# AKI Update – a Northumbrian Journey

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2019

# What is Acute Kidney Injur

ACUTE K'ID'NEY INJURY
IDENTIFY, PREVENT, TREAT

- Spectrum of illness:
  - Minor change in creatinine to failure of renal function and requirement for renal replacement
  - Measured with biochemical parameters (serum creatinine) and/or urine output

| AKI stage | Serum creatinine | Urine output |
|---|---|---|
| 1 (Early) | 1.5 - 1.9 x baseline or >26.5mmol/l from baseline | <0.5ml/kg for 6-12 hours |
| 2 (Moderate) | 2 - 2.9 x baseline | <0.5ml/kg for >12 hours |
| 3 (Severe) | 3 x baseline or Creatinine > 353mmol/l Or requirement for RRT | Anuria for > 12 hours |

- ICE will alert for AKI stages – do not ignore!

70 YEARS OF THE NHS 1948 - 2018

NHS Northumbria Healthcare NHS Foundation Trust

Northumbria Healthcare NHS
NHS Foundation Trust

- Patient admitted with known chronic kidney disease (CKD) and multiple co-morbidities
- Underwent contrast CT scan to investigate current symptoms (suspected malignancy (not confirmed on CT))
- Deterioration in renal function after CT necessitating admission to ICU
- Patient died due to contrast-induced acute kidney injury (AKI)

**Issues**

- CKD not recognised on admission
- Creatinine in 'normal' range but actual renal function poor (creatinine clearance 31ml/min on admission – normal ~90ml/min)
- CT scan did not need to be done urgently
- Radiology correctly reviewed renal function prior to CT but falsely reassured by normal creatinine
- Not recognised by ward staff that patient at risk of contrast induced AKI
- Management of subsequent AKI poor including poor fluid balance

# SUI 2017/15721: Death following contrast induced nephropathy

**Outcomes**

- Rapid deterioration in renal function after the CT
- Patient admitted to ICU for renal replacement therapy
- Despite this, patient deteriorated and was palliated and died at home

**Improvements**

- Estimated glomerular filtration rate (eGFR) now measured on all inpatient bloods to provide a guide to degree of renal impairment rather than relying on creatinine alone
- AKI steering group created to drive improvement in management of patients with AKI
- Critical care outreach team review all patients with AKI stage 2 & 3

## 6. Action Plan

| Ref. | Recommendation | Action to be taken |
|---|---|---|
| 1 | Include eGFR calculation on all inpatient bloods | eGFR to be automatically calculated on all inpatient blood tests (to be discussed at CCSB meeting) |
| 2 | Consider modifying CT request form | Modify CT request form to include prompt to document eGFR or presence of AKI with reference to trust guidelines on contrast induced nephropathy (to be discussed at radiology CG) |
| 3 | Develop AKI bundle | Review current audit of AKI bundle in acute medicine and potential role out to all wards |
| 4 | Outreach to review patients with AKI stage 2 and 3 | Critical care outreach team to be informed about all patients with AKI stage 2 and 3 for assessment and initiation of AKI bundle |
| 5 | Development of clear Trust strategy on AKI | Trust to develop an AKI steering group with appropriate clinical/nursing leads and to link with regional strategy |
| | | |

# **Why** is **A**cute **K**idney **I**njury important?

- NCEPOD report (2009) – up to 50% of patients had sub-optimal management
- Excess mortality from sub-optimal care
- 5% prevalence in hospitalised patients – there's a lot of it!
- Strongly associated with mortality
  - Stage 3 AKI – 40% mortality

| AKI stage | 1 | 2 | 3 |
|---|---|---|---|
| OR for death | 2.2 | 6.1 | 8.6 |

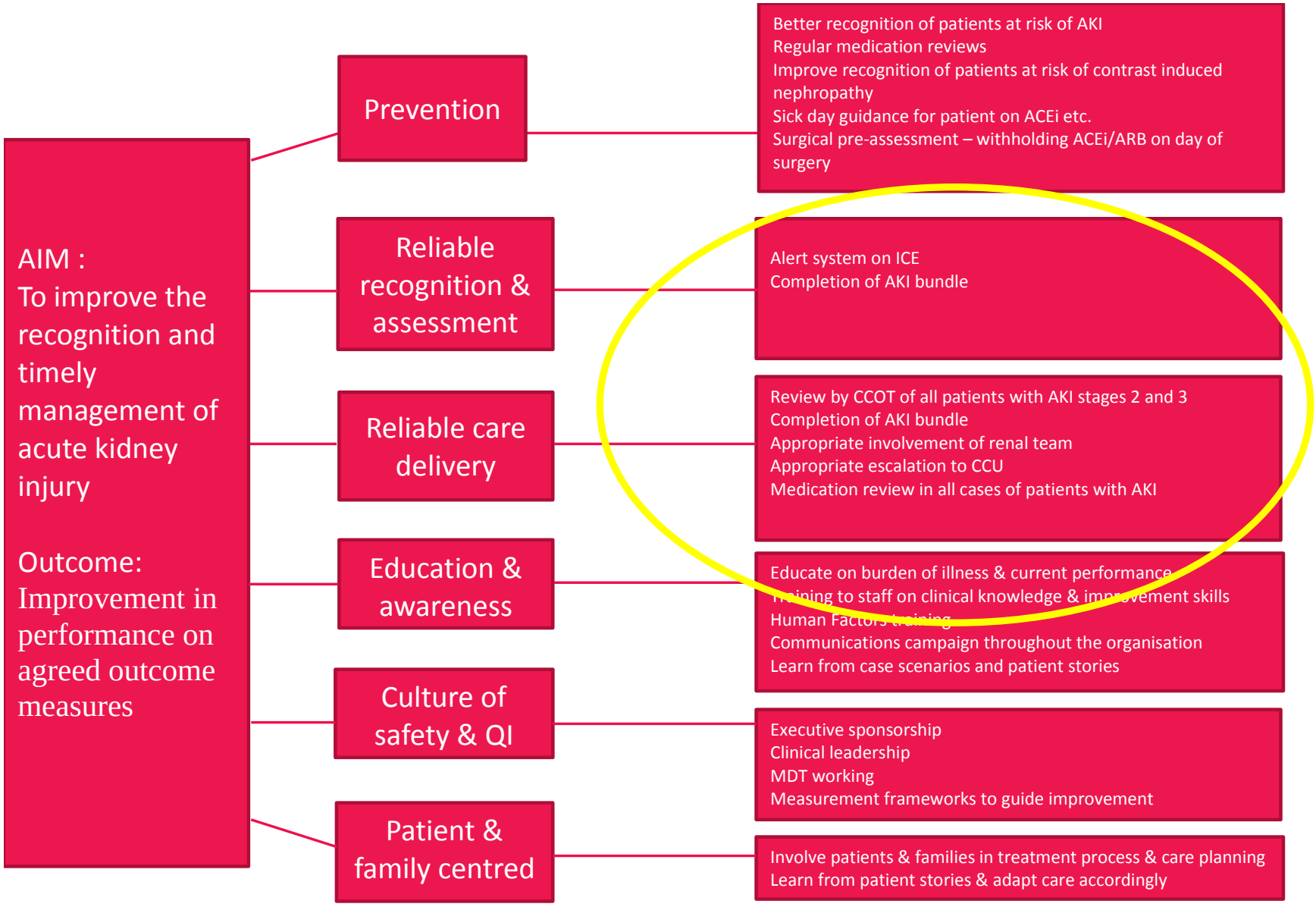
- AKI confers long term risk of CKD

## Facts

- It's COMMON - May be present in up to **5%** of hospital admissions
- NCEPOD report 2009 demonstrated suboptimal care in **50%** of cases
- Associated with mortality up to **40%**

## Signs

- AKI often shows few symptoms initially – **40%** of patients with AKI stage 2 and 3 will have a NEWS score 4 or less
- Those most at risk include patients with co-morbidities, known CKD, high NEWS score and those who have had emergency surgery
- Most common causes include dehydration, sepsis, toxins / medications and urinary tract obstruction


AIM :
To improve the recognition and timely management of acute kidney injury
Outcome:
Improvement in performance on agreed outcome measures
Prevention
Reliable recognition & assessment
Reliable care delivery
Education & awareness
Culture of safety & QI
Patient & family centred
Better recognition of patients at risk of AKI
Regular medication reviews
Improve recognition of patients at risk of contrast induced nephropathy
Sick day guidance for patient on ACEi etc.
Surgical pre-assessment – withholding ACEi/ARB on day of surgery
Alert system on ICE
Completion of AKI bundle
Review by CCOT of all patients with AKI stages 2 and 3
Completion of AKI bundle
Appropriate involvement of renal team
Appropriate escalation to CCU
Medication review in all cases of patients with AKI
Educate on burden of illness & current performance
Training to staff on clinical knowledge & improvement skills
Human Factors training
Communications campaign throughout the organisation
Learn from case scenarios and patient stories
Executive sponsorship
Clinical leadership
MDT working
Measurement frameworks to guide improvement
Involve patients & families in treatment process & care planning
Learn from patient stories & adapt care accordingly

# ACUTE K'ID'NEY INJURY

## IDENTIFY. PREVENT. TREAT

To be completed for all patients identified with Stage 2 or 3 AKI

**Remember:** AKI often shows few symptoms initially – 40% of patients with AKI stage 2 and 3 will have a NEWS score 4 or less!

NHS
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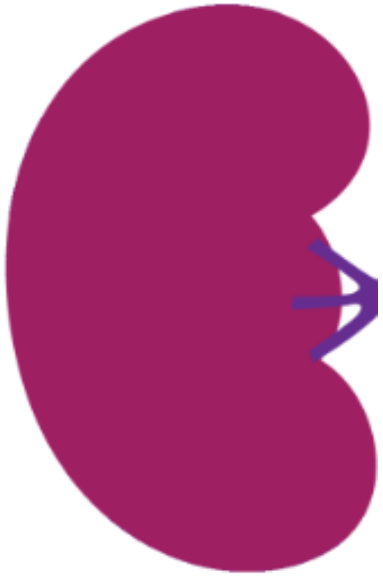
Affix patient label or

NHS Number:.....
Trust Number:.....
Surname:.....
Forename:.....
Date of Birth:.....
Address:.....
.....

Name of Dr/Nurse initiating the pathway: _____

Date: _____/_____/_____ Time _____:_____ (24 hour clock)



Is your patient on document for dying patient? YES → Leave the AKI MDT Pathway

NO ↓

Review the patient's medications
- Stop common drivers of AKI (NSAIDs, ACEi, ARB etc.)?
- Reduce dose or suspend drugs with renal excretion (DOACs, metformin, opiates etc.)?

↓

Look at patient's U & Es
- Are they hyperkalaemic? (K > 6.5 after medical therapy)
- Do they have a metabolic acidosis? (if Bicarb <18 do a VBG or ABG OR is pH <7.2?)

YES ↓

↓

Review the patient using a ABCDE method

↓

Airway + Breathing: Is there evidence of pulmonary oedema? YES → ! CALL CRITICAL CARE IMMEDIATELY REQUEST A SENIOR REVIEW

NO ↓

Circulation – are there signs of shock or reduced urine output? YES →
- Commence strict fluid balance chart & measure urine output. Consider catheter (inform nurse in charge)
- Consider IV fluid challenge if signs of dehydration (up to 2L)
- Consider sepsis – use sepsis screening tool (THINK INFECTION SPOT SEPSIS)

→ YES → CALL CRITICAL CARE IMMEDIATELY REQUEST A SENIOR REVIEW

- Does the patient remain shocked? (systolic BP<90 or drop in systolic of <20mmHg from baseline)
- Is urine output <30ml/hour?

→ YES → ACUTE KIDNEY INJURY (AKI) MDT PATHWAY

NO ↓

Disability: if drowsy consider opiates and other drug toxicity or uremic encephalopathy. Is GCS <15?

NO ↓

Exposure: are there signs of obstruction? YES →
- Catheterise
- Consider urgent renal USS

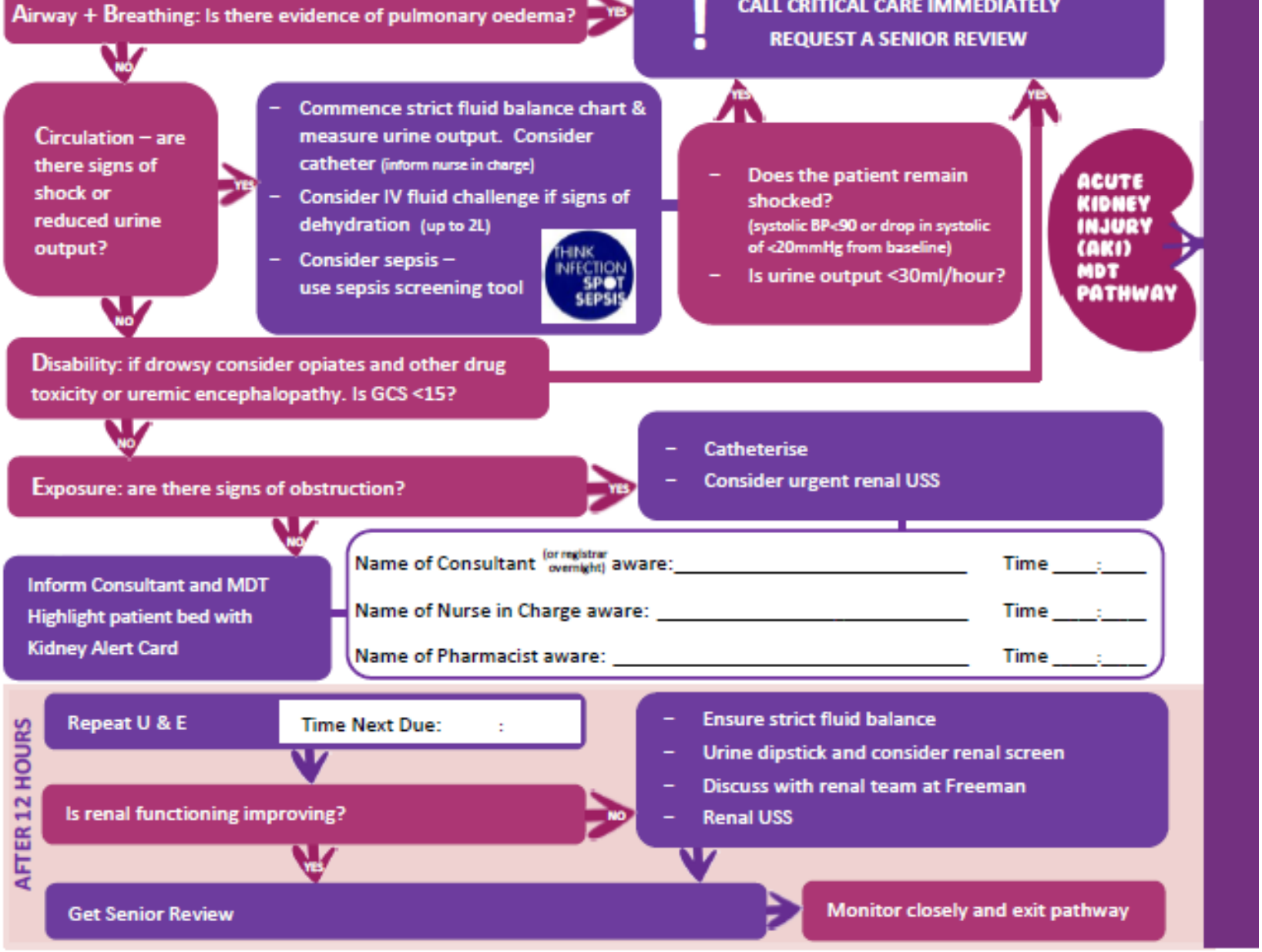
NO ↓

Inform Consultant and MDT
Highlight patient bed with Kidney Alert Card

Name of Consultant (or registrar overnight) aware:_____ Time ____:____

Name of Nurse in Charge aware: _____ Time ____:____

Name of Pharmacist aware: _____ Time ____:____




AKI MDT Pathway Draft 4

# Call Critical Care if…

- K >6.5 after medical therapy
- Metabolic acidosis (bicarb <18 or pH <7.2)
- Pulmonary oedema
- Shocked (systolic <90mmHg or >20mmHg from baseline)
- U.O <30mls/hour
- GCS <15/ drowsy

Note: ICE reports in eGFR
The dosing in this guide relates only to CrCl
To calculate CrCl refer to online calculator on trust AKI webpage

# Quick reference guide: medicines in AKI

For medications not listed, refer to AKI/antibiotic guidelines or Microguide app

ACUTE K'ID'NEY INJURY
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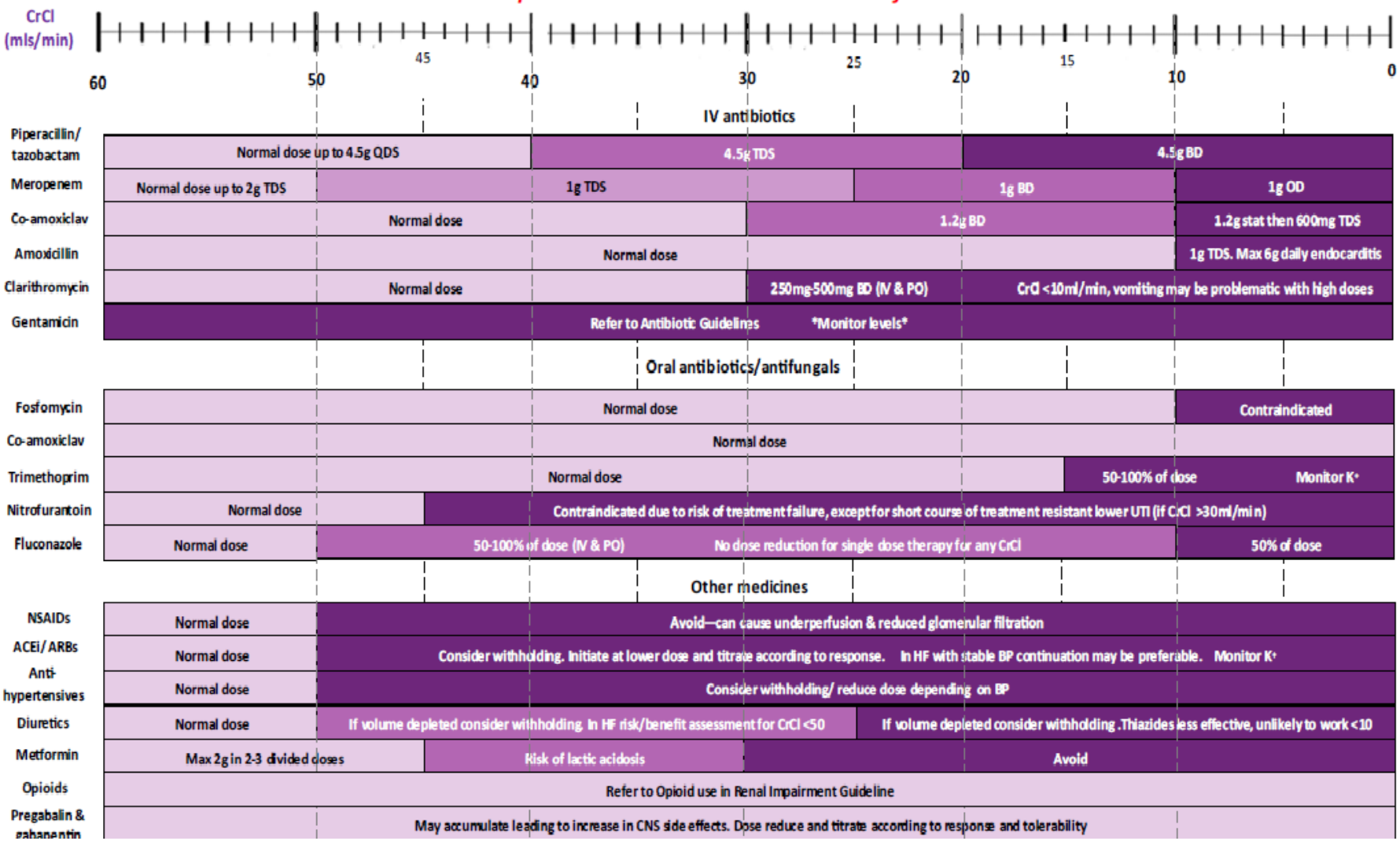
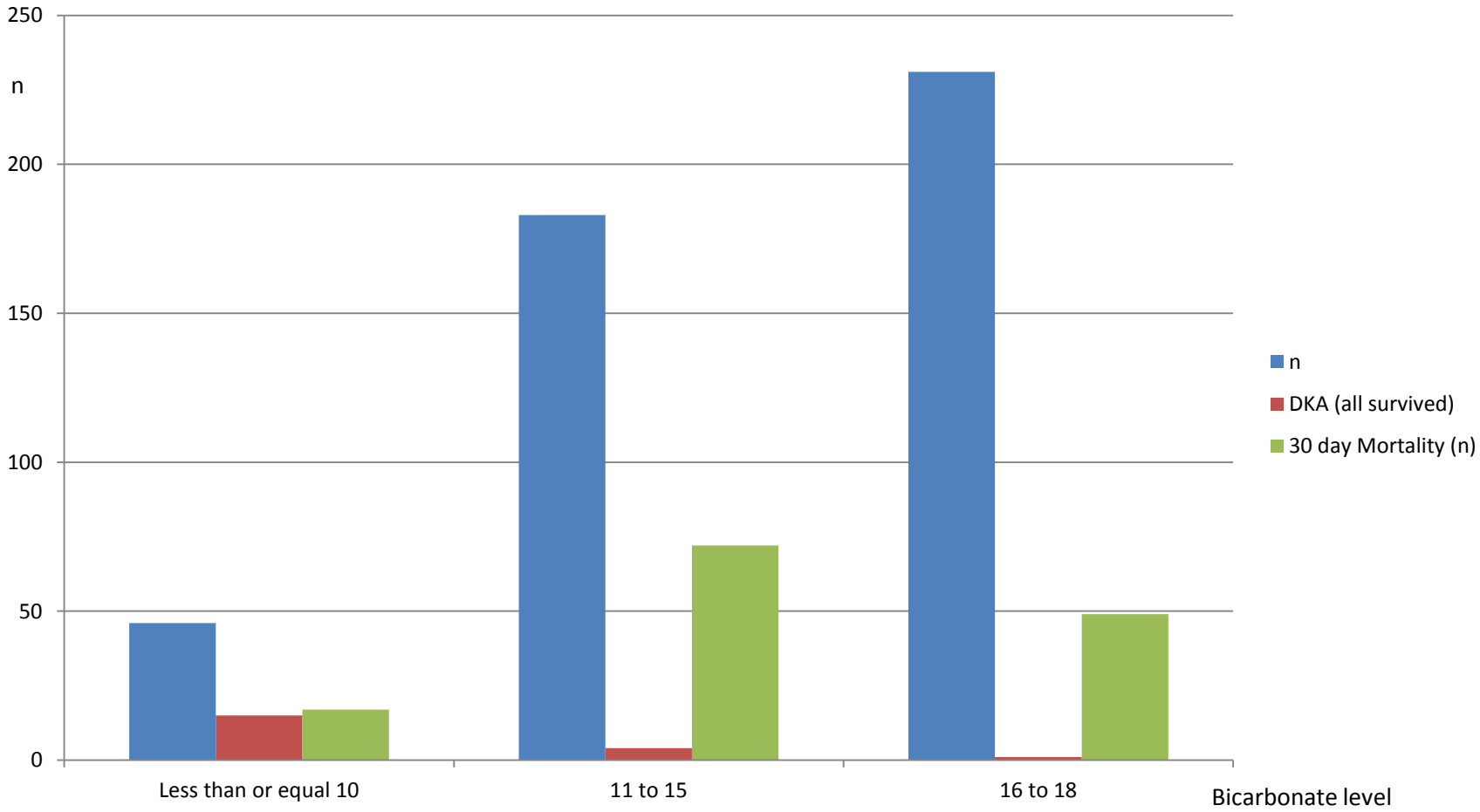
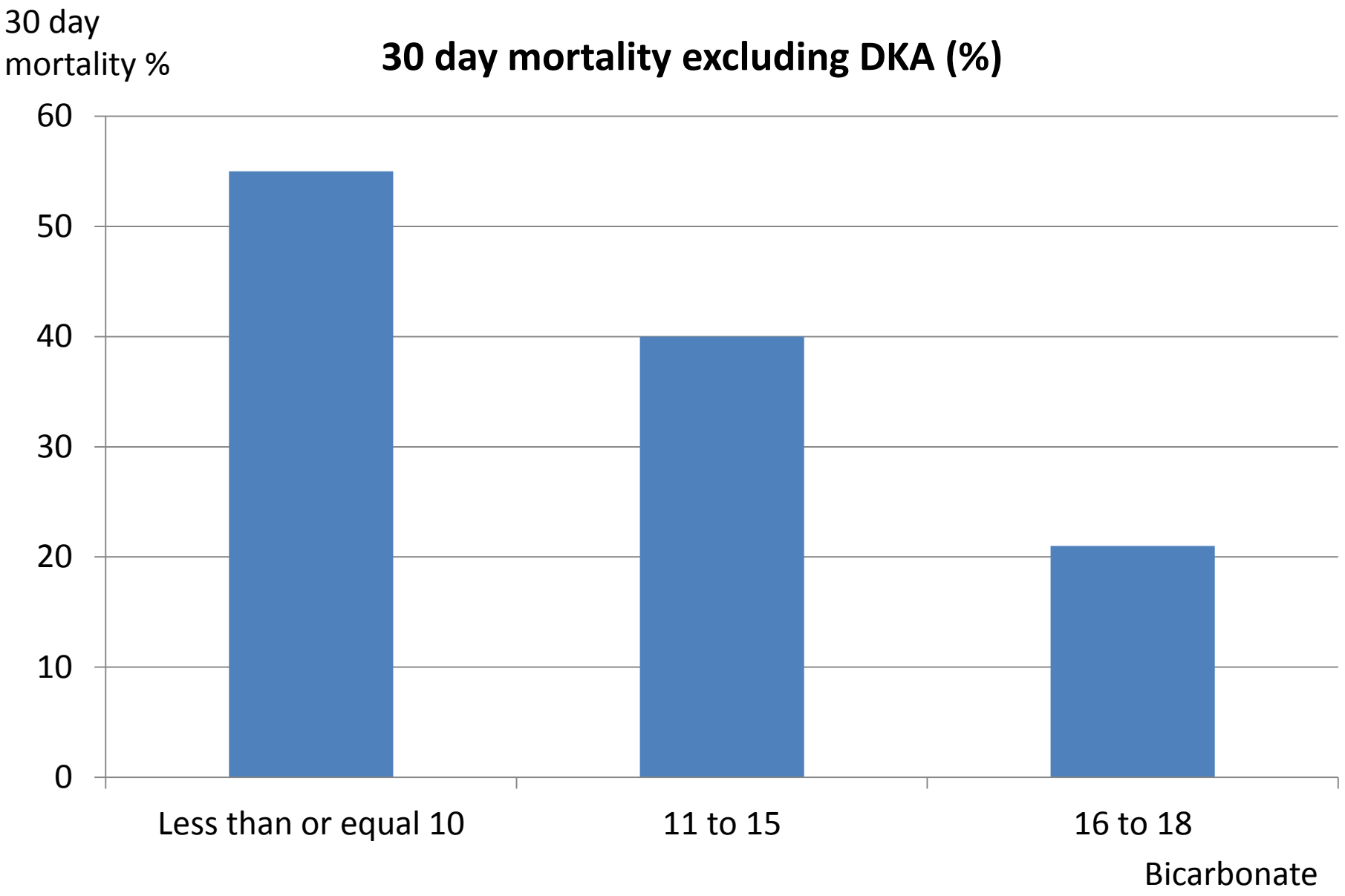
*Sepsis Kills...Full dose IV antibiotics for 48hrs*



# Bicarbonate

July and August 2018, all bicarbonate <18 and 30 day mortality
Duplicates removed (922-460 patients)– lowest result included




30 day mortality %
30 day mortality excluding DKA (%)
60
50
40
30
20
10
0
Less than or equal 10
11 to 15
16 to 18
Bicarbonate

# AKI 2 & 3 NSECH Jan-May 2019

| Ward/ Dept | No. of Alerts | Hospital acquired | Re-admission within 30 days | Average length of stay from alert | 30 Day Mortality |
|---|---|---|---|---|---|
| Ward 1 | 5 | 20% | 20% | 17 Days | 0% |
| Ward 3 | 20 | 5% | 12% | 10 Days | 18% |
| Ward 4 | 7 | 29% | 67% | 11 Days | 14% |
| Ward 6 | 4 | 0% | 25% | 3 Days | 25% |
| Ward 7 | 2 | 0% | 50% | 4 Days | 0% |
| HASU | 1 | 0% | 0% | 20 Days | 0% |
| Ward 9 | 9 | 0% | 13% | 12 Days | 44% |
| Ward 10 | 8 | 13% | 17% | 19 Days | 25% |
| Ward 12 | 14 | 7% | 40% | 4 Days | 60% |
| Ward 15 | 3 | 0% | 33% | 13 Days | 67% |
| Ward 16 | - | - | - | - | - |
| CCU | 9 | 22% | 0% | 10 Days | 44% |

# AKI - Next steps

- In use at NSECH (all wards and ED)
- Rolling out NTGH and Wansbeck
- Embed within regular junior Dr and NP education
- Drop in awareness events
- Establishing regular measurement/ audit
  - Monthly data feedback to wards
- Establishing links with community

# Questions?

Thank you