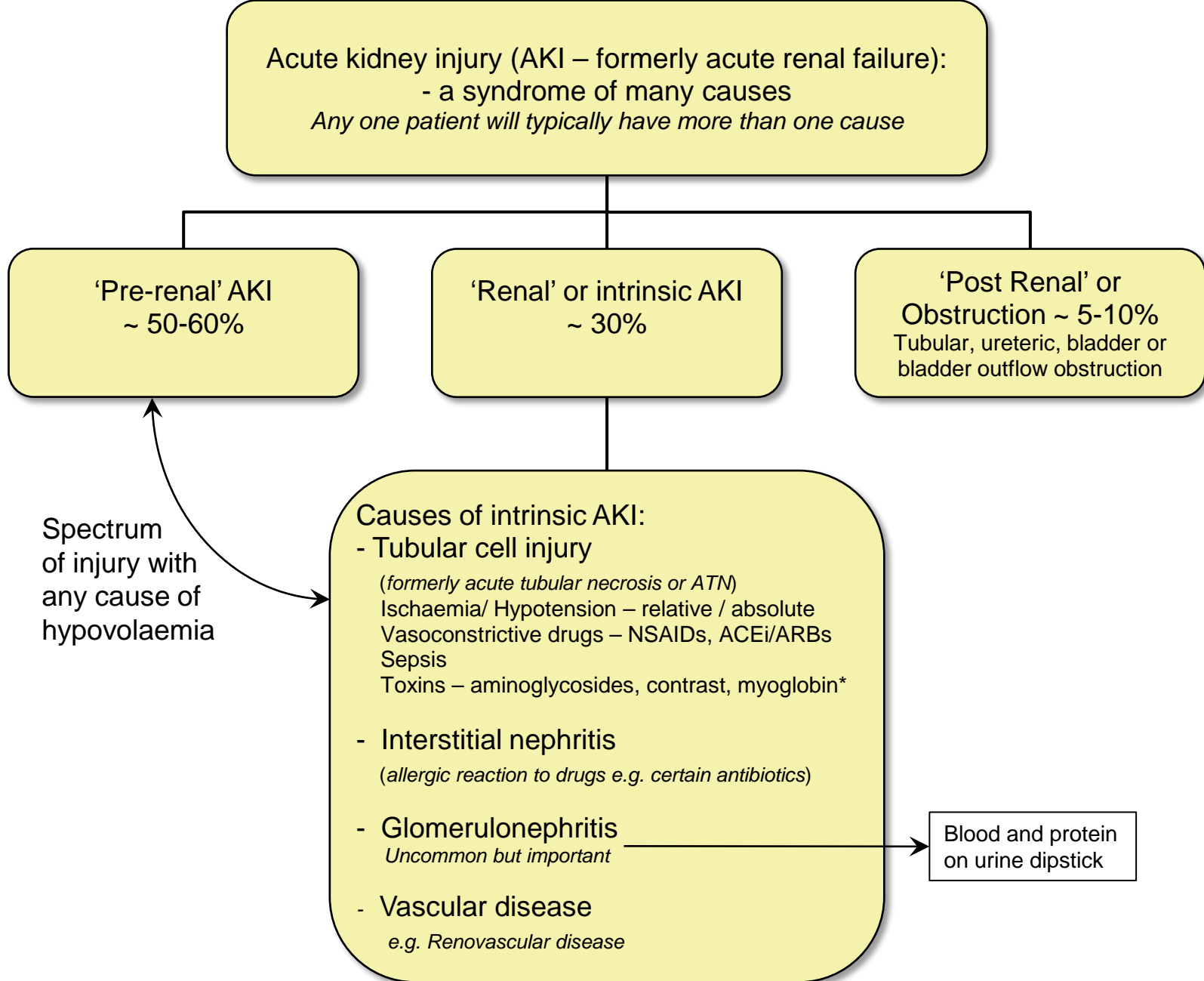
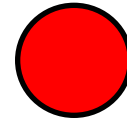


Figure 2: Causes of acute kidney injury (AKI). Note that AKI is now regarded as a spectrum of injury ranging from minimal to devastating.

NSAIDs - Non steroidal anti-inflammatory drugs; ACEi – Angiotensin converting enzyme inhibitors; ARB – Angiotensin receptor blockers; * Rhabdomyolysis

RENAL BLOOD FLOW AUTOREGULATION: THE KIDNEYS CAN REGULATE THEIR BLOOD FLOW ACROSS A CERTAIN RANGE



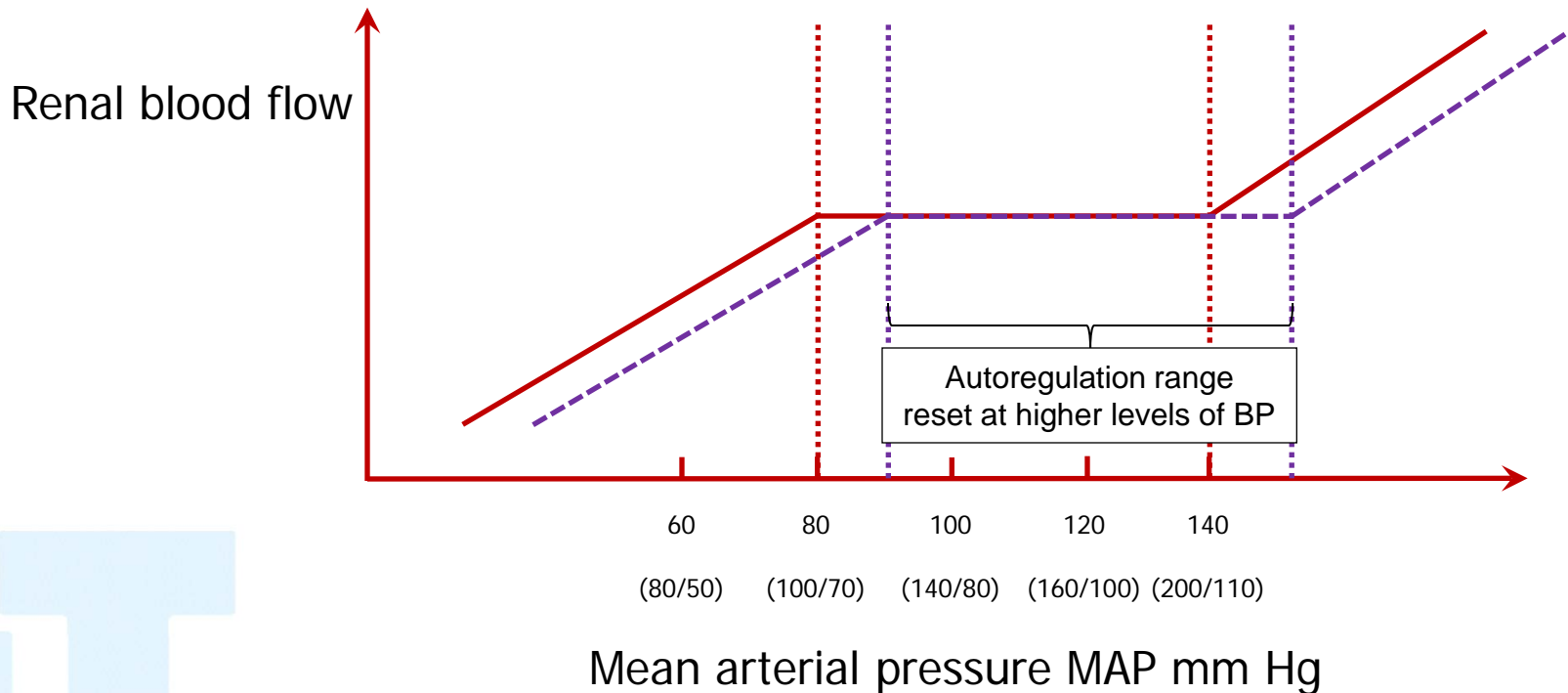
Maximal
vasodilation



Normal



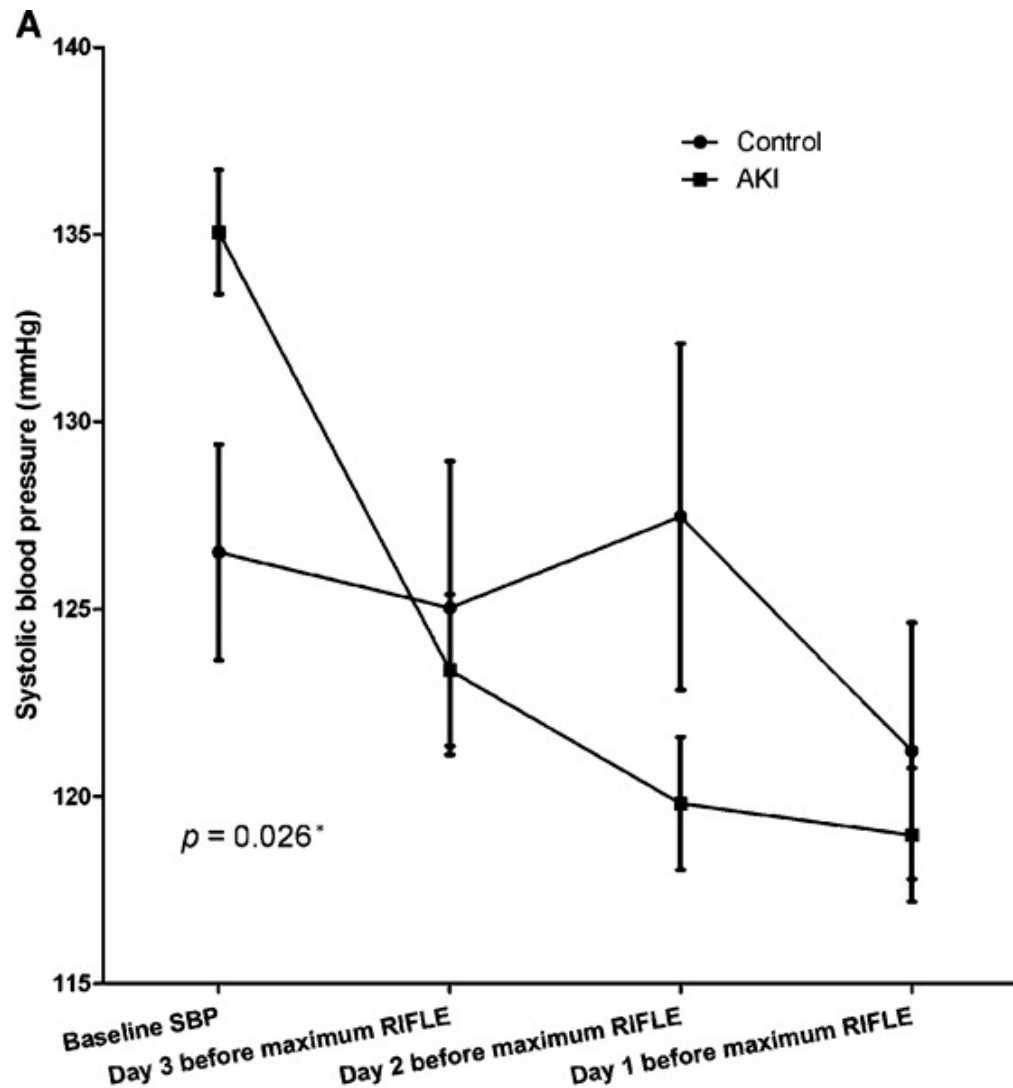
Maximal
vasoconstriction



Threshold below which renal hypoxia occurs is
reset at higher level in chronic hypertension

Systolic blood pressure preceding onset of acute kidney injury with reference to baseline

Mean \pm standard error of mean: *two-way ANOVA



Nephrotoxins – something old, something new

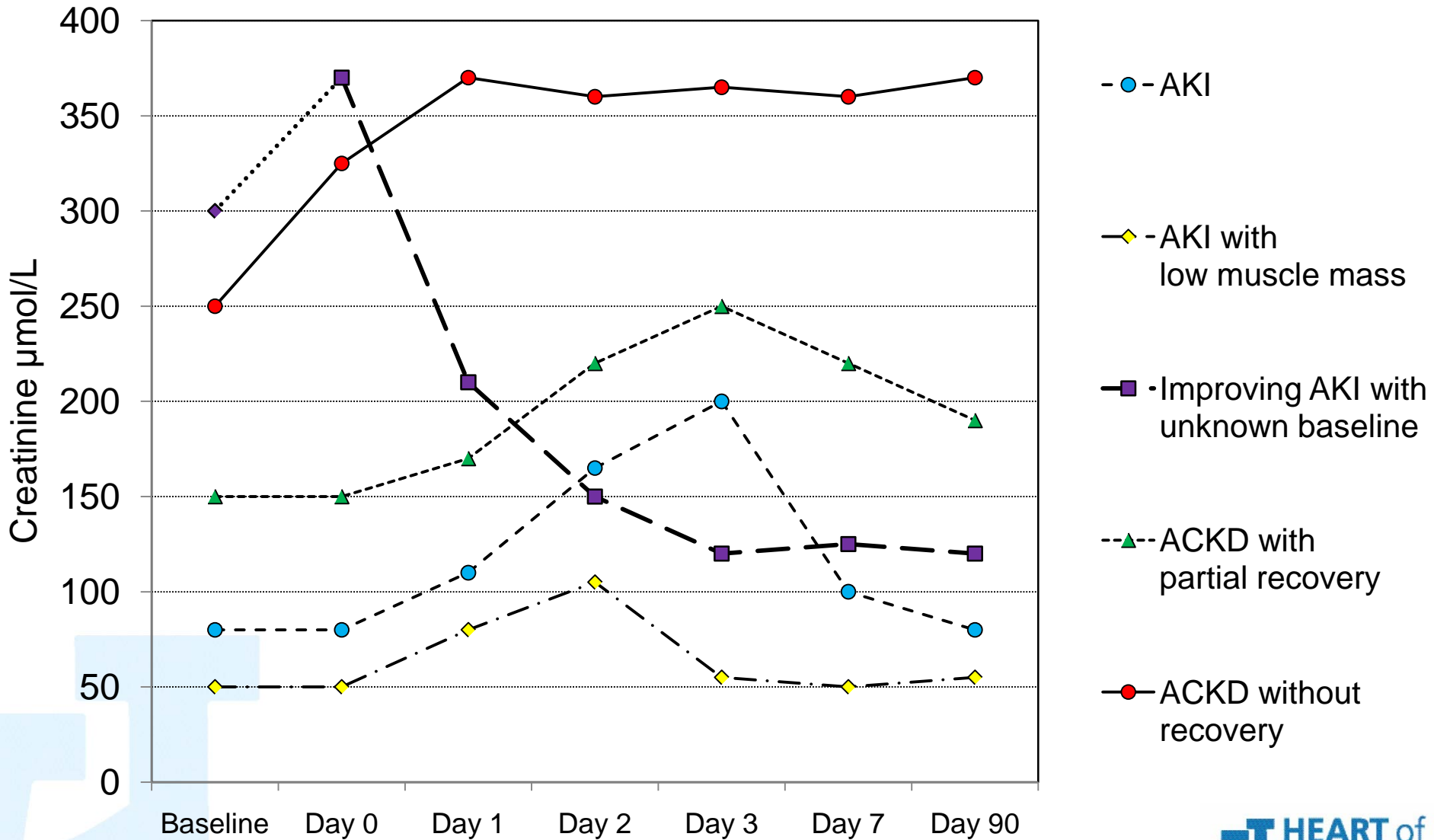
If in doubt check the Renal Drug Handbook

- ACE inhibitors and ARBs
- NSAIDs – potentially including gels
- Aminoglycosides
- Calcineurin inhibitors – Ciclosporin etc.
- Iodinated contrast
- Aciclovir
- Warfarin with high INR and haematuria
 - glomerular bleeding and tubular obstruction
- Statins
 - recent use of high potency statins

Key points about the causes of AKI

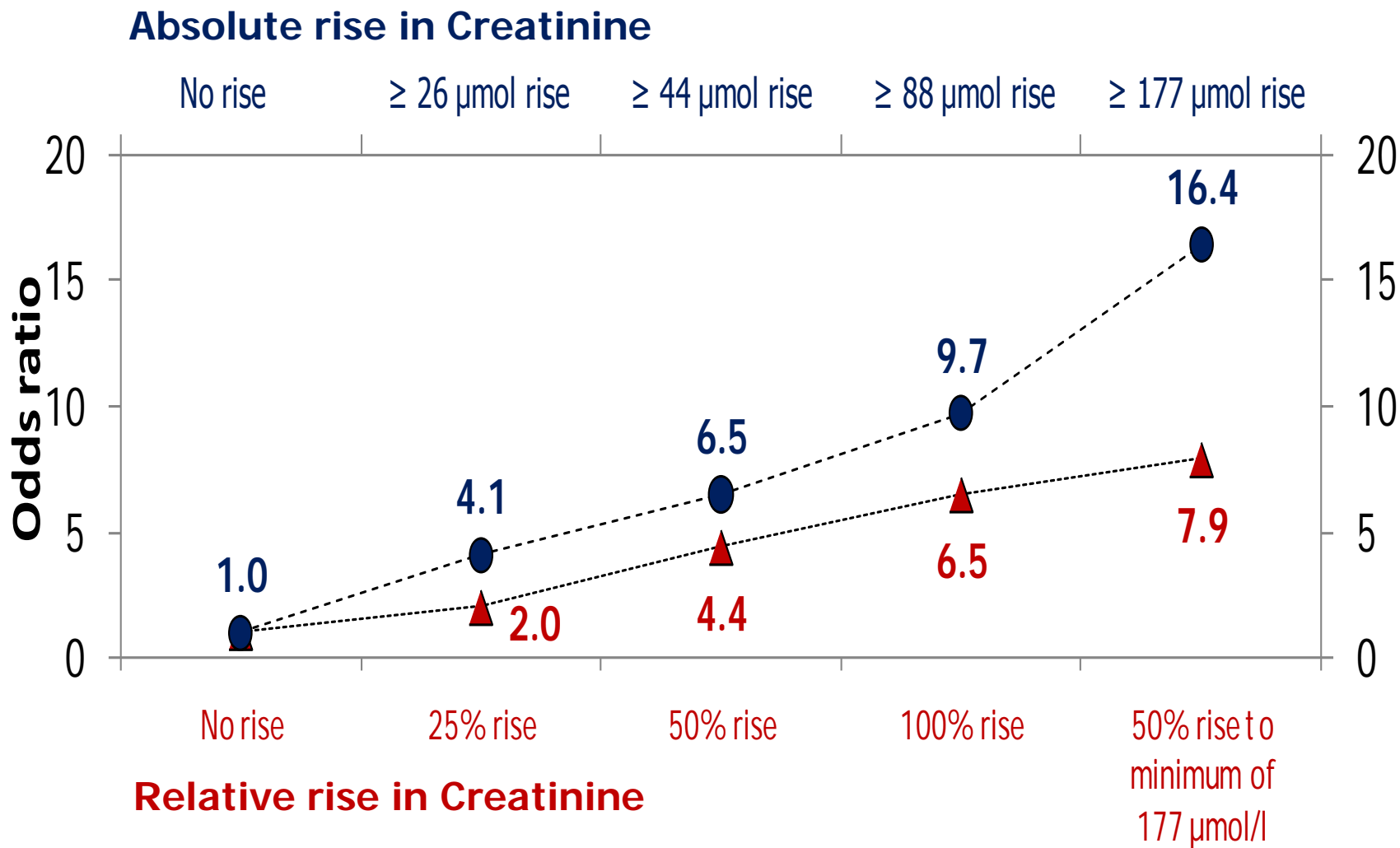
- The kidney is vulnerable to ischaemia
- Vasodilatory prostaglandins and Angiotensin II help maintain GFR in the face of hypovolaemia
- We are a high blood pressure society
- Autoregulation
 - the kidney is used to BP in a certain range
- We should consider :
 - “What is normal for my patient?”

AKI: a syndrome of many guises



Effect of AKI on odds of death in multivariate analysis

Chertow GM et al *J Am Soc Nephrol* 2005



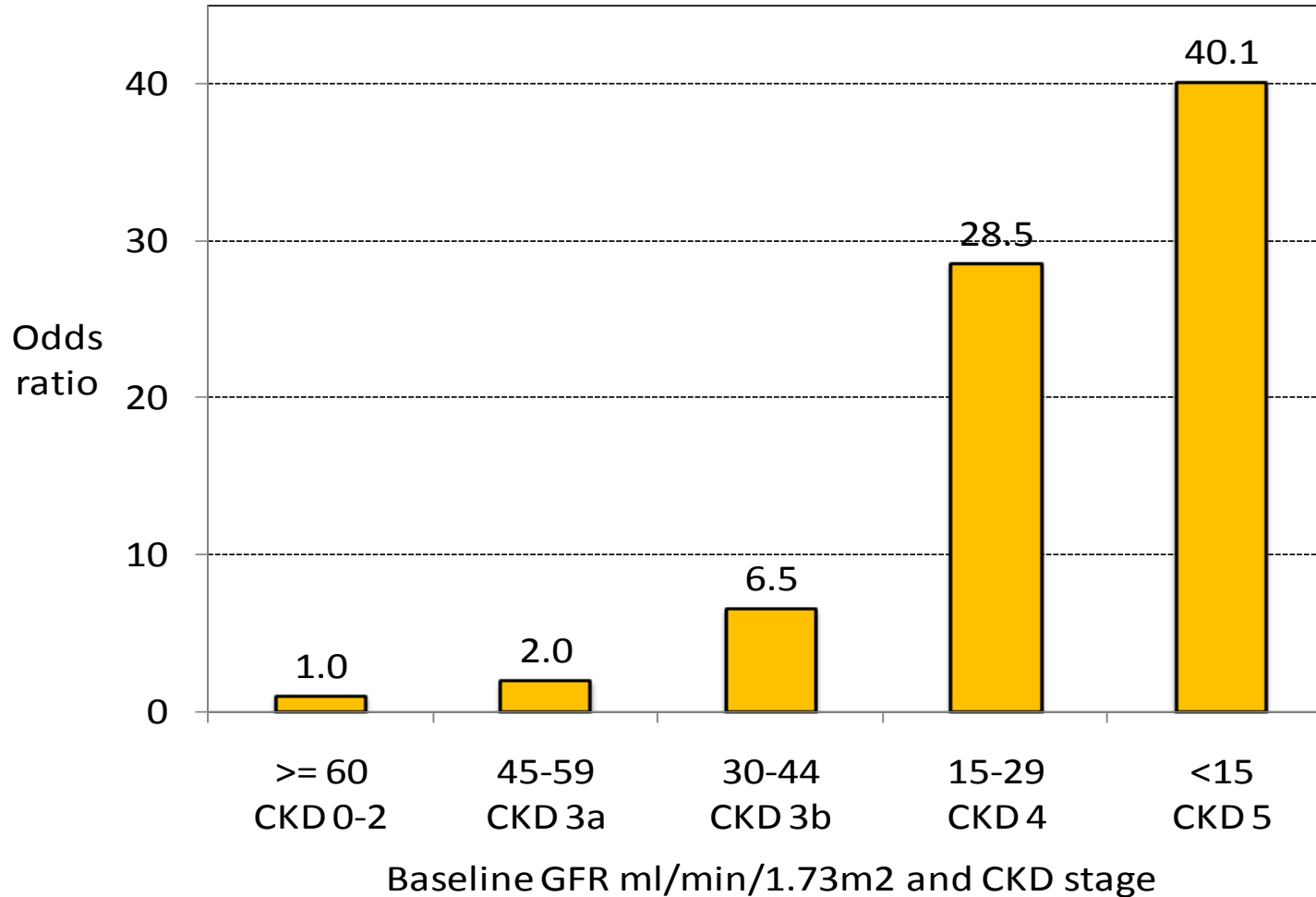
| Stage | Creatinine (Cr) |
|-------|---|
| 1 | <p>Rise of $\geq 26 \mu\text{mol/L}$ within 48 hours</p> <hr/> <p>or $\geq 50 - 99\%$ Cr rise from baseline *</p> <p>(1.50-1.99 baseline)</p> |
| 2 | <p>100 - 199% Cr rise from baseline *</p> <p>(2.00-2.99 baseline)</p> |
| 3 | <p>$\geq 200\%$ Cr rise from baseline *</p> <p>(≥ 3.00 baseline)</p> <hr/> <p>or</p> <p>(Current) Cr $\geq 354 \mu\text{mol/L}$, with either:</p> <p>Rise of $\geq 26 \mu\text{mol/L}$ within 48 hours; or $\geq 50\%$ Cr rise from baseline</p> <p>(i.e. baseline* of at least $236 \mu\text{mol/L}$)</p> <hr/> <p>or any requirement for renal replacement therapy</p> |

TABLE 1. THE INITIAL DETECTION AND STAGING OF ACUTE KIDNEY INJURY FOR ADULTS IN PRIMARY CARE (AFTER KDIGO¹)

* Typically the rise is known (based on a prior blood test) or presumed (based on the patient history) to have occurred within 7 days; note the National algorithm used by the Laboratory may look back up to 365 days

Risk of dialysis requiring AKI in inpatients

Risk increases dramatically if the patient has a background of CKD



Hsu CY et al,
Kidney Int 2008.

Warn your CKD patients of this:
don't sit at home with D&V – use sick day rules!

Sample B,14.1287104.Q (BLOOD) Collected 15 Nov 2014 18:22 Received 15 Nov 2014 19:25

Urea & Electrolytes

| | | | | |
|------------------|---|----------|---------------------------|-----------|
| Sodium | | 142 | mmol/L | 133 - 146 |
| Potassium | | 5.3 | mmol/L | 3.5 - 5.3 |
| Urea | * | 32.6 | mmol/L | 2.5 - 7.8 |
| Creatinine | * | 383 | umol/L | 64 - 111 |
| Estimated GFR | * | 13 | ml/min/1.73m ² | >60 |
| AKI Stage | * | 3 | | <0 |

Possible AKI stage 3 - see guidance <http://heftpathology.com/aki>
GFR estimated with MDRD equation. Sex MALE. NOT adjusted for race.
Multiply GFR by 1.21 if Afro-Caribbean race.
End-stage renal failure < 15 ml/min/1.73m²

- Currently your U&E results show NA for AKI stage
- Your U&E results will come with an AKI stage from 1st April
- This stage is calculated using a National algorithm
- The possible stages are 0 (no AKI) and 1, 2 or 3

Proposed online guidance on AKI

A stage based approach to the management of AKI

Short guidance for primary care

Dept of Renal Medicine

Heart of England Foundation Trust

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DEPARTMENT OF RENAL MEDICINE

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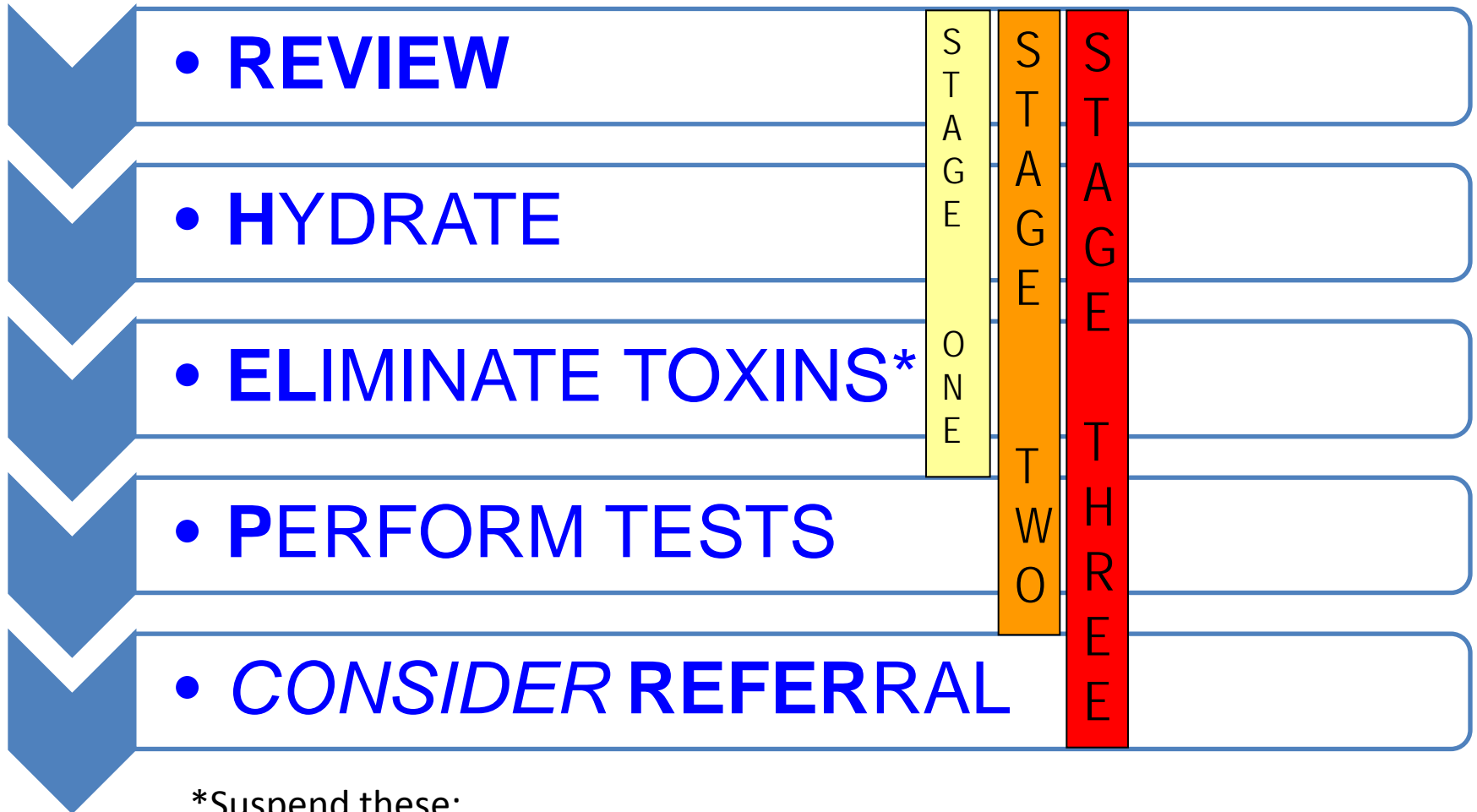
IF YOU HAVE A CASE OF AKI YOU WANT TO DISCUSS – PLEASE TELEPHONE US!

What can you do when seeing an AKI alert?

- This approach is meant for the primary care as a first assessment of community acquired AKI
- This touches the most important points to consider
- Obviously the patient will not be present:
 - the alert will usually show after the patient has already left the surgery

A stage based management

Review – Help – Refer?



*Suspend these:

ACEi, ARB, NSAID, Diuretics if relative volume depletion,
NSAID gels, Aciclovir, “non essential” Aspirin

Stage 1 - possible virtual management

≥26 μmol rise in 48h or 50-100% rise in Creatinine

■ REVIEW THE PATIENT

- It is known that this stage increases mortality – they may be sicker than you thought!
- Review – medical background
- Review – why were they having blood tests? Recent symptoms?
- **Usually call the patient – especially if no known cause - ?review**

■ HELP THE PATIENT

- **Hydrate: If D / V / nausea ensure drinking and tolerating 1.5 L/day**
- **ELiminate: Suspend nephrotoxins* and consider for diuretics**
- **Perform “tests”:** Consider U&E in 0-5 days depending on frailty

* Suspend these (typically for 2 – 7 days until better):
ACEi, ARB, NSAID, Diuretics if relative hypovolaemia,
NSAID gels, Aciclovir, “non essential” Aspirin
Trimethoprim elevates Creatinine without AKI

Consider relative hypovolaemia if:
• HR rise on standing ≥ 30 bpm²
• SBP <110 mm Hg over 65 years³
• SBP fall of ≥ 20 mm Hg from usual level⁴

Stage 2 – ‘extra’ care with stage 2 in red

100 – 199% rise in Creatinine

■ REVIEW

- review – medical background
- review – why were they having blood tests? Recent symptoms?
- **Call patient**
- **Usually recall to surgery – they may be sicker than thought**

■ HELP

- **Hydrate:** If D / V / nausea ensure drinking and tolerating 1.5 L/day
- **Eliminate:** Suspend nephrotoxins* and consider for diuretics
- **Perform “tests”:**
 - **Check lying and standing HR and BP , oedema**
 - **Urine dipstick**
 - **Consider U&E recheck in 0-2 days – including Saturday if needed**

- **REFER?**  Note question mark – admission not mandatory
 - **May need admission**

* Suspend these (typically for 2 – 7 days until better):
ACEi, ARB, NSAID, Diuretics if relative hypovolaemia,
NSAID gels, Aciclovir, “non essential” Aspirin
Trimethoprim elevates Creatinine without AKI

Consider relative hypovolaemia if:
• HR rise on standing ≥ 30 bpm²
• SBP < 110 mm Hg over 65 years³
• SBP fall of ≥ 20 mm Hg from usual level⁴

Stage 3 – ‘extra’ care with stage 3 in red

≥200% rise or smaller rise with CKD

■ REVIEW

- review – medical background
- review – why were they having blood tests? Recent symptoms?
- **Recall to surgery – they are sick**

■ HELP

- **Hydrate:** If D / V / nausea ensure drinking and tolerating 1.5 L/day
- **ELiminate:** Suspend nephrotoxins* and consider for diuretics
- **Perform “tests”:**
 - Check lying and standing HR and BP , oedema
 - Urine dipstick
 - **Consider U&E recheck in 0-1 days**

■ REFER?

- **Likely to need admission**

* Suspend these (typically for 2 – 7 days until better):
ACEi, ARB, NSAID, Diuretics if relative volume depletion,
NSAID gels, Aciclovir, “non essential” Aspirin
Trimethoprim elevates Creatinine without AKI

Consider relative hypovolaemia if:
• HR rise on standing ≥ 30 bpm²
• SBP <110 mm Hg over 65 years³
• SBP fall of ≥ 20 mm Hg from usual level⁴

Referral Criteria in AKI or ACKD

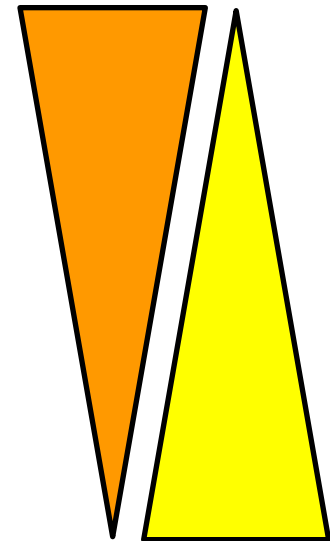
Taken from the NICE guidelines 2013 ⁵

ACKD Acute on Chronic Kidney disease

- Refer these patients:
 - ✓ stage 3 acute kidney injury
 - ✓ acute kidney injury with no clear cause
 - ✓ inadequate response to treatment
 - ✓ a possible diagnosis that may need specialist treatment (glomerulonephritis, vasculitis, interstitial nephritis, myeloma)
 - ✓ complications: hyperkalaemia, fluid overload, uraemia
 - ✓ prior chronic kidney disease stage 4 or 5 + added AKI (ACKD)
 - ✓ a renal transplant with any AKI

LIKELY BEST
PATHWAY

Refer to ED/
Acute Med



Refer to
Renal

References

1. Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO Clinical Practice Guideline for Acute Kidney Injury. *Kidney Int Suppl* 2012; 2: 1–138.
<http://kdigo.org/home/guidelines/acute-kidney-injury/>
2. A heart rate rise on standing of ≥ 30 bpm is the best indicator of hypovolaemia.
See: McGee S: *Evidence-Based Physical Diagnosis*. 1st Edition, Saunders, 2001.
3. Systolic BP < 110 mm Hg is below 10th percentile for both sexes aged 65 years and over (Health Survey for England, 2003).
4. The average fall in BP with the onset of AKI is only 15 mm Hg or so.
See: Liu Y L et al. *Nephrol Dial Transplant* 2009;24:504-511.
<http://ndt.oxfordjournals.org/content/24/2/504.short>
5. Acute kidney injury: Prevention, detection and management of acute kidney injury up to the point of renal replacement therapy. NICE guidelines [CG169] Published date: August 2013.
<https://www.nice.org.uk/guidance/cg169>

AKI stage 2 or 3 shown on blood test
Alert issued for inpatient or patient in community

BEFORE STUDY - ALERTS RUN FOR BOTH HOSPITALS/AREAS
2 MONTHS - GOOD STANDARD CARE - PROVIDING CONTROL DATA

AFTER STUDY - 5 MONTHS
INTERVENTION GROUP
- OUTREACH CALL

Heartlands Hospital and area patients

AFTER STUDY - 5 MONTHS
CONTROL GROUP
- GOOD STANDARD CARE

Good Hope Hospital and area patients

Telephone call to clinician
visit to patient
to give specialist advice

No phone call to clinician
responsible for patient -
clinician may call or refer for
specialist advice at their discretion

About 10 alerts per day
OUTREACH CALL MADE

1470 patients over 5 months
Followed up for outcomes 12 mo

About 2.5 alerts per day
CONTROL GROUP - NO CALL

375 patients over 5 months
Followed up for outcomes 12 mo

The AKORDD study

Acute **K**idney **O**utreach
to **R**educe **D**eterioration
and **D**eath:

A pilot for a Cluster
randomised trial

From June to Oct 2015
GPs looking after new
AKI patients in the
Heartlands area will
get a phone call to offer
advice on their care; this
is a pilot and the service
will revert to normal referral
mechanisms in Nov 2015

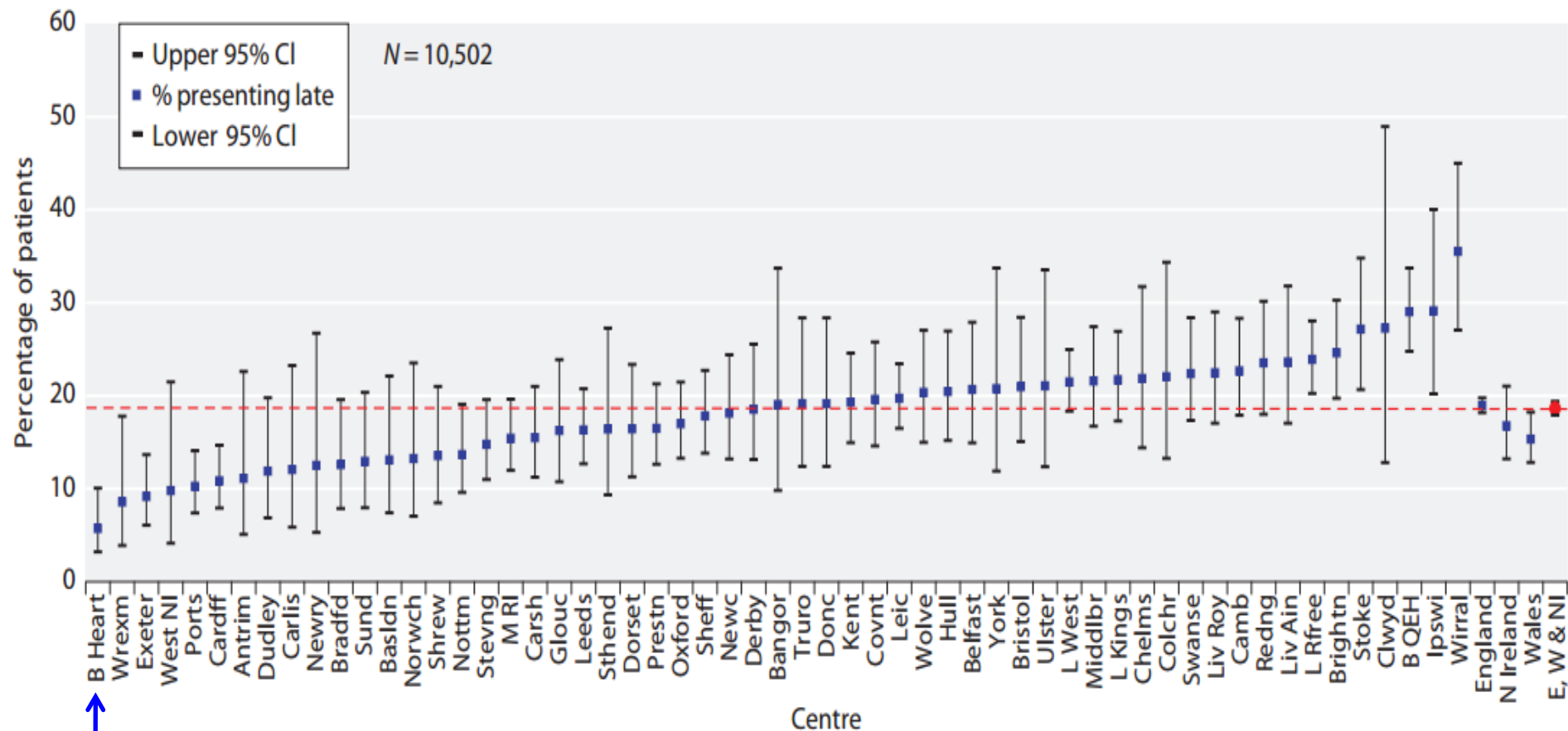


Dept of Renal Medicine has established record of community surveillance and outreach to improve population outcomes

Lowest rate of late presentation for chronic dialysis in UK

Using other laboratories does not allow CKD or AKI surveillance

GPs get this by using the HEFT laboratory



UK Renal Registry report 2014

<https://www.renalreg.org/wp-content/uploads/2014/12/01-Chap-01.pdf>

5.7%