Peterborough and Stamford Hospitals
NHS Foundation Trust

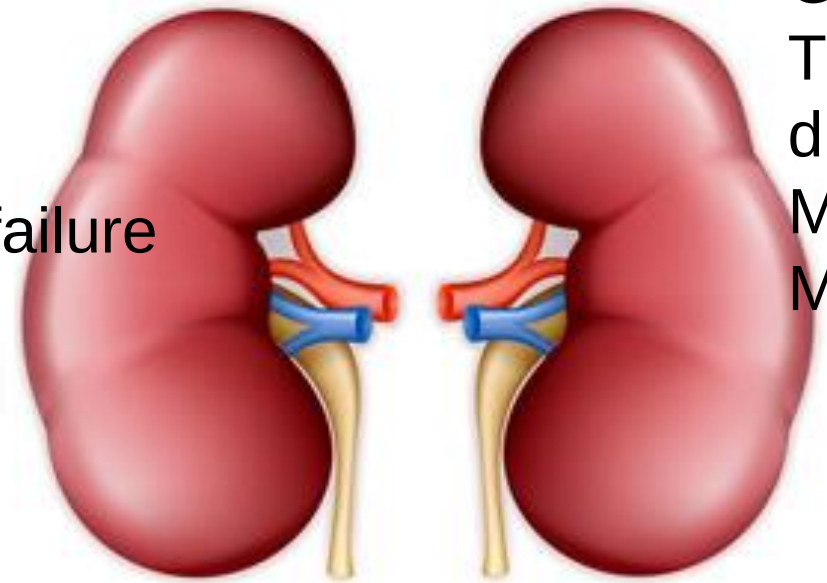
# ACB National Audit: Acute Kidney Injury

Jamie West
Peterborough City Hospital
June 2016

Caring Creative Community

# Acute Kidney Injury (AKI)

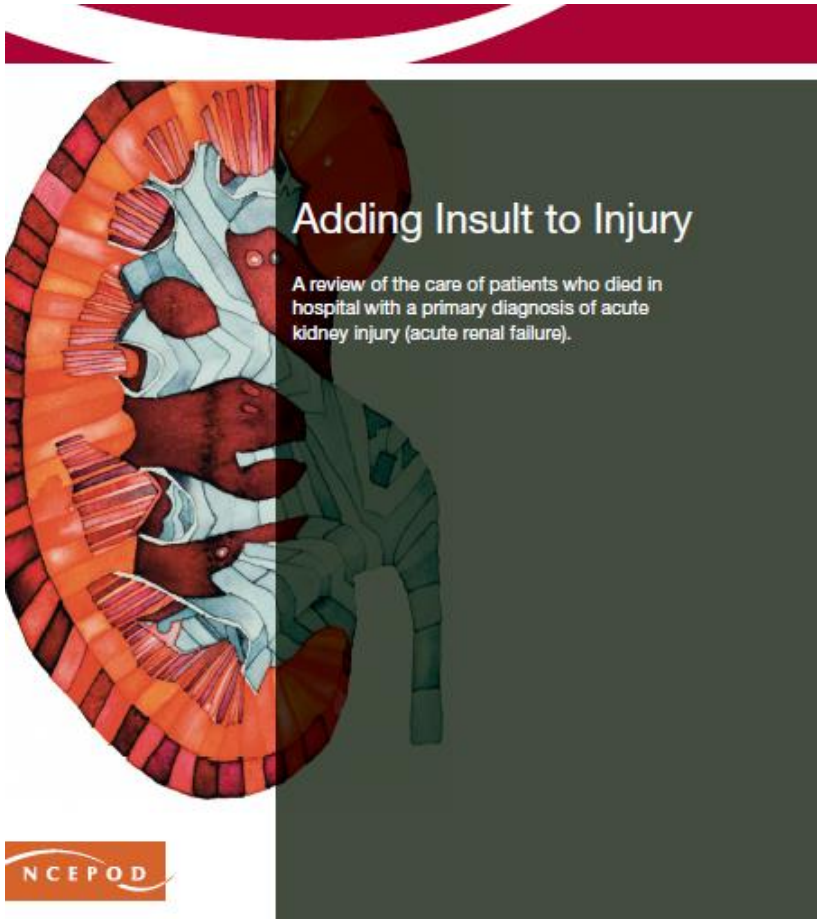
**Pre-renal:**
Dehydration
Haemorrhage
Fluid loss
Sepsis
Acute cardiac failure



**Intrinsic:**
Glomerular disease
Tubulointerstitial disease
Microvascular disease
Miscellaneous

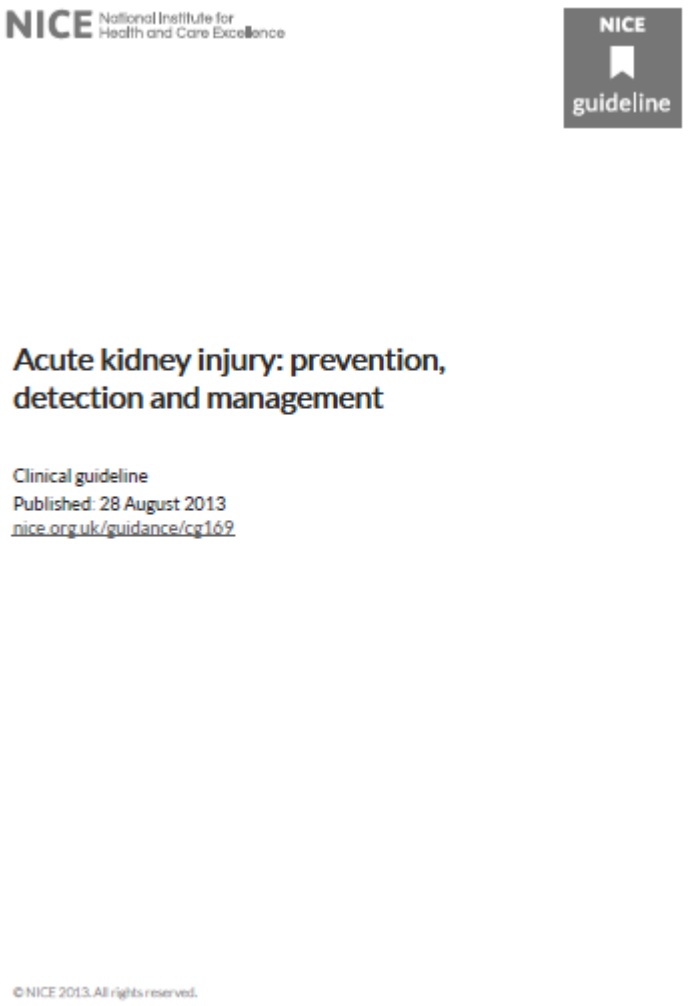
**Post-renal:**
Bladder obstruction
Prostate disease
Renal calculi

# NCEPOD Report (2009)




- 645 cases reviewed
- 50% care good
- Poor assessment of risk factors
- Unacceptable delay of AKI diagnosis in 43%
- AKI complications:
  - Missed (13%)
  - Avoidable (17%)
  - Managed badly (22%)

# NICE Clinical Guideline 169




- Risk assessment and prevention
- Identified risks
  - CKD
  - Heart failure
  - Liver failure
  - Diabetes
  - Others
- Ongoing assessment of patients condition
- Detecting AKI
- Identifying cause of AKI
- Ultrasound
- Nephrology referral
- Information and support

# Definitions of AKI – RIFLE (2004)

| Class | GFR | UO |
|---|---|---|
| Risk | ↑ SCr × 1.5 or ↓ GFR >25% | <0.5 mL/kg/h × 6 h |
| Injury | ↑ SCr × 2 or ↓ GFR >50% | <0.5 mL/kg/h × 12 h |
| Failure | ↑ SCr × 3 or ↓ GFR >75% or if baseline SCr ≥353.6 μmol/L (≥4 mg/dL) ↑ SCr >44.2 μmol/L (>0.5 mg/dL) | <0.3 mL/kg/h × 24 h or anuria × 12 h |
| Loss of kidney function | Complete loss of kidney function >4 weeks | |
| End-stage kidney disease | Complete loss of kidney function >3 months | |

[a]GFR, glomerular filtration rate; UO, urine output; SCr, serum creatinine.

Bellomo R, et al. Palevsky P and the ADQI workgroup. Acute renal failure—definition, outcome measures, animal models, fluid therapy and information technology needs: the Second International Consensus Conference of the Acute Dialysis Quality Initiative (ADQI) Group. Crit Care 2004; 8: R204

# Definitions of AKI – AKIN (2007)

| Stage | SCr | UO |
|---|---|---|
| 1 | ↑ SCr ≥26.5 μmol/L (≥0.3 mg/dL) or ↑SCr ≥150 a 200% (1.5 a 2×) | <0.5 mL/kg/h (>6 h) |
| 2 | ↑ SCr >200 a 300% (>2 a 3×) | <0.5 mL/kg/h (>12 h) |
| 3[b] | ↑ SCr >300% (>3×) or if baseline SCr ≥353.6 μmol/L (≥4 mg/dL) ↑SCr ≥44.2 μmol/L (≥0.5 mg/dL) | <0.3 mL/kg/h (24 h) oranuria (12 h) |

[a]SCr, serum creatinine; UO, urine output.
[b]Stage 3 also includes patients requiring RRT independent of the stage (defined by SCr and/or UO) they are in at the moment they initiate RRT.

Mehta RL, Kellum JA, Shah SV et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Crit Care 2007; 11: R31

# KDIGO Clinical Practice Guidelines, 2011

## Section 2: AKI Definition

**2.1.1: AKI is defined as any of the following (*Not Graded*):**

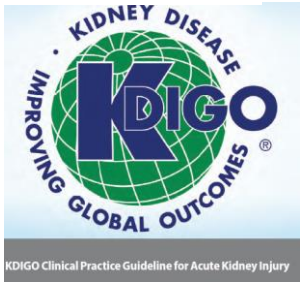
- **Increase in SCr by ⩾0.3 mg/dl (⩾26.5 μmol/l) within 48 hours; or**
- **Increase in SCr to ⩾1.5 times baseline, which is known or presumed to have occurred within the prior 7 days; or**
- **Urine volume <0.5 ml/kg/h for 6 hours.**

**2.1.2: AKI is staged for severity according to the following criteria (Table 2). (*Not Graded*)**

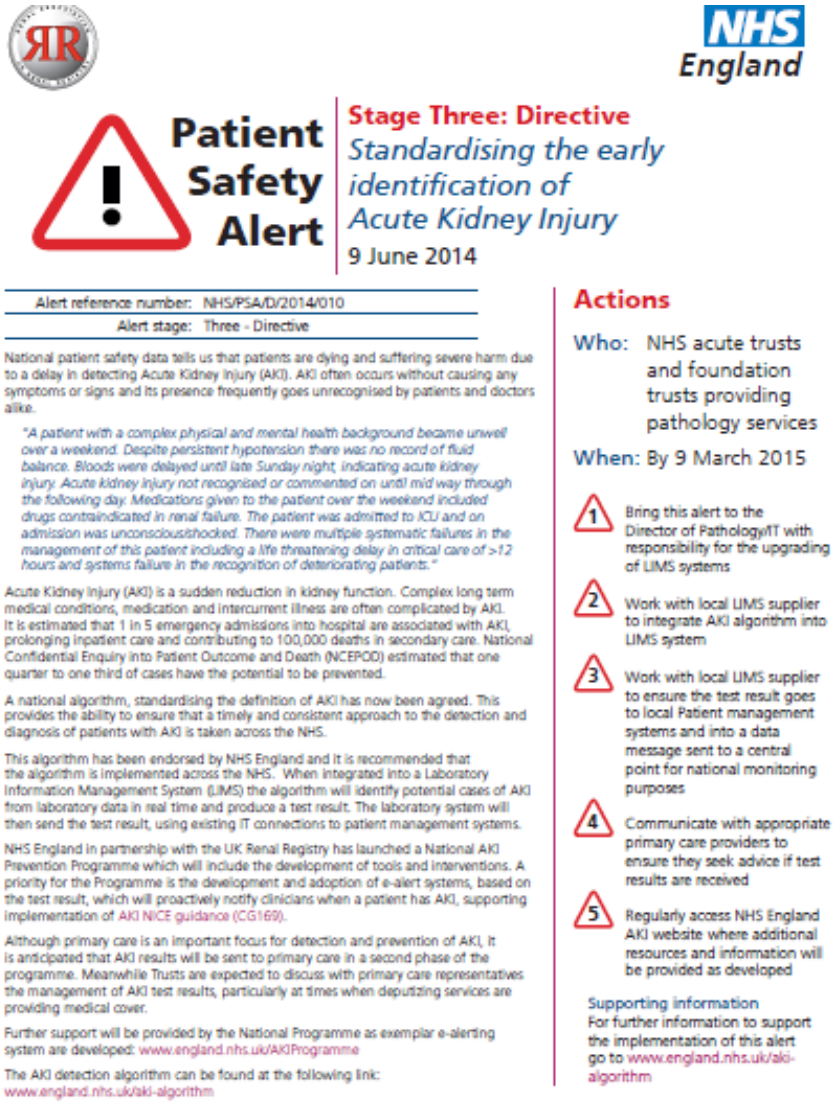
**Table 2 | Staging of AKI**

| Stage | Serum creatinine | Urine output |
|---|---|---|
| 1 | 1.5–1.9 times baseline<br>OR<br>⩾0.3 mg/dl (⩾26.5 μmol/l) increase | <0.5 ml/kg/h for 6–12 hours |
| 2 | 2.0–2.9 times baseline | <0.5 ml/kg/h for ⩾12 hours |
| 3 | 3.0 times baseline<br>OR<br>Increase in serum creatinine to ⩾4.0 mg/dl (⩾353.6 μmol/l)<br>OR<br>Initiation of renal replacement therapy<br>OR, In patients <18 years, decrease in eGFR to <35 ml/min per 1.73 $m^2$ | <0.3 ml/kg/h for ⩾24 hours<br>OR<br>Anuria for ⩾12 hours |

Kidney Disease: Improving Global Outcomes. Clinical practice guideline on acute kidney injury, 2011. www.kdigo.org



# NHS England Patient Safety Alert June 2014



NHS England

**Patient Safety Alert**

**Stage Three: Directive**

*Standardising the early identification of Acute Kidney Injury*

9 June 2014

Alert reference number: NHS/PSA/D/2014/010

Alert stage: Three - Directive

National patient safety data tells us that patients are dying and suffering severe harm due to a delay in detecting Acute Kidney Injury (AKI). AKI often occurs without causing any symptoms or signs and its presence frequently goes unrecognised by patients and doctors alike.

*"A patient with a complex physical and mental health background became unwell over a weekend. Despite persistent hypotension there was no record of fluid balance. Bloods were delayed until late Sunday night, indicating acute kidney injury. Acute kidney injury not recognised or commented on until mid way through the following day. Medications given to the patient over the weekend included drugs contraindicated in renal failure. The patient was admitted to ICU and on admission was unconscious/shocked. There were multiple systematic failures in the management of this patient including a life threatening delay in critical care of >12 hours and systems failure in the recognition of deteriorating patients."*

Acute Kidney Injury (AKI) is a sudden reduction in kidney function. Complex long term medical conditions, medication and intercurrent illness are often complicated by AKI. It is estimated that 1 in 5 emergency admissions into hospital are associated with AKI, prolonging inpatient care and contributing to 100,000 deaths in secondary care. National Confidential Enquiry into Patient Outcome and Death (NCEPOD) estimated that one quarter to one third of cases have the potential to be prevented.

A national algorithm, standardising the definition of AKI has now been agreed. This provides the ability to ensure that a timely and consistent approach to the detection and diagnosis of patients with AKI is taken across the NHS.

This algorithm has been endorsed by NHS England and it is recommended that the algorithm is implemented across the NHS. When integrated into a Laboratory Information Management System (LIMS) the algorithm will identify potential cases of AKI from laboratory data in real time and produce a test result. The laboratory system will then send the test result, using existing IT connections to patient management systems.

NHS England in partnership with the UK Renal Registry has launched a National AKI Prevention Programme which will include the development of tools and interventions. A priority for the Programme is the development and adoption of e-alert systems, based on the test result, which will proactively notify clinicians when a patient has AKI, supporting implementation of AKI NICE guidance (CG169).

Although primary care is an important focus for detection and prevention of AKI, it is anticipated that AKI results will be sent to primary care in a second phase of the programme. Meanwhile Trusts are expected to discuss with primary care representatives the management of AKI test results, particularly at times when deputizing services are providing medical cover.

Further support will be provided by the National Programme as exemplar e-alerting system are developed: www.england.nhs.uk/AKIProgramme

The AKI detection algorithm can be found at the following link: www.england.nhs.uk/aki-algorithm

**Actions**

**Who:** NHS acute trusts and foundation trusts providing pathology services

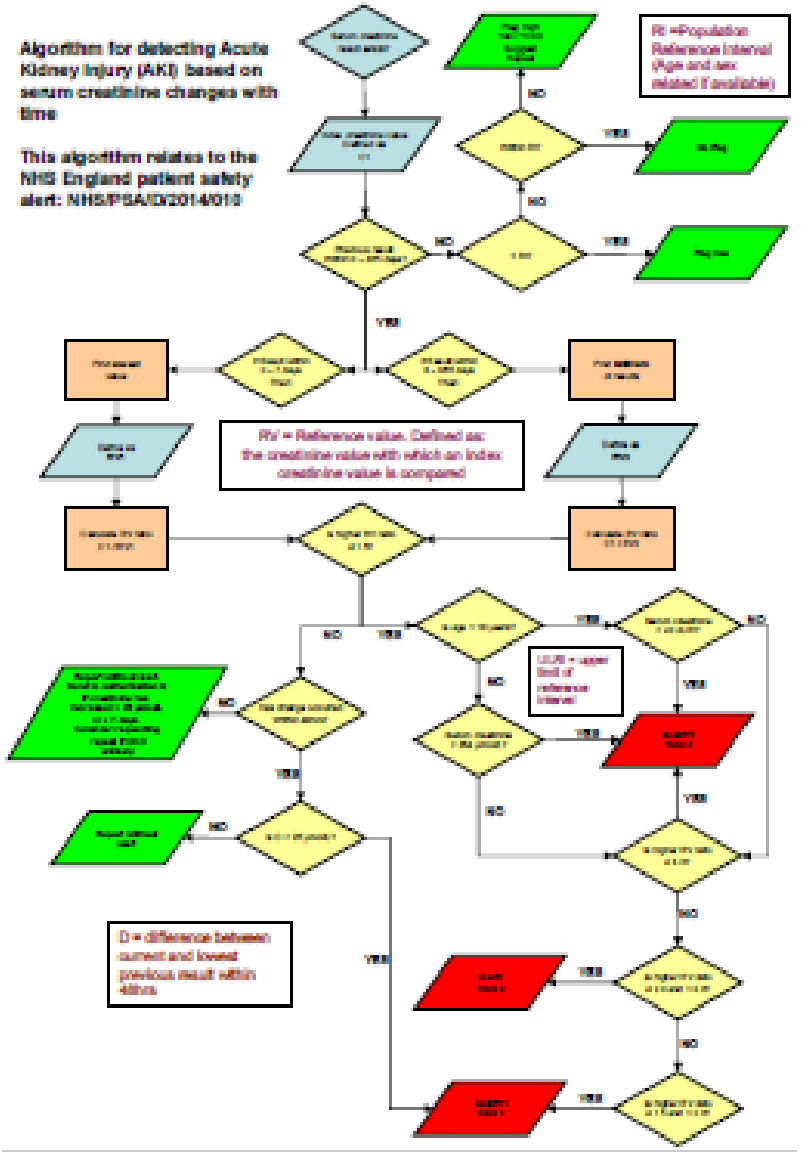
**When:** By 9 March 2015

1. Bring this alert to the Director of Pathology/IT with responsibility for the upgrading of LIMS systems
2. Work with local LIMS supplier to integrate AKI algorithm into LIMS system
3. Work with local LIMS supplier to ensure the test result goes to local Patient management systems and into a data message sent to a central point for national monitoring purposes
4. Communicate with appropriate primary care providers to ensure they seek advice if test results are received
5. Regularly access NHS England AKI website where additional resources and information will be provided as developed

Supporting information
For further information to support the implementation of this alert go to www.england.nhs.uk/aki-algorithm

- Integrate national AKI algorithm into LIMS
- AKI test result to local patient management systems
- National monitoring
- Communicate with Primary Care
- Access NHS England AKI Website
- Implementation date March 2015

# NHS England National AKI Algorithm



# Good Practice in AKI – AKI alert comments

P – Perfusion

S – Sepsis

T – Toxicity - often drugs

O – Obstruction

P – Parenchymal kidney disease

THINK KIDNEYS

Latest: Oliguria statement [news]

Home About Case studies AKI data Latest Resources Events Forum

## Acute Kidney Injury

# The NHS campaign to improve the care of people at risk of, or with, acute kidney injury

In the UK up to 100,000 deaths each year in hospital are associated with acute kidney injury. Up to 30% could be prevented with the right care and treatment

NCEPOD. Adding insult

It is estimated that one in five people admitted to hospital each year as an emergency has acute kidney injury

Wang, et al. 2012

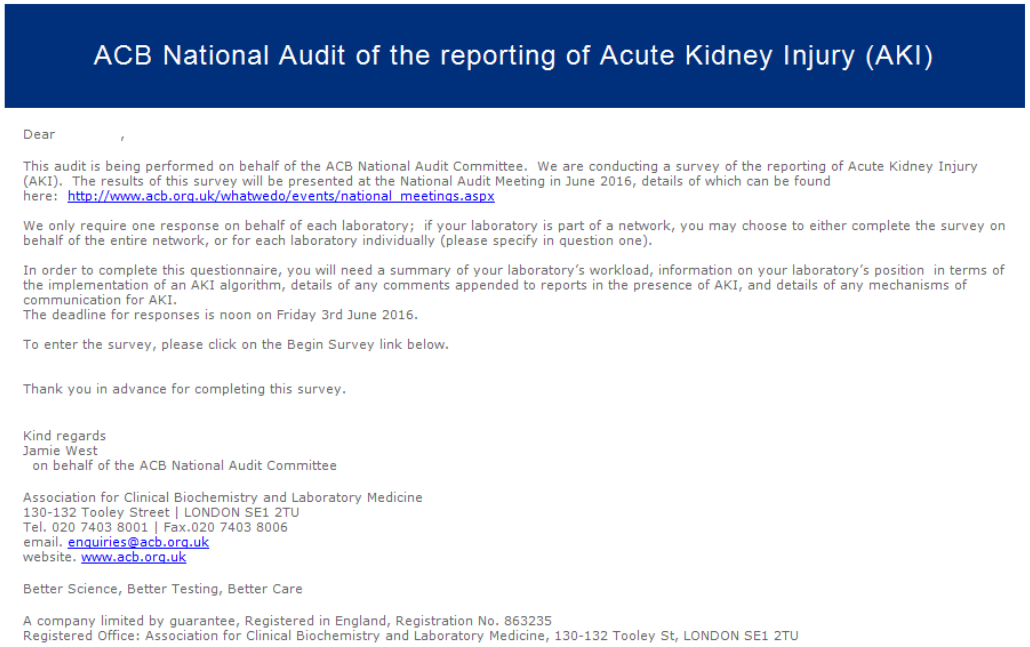
Just one in two people know their kidneys make urine

Ipsos MORI survey,

About 65% of acute kidney injury starts in the community

Selby, et al. 2012

# ACB National Audit Group AKI audit – May 2016



ACB National Audit of the reporting of Acute Kidney Injury (AKI)

Dear ,

This audit is being performed on behalf of the ACB National Audit Committee. We are conducting a survey of the reporting of Acute Kidney Injury (AKI). The results of this survey will be presented at the National Audit Meeting in June 2016, details of which can be found here: http://www.acb.org.uk/whatwedo/events/national_meetings.aspx

We only require one response on behalf of each laboratory; if your laboratory is part of a network, you may choose to either complete the survey on behalf of the entire network, or for each laboratory individually (please specify in question one).

In order to complete this questionnaire, you will need a summary of your laboratory's workload, information on your laboratory's position in terms of the implementation of an AKI algorithm, details of any comments appended to reports in the presence of AKI, and details of any mechanisms of communication for AKI.
The deadline for responses is noon on Friday 3rd June 2016.

To enter the survey, please click on the Begin Survey link below.

Thank you in advance for completing this survey.

Kind regards
Jamie West
on behalf of the ACB National Audit Committee

Association for Clinical Biochemistry and Laboratory Medicine
130-132 Tooley Street | LONDON SE1 2TU
Tel. 020 7403 8001 | Fax.020 7403 8006
email. enquiries@acb.org.uk
website. www.acb.org.uk

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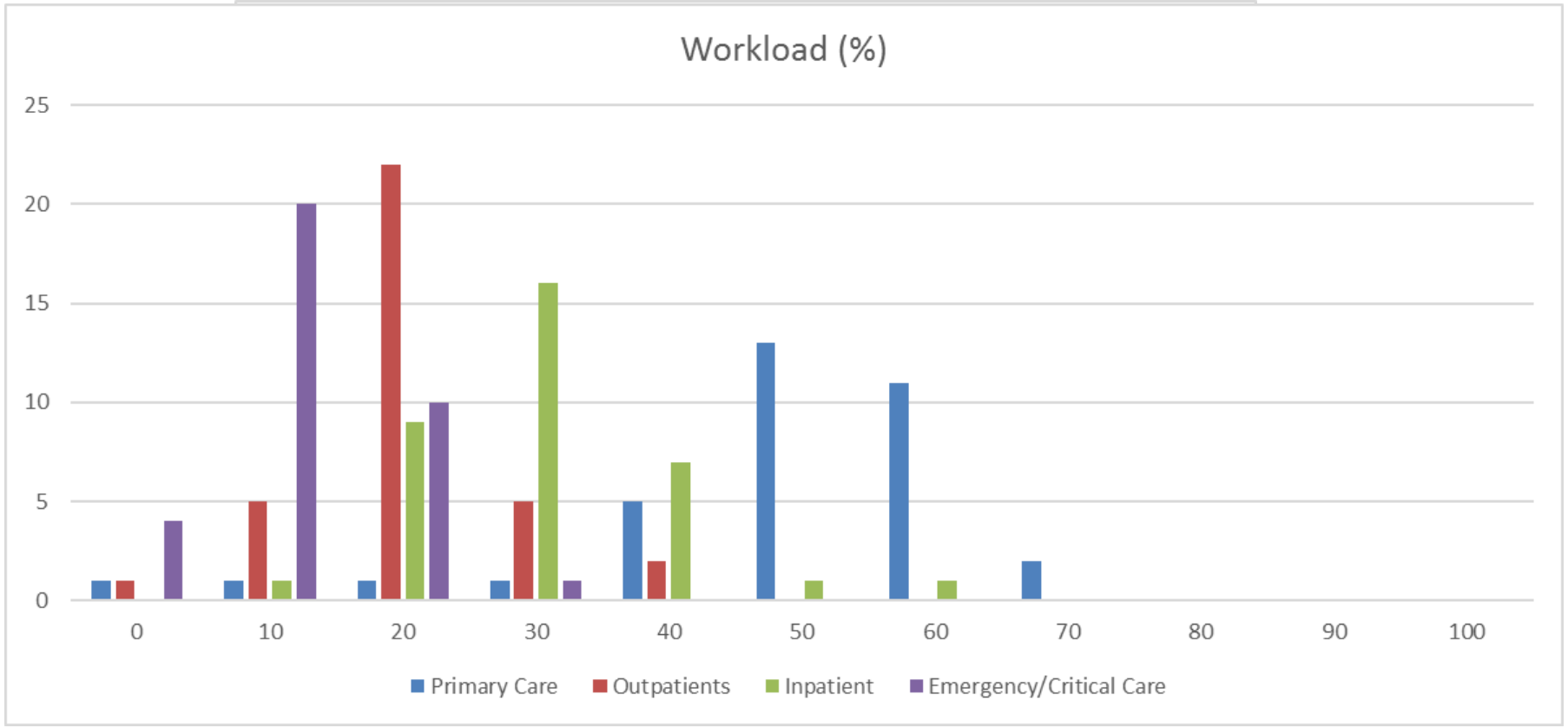
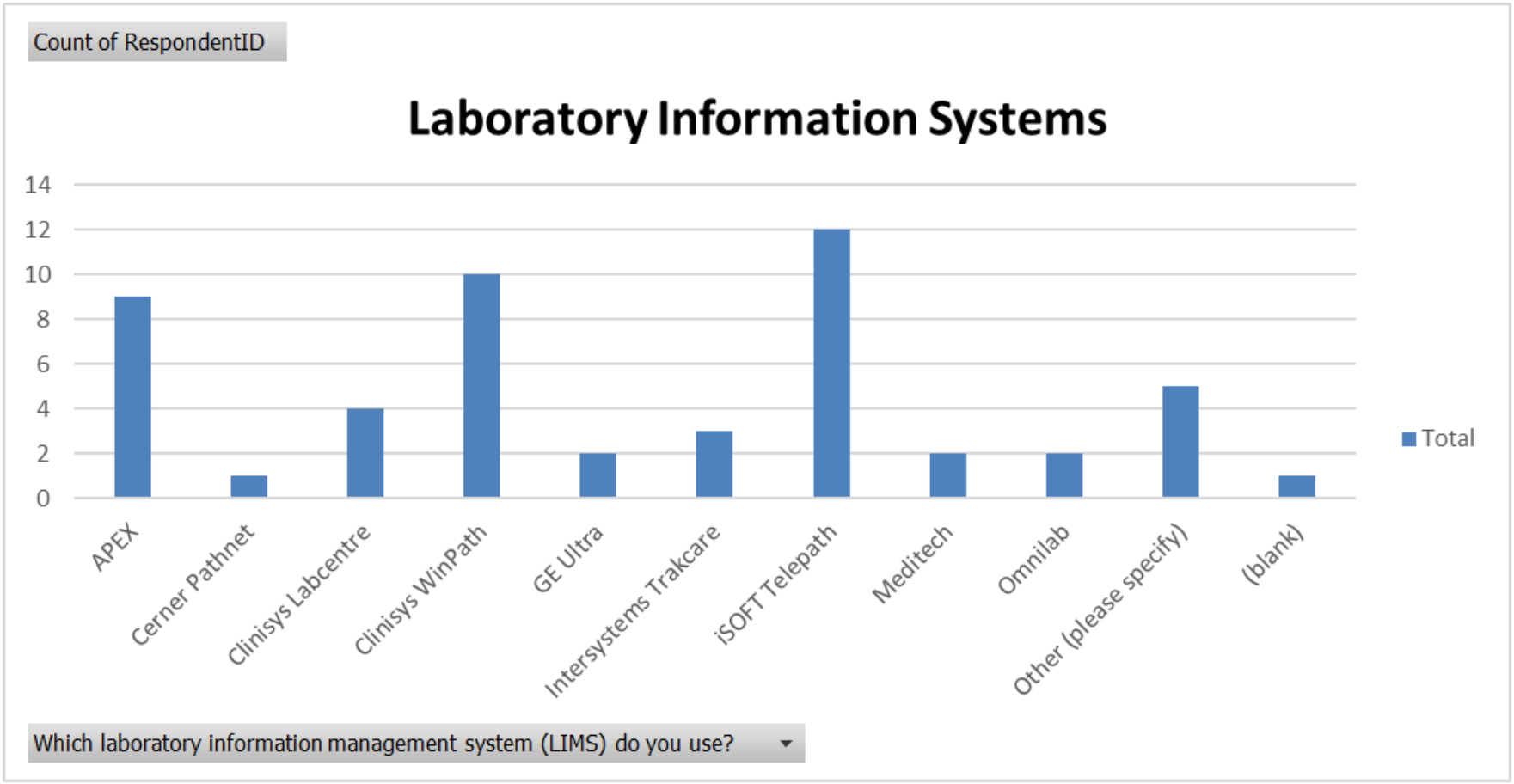
- Issued 28th April 2016
- Closed 3rd June 2016
- 51 respondents

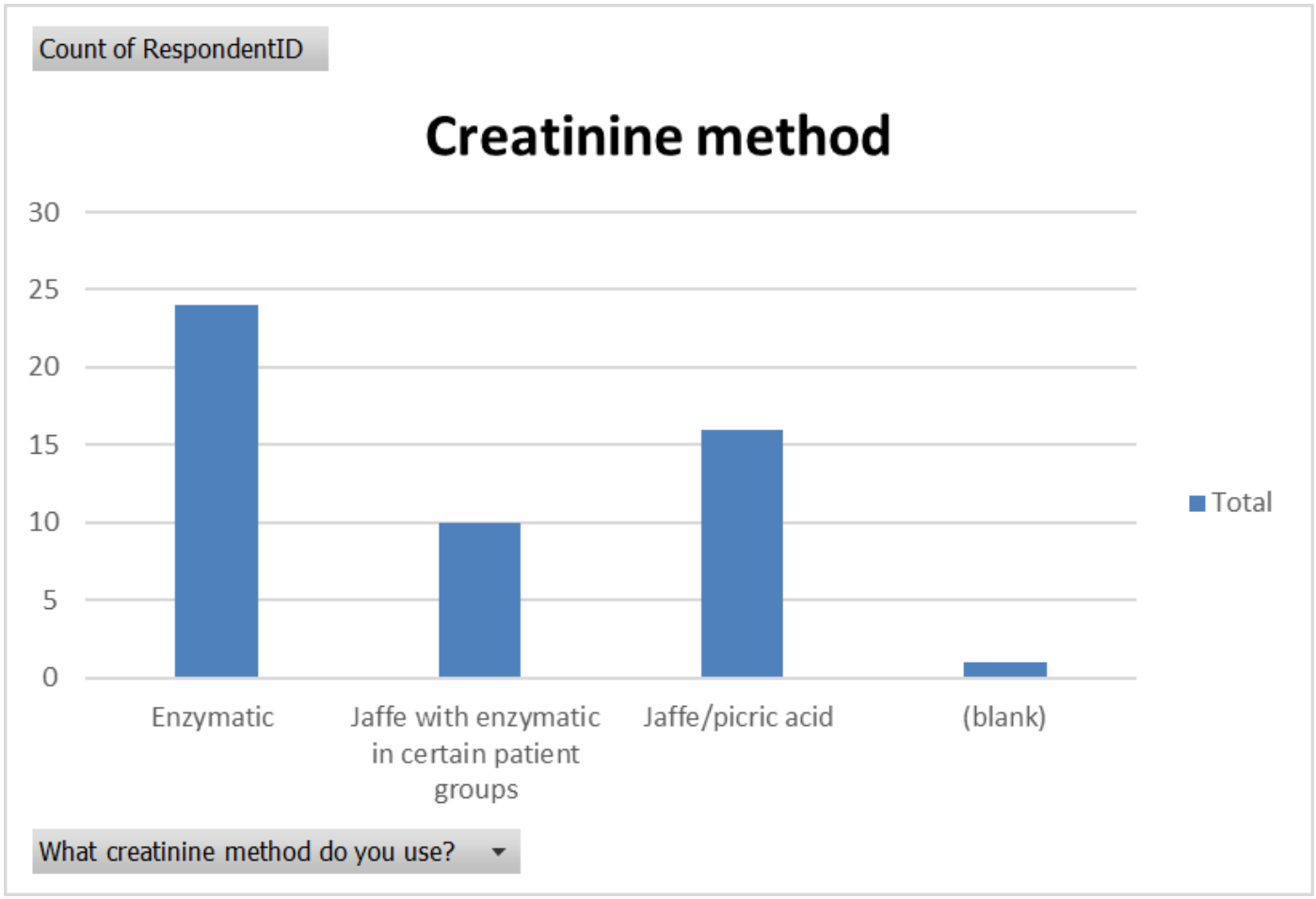
# Respondents



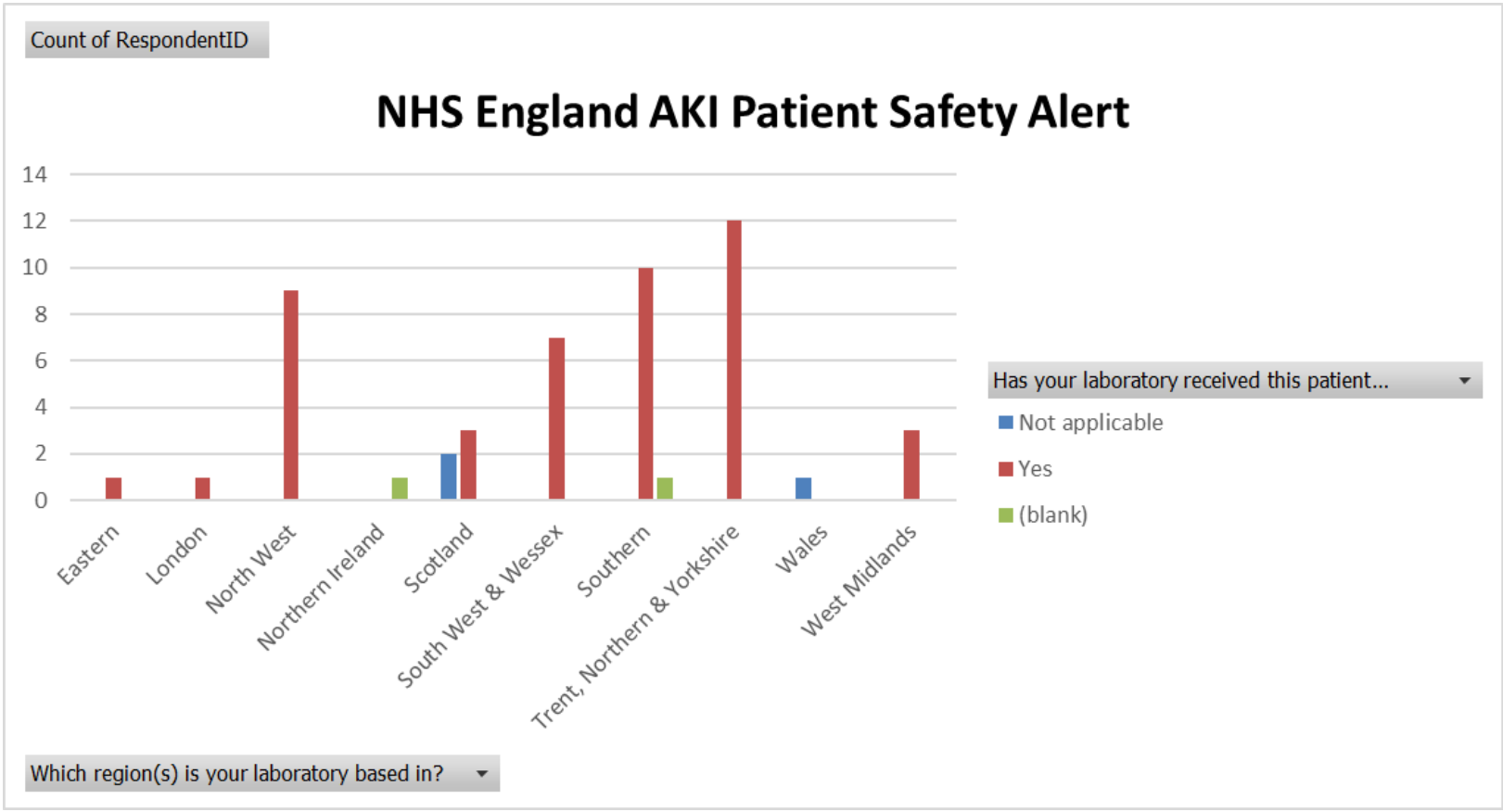
# Laboratory Information Systems



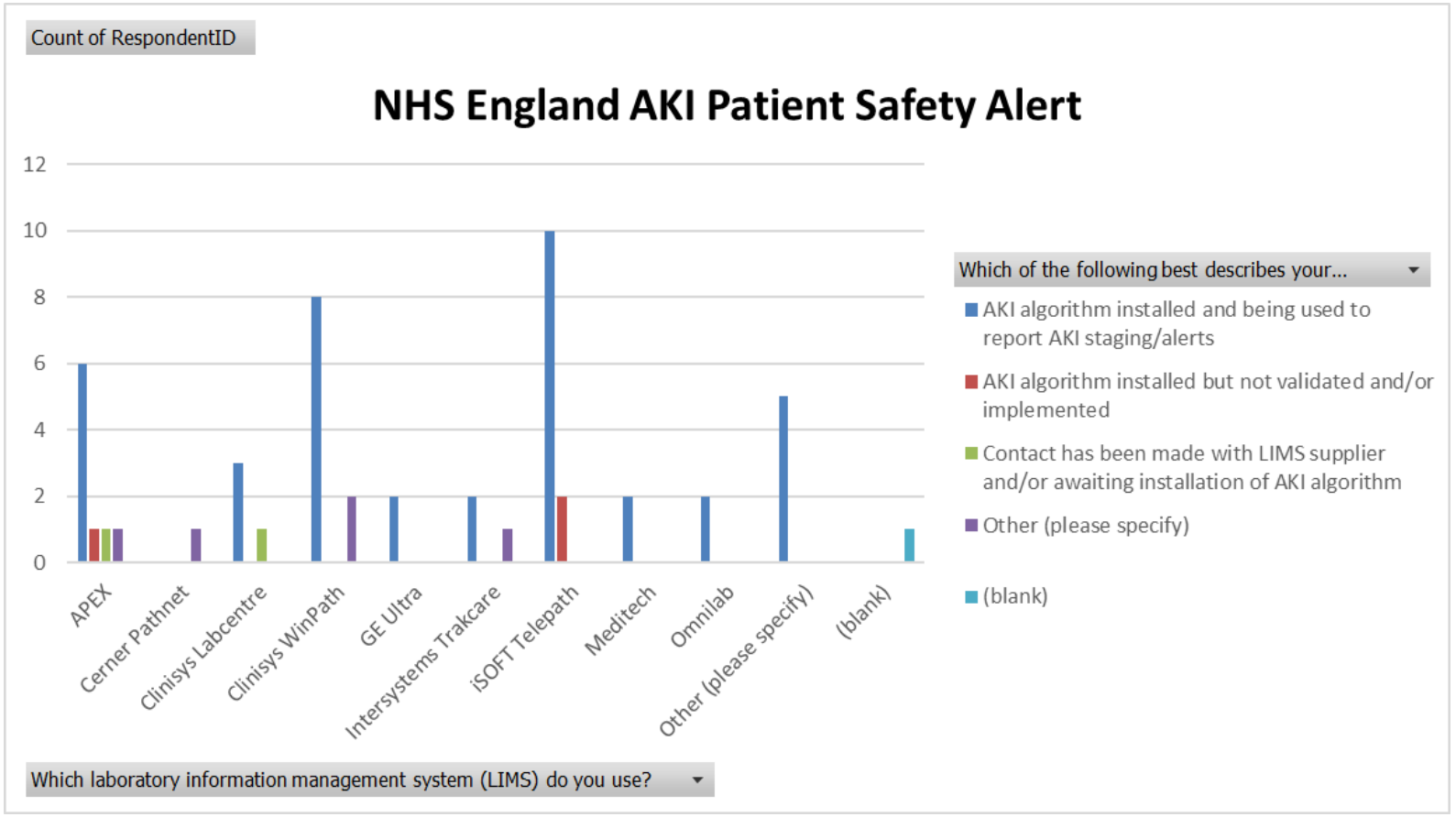
# Creatinine method



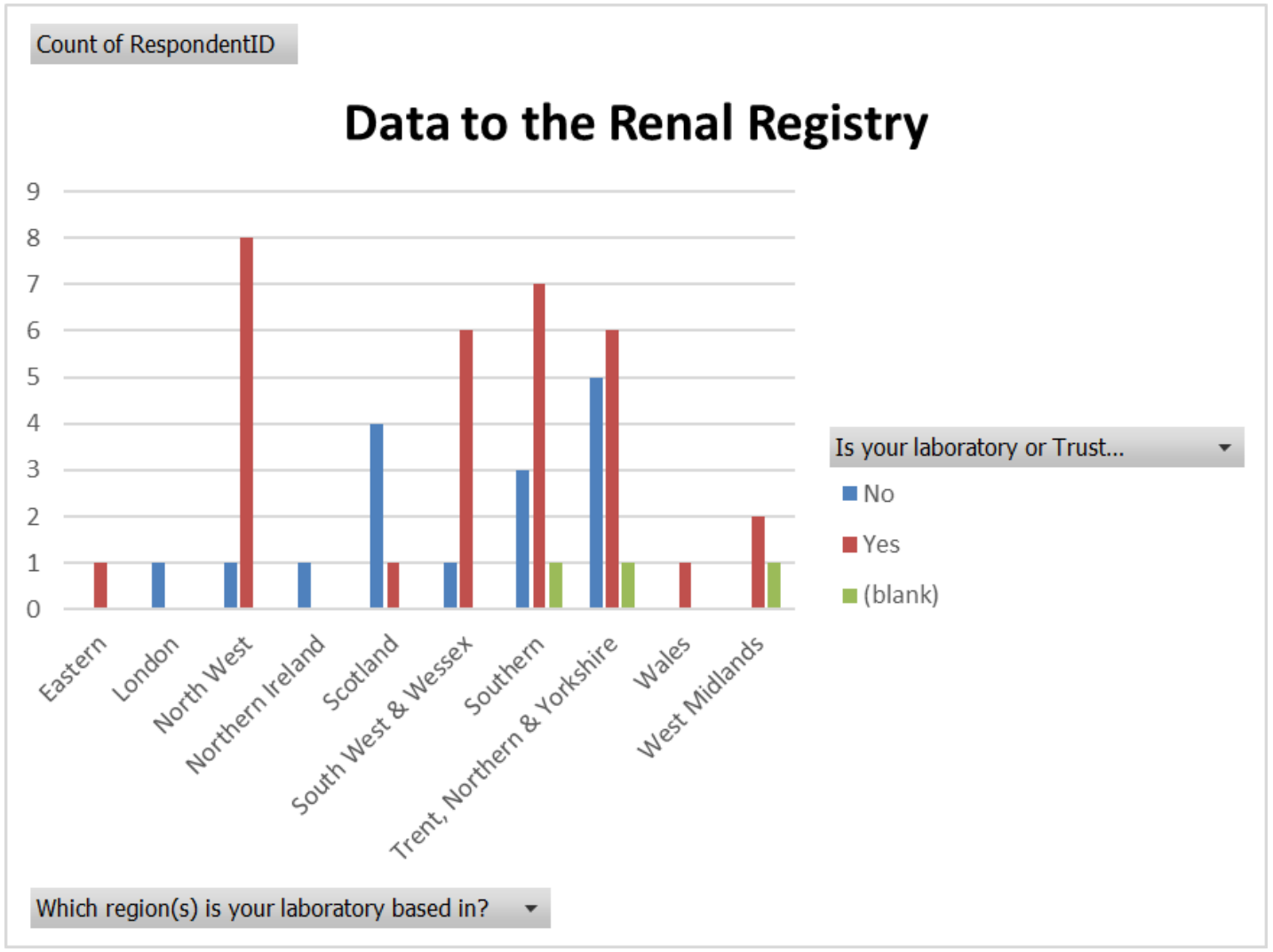
# Has your laboratory received the NHS England AKI patient safety alert?



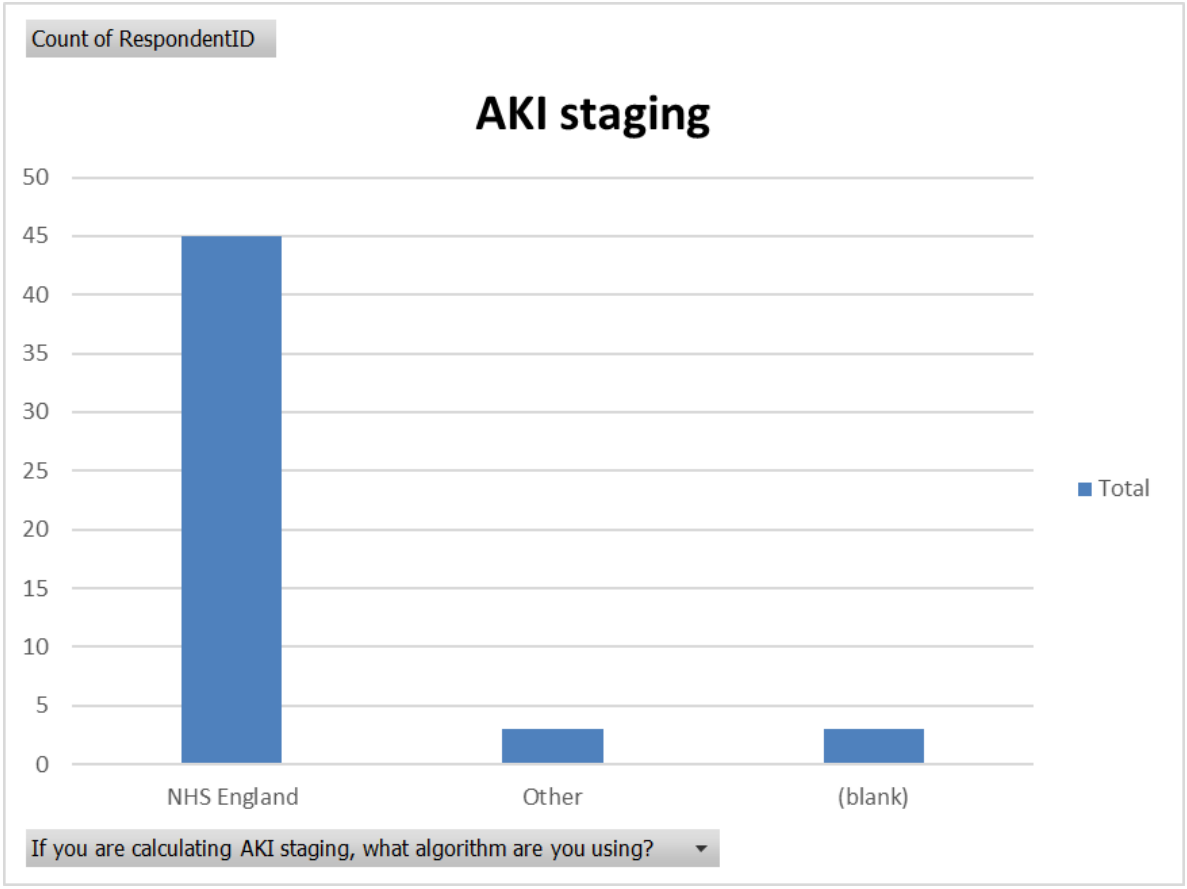
# Which of the following best describes your laboratory's position in terms of actioning the patient safety alert?



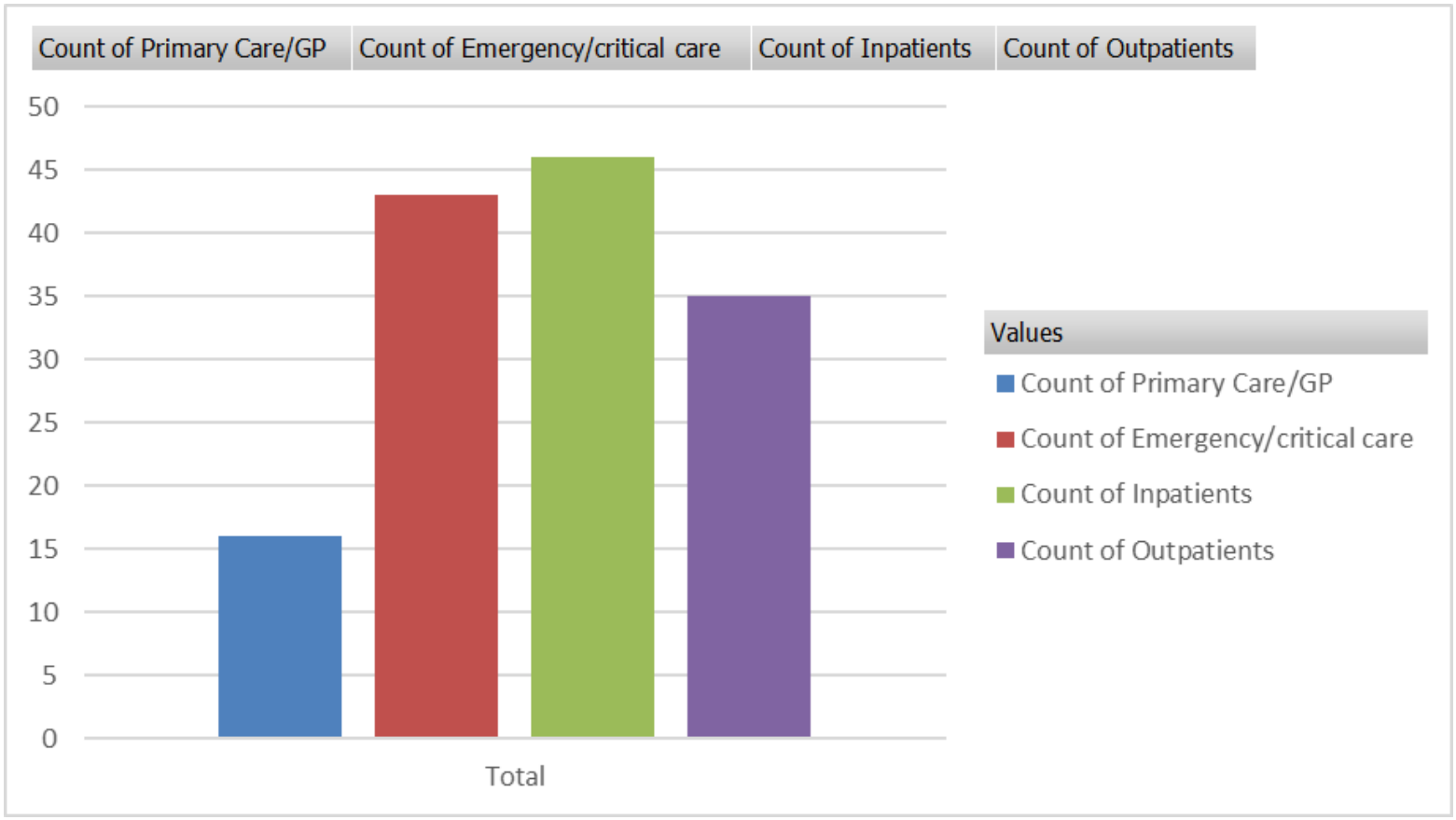
# Is your laboratory or Trust providing AKI data to the Renal Registry?



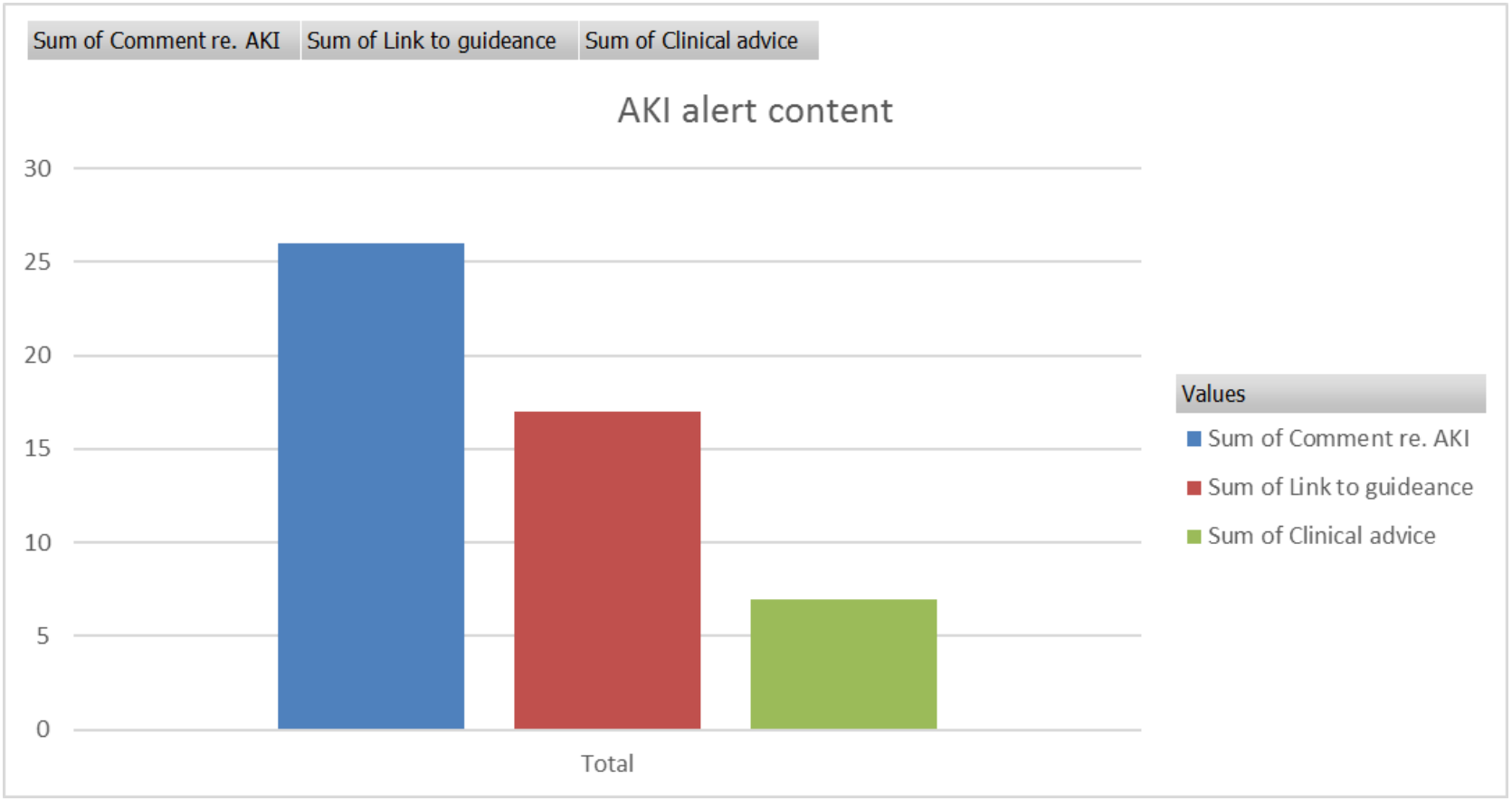
# If you are calculating AKI staging, what algorithm are you using?



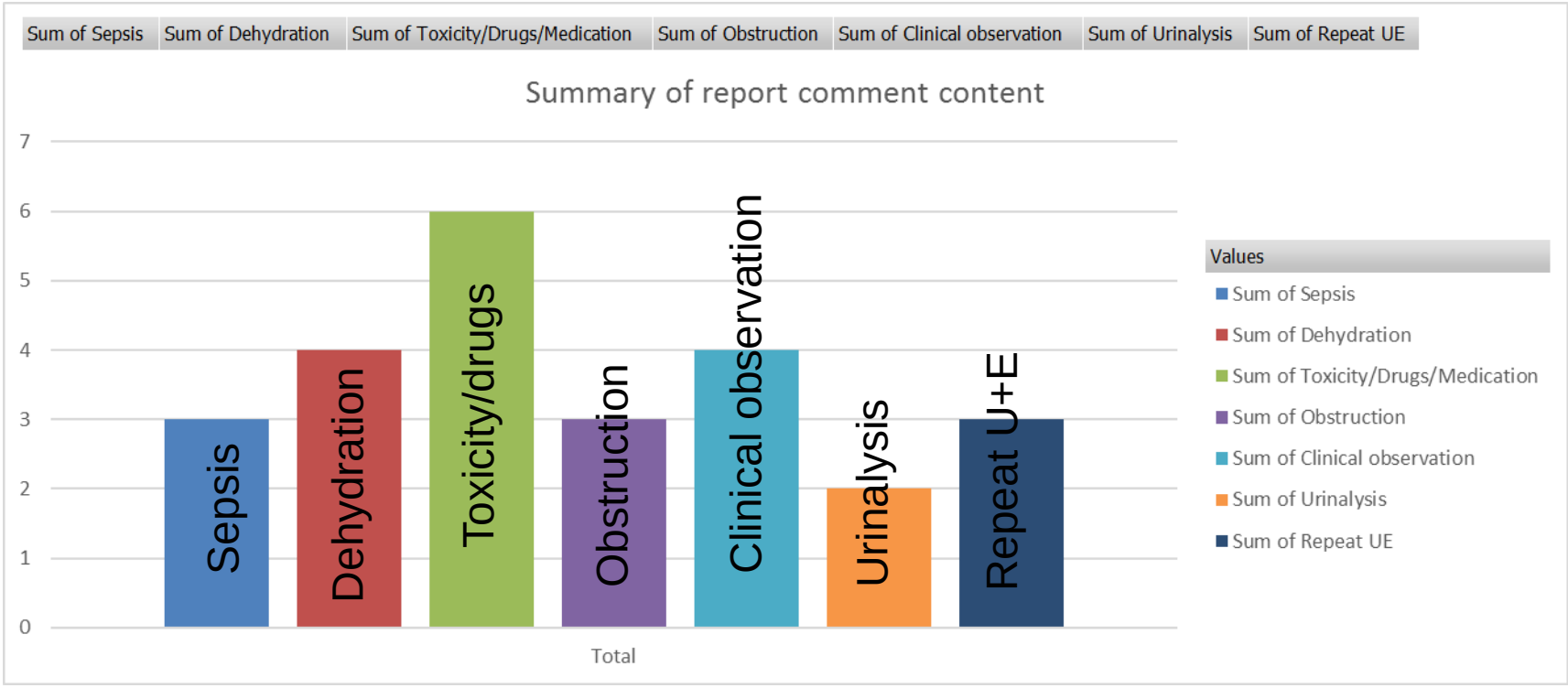
# If your report or comment on AKI stagings, which patient groups do you report on?



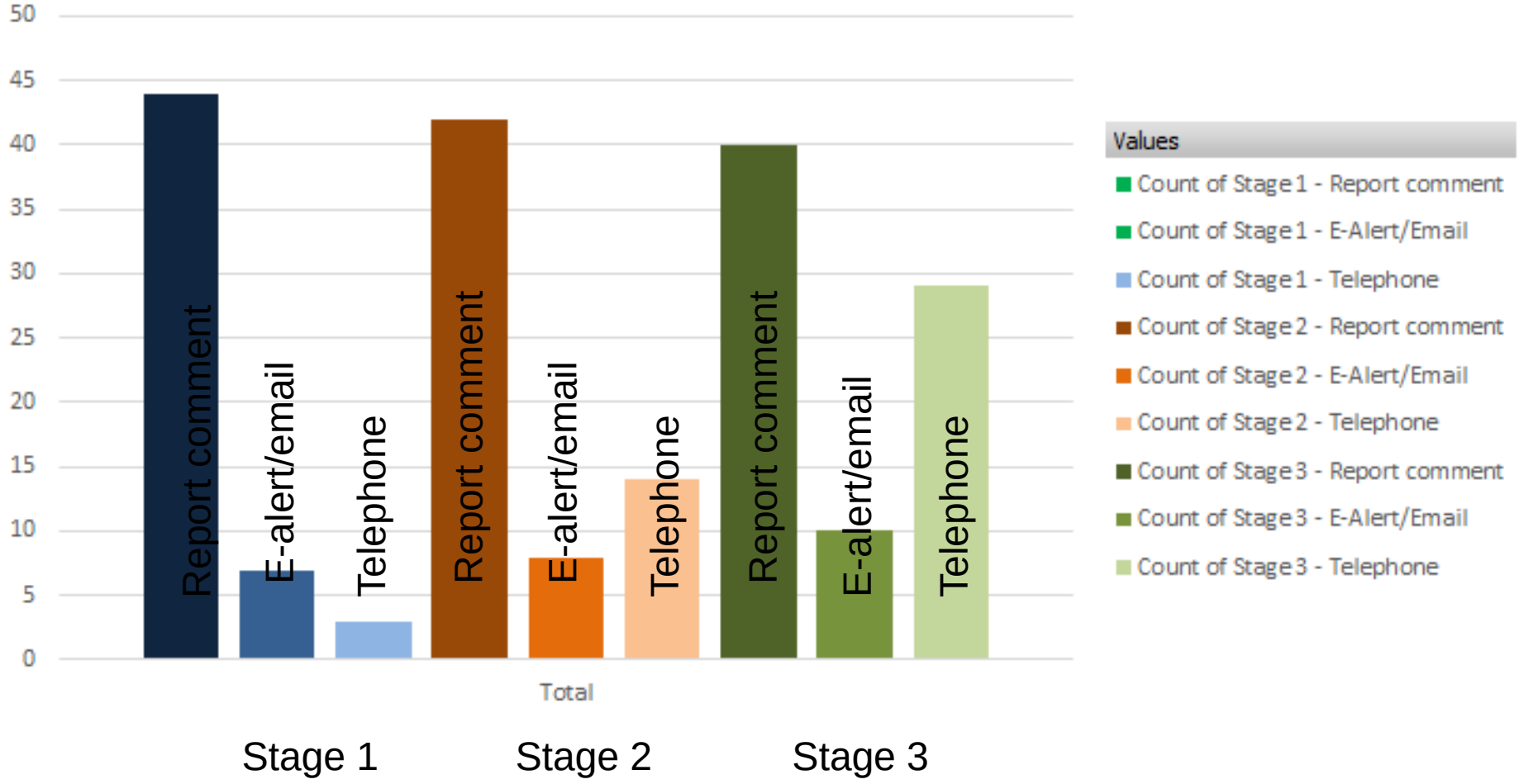
# AKI alert contents



# Clinical commentary on AKI alerts



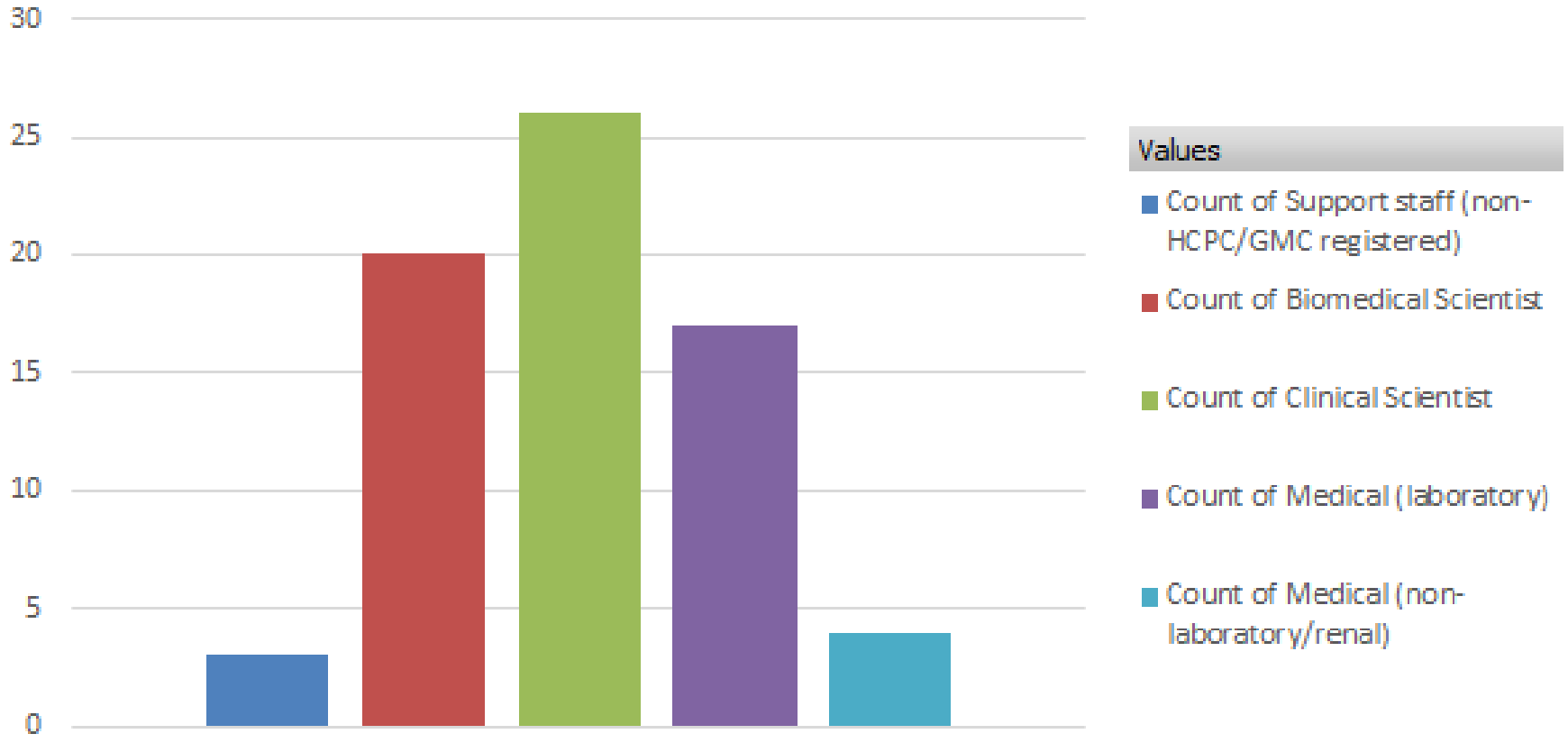
# Please describe how AKI stagings are communicated to users



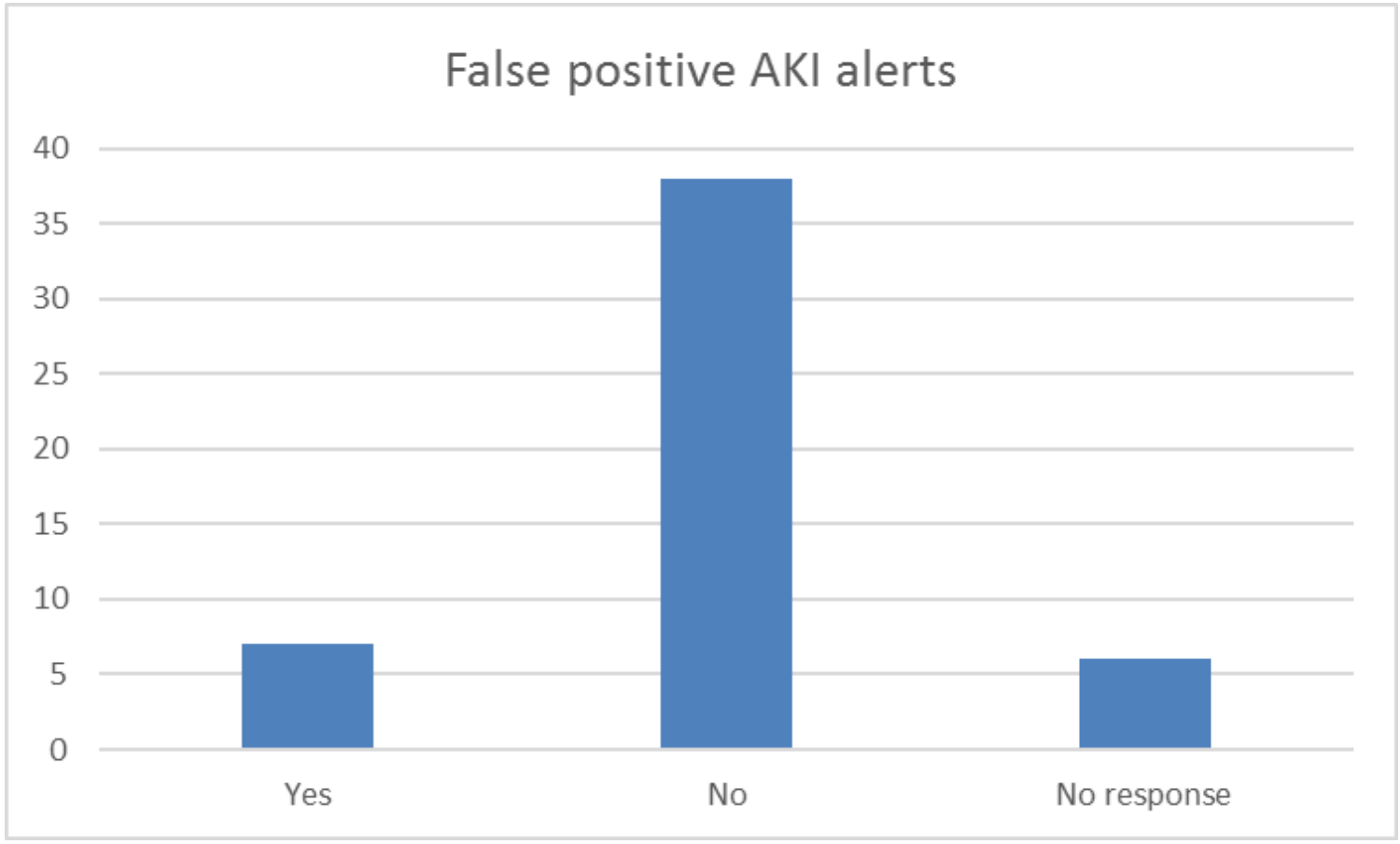
# AKI alerts – other processes

- High creatinine results telephoned (e.g. >400umol/L or >200umol/L)
- Web-based lists made available:
  - Renal teams
  - Critical care outreach
  - Pharmacy
- Traffic light alerts via order comms system
- Case-by-case review
- Review by Duty Biochemist

# If AKI staging results are discussed by telephone, what grade(s) and staff roles are involved in the communication of results?

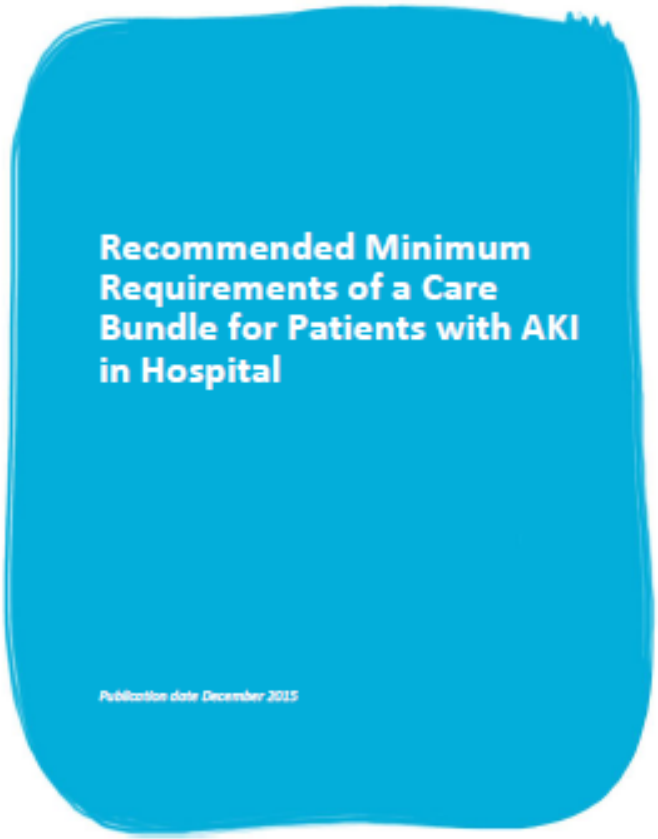


Does the laboratory take any action or provide comments on potential 'false positive' AKI alerts (e.g. in patients with previously low creatinine due to fluids or pregnancy)?



# Survey limitations

- 51 respondents
- Survey  respondents may be selective
- A ‘snapshot’ in time
- Additional materials not reviewed



# Key findings

- 90% respondents have received the NHS England AKI Patient Safety Alert
- 78% respondents have the national AKI algorithm installed and being used to issue AKI alerts
- 63% respondents providing data to the UK Renal Registry
- 88% of responding labs using national AKI algorithm

# AKI opportunities

- Further work for some labs in implementing the national algorithm
- Improvements in submitting data to the UK Renal Registry
- Variation in practice:
  - Clinical groups on which AKI reported
  - Reporting mechanisms
  - Alert content
- Advice on ‘false positive’ results

# Thank you!

Caring Creative Community