1. Background

Acute Kidney Injury (AKI) was identified as a priority area for patient safety improvement and a number of Patient Safety Collaboratives (PSC) selected it as a clinical priority. The PSCs joined with Strategic Clinical Networks focussing on AKI to form a ‘cluster’ under the leadership of Kent Surrey and Sussex PSC. Partnerships were developed with Think Kidneys (TK), and the UK Renal Registry (UKRR) who, together with the cluster identified the most important areas on which to collaborate. The National Patient Safety Alert and resultant capability of the UKRR to link data items at patient level (the Master Patient Index) and produce information relating to AKI offered an opportunity to co-design a measurement strategy for improvement. A workshop was held on 16th March 2016 to commence the work and this paper provides a description of the ambition and progress to date.

2. The AKI Cluster objectives

**Members:** North East and North Cumbria AHSN and PSC project, North West Coast AHSN, Northern England SCN, Yorkshire and Humber PSC, Cheshire and Merseyside SCN, AQ programme in AQUA, Oxford AHSN PSC, UCL Partners PSC, South West SCN, East of England SCN, Wessex Clinical senate and SCN, Manchester, Lancashire and South Cumbria SCN, South Central SCN, West of England AHSN and Kent Surrey Sussex PSC.

<table>
<thead>
<tr>
<th>1. To provide a forum for Strategic Clinical Networks and AHSN Patient Safety Collaboratives who are working on quality improvement in Acute Kidney Injury to exchange information, learn from each other and accelerate adoption and spread;</th>
<th>2. To create mutually beneficial relationships with national programmes and bodies working on AKI</th>
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<tbody>
<tr>
<td>3. To share approaches to measurement for improvement in AKI, agreeing common high level measure sets if appropriate and linking with the national Patient Safety Measurement Unit and Renal Registry to avoid duplication and maximise use of routinely collected data.</td>
<td>4. To provide feedback and briefings to the Academic Health Science Network Patient Safety Collaborative Board and Patient Safety Leads meeting and to communicate about the work of each cluster. To provide information to NHSE as part of contract assurance.</td>
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<tr>
<td>5. To share approaches to industry and</td>
<td>6. To contribute to specific and generic work on measurement for improvement,</td>
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</table>
innovation, identifying opportunities for wider deployment of innovative technologies and approaches.

evaluation of Patient Safety Collaboratives.

7. To map areas of current work and create sub-networks of common interest. Identify cross cutting issues where there is an opportunity for shared learning or wider impact.

8. To identify effective ways of disseminating learning to PSCs not working on AKI

9. To create a repository of ‘tools, tips and tricks’ documents and other materials available to all improvement practitioners and organisations, to support adoption and spread;

10. To share learning with other clusters for effective ways of working as a cluster.

11. To share best practice on patient and citizen engagement;

12. To agree ways of documenting learning and the impact of the cluster.

3. Rationale for the co-design workshop.

- The AKI Cluster members identified the common challenge of developing a robust sustainable and meaningful measurement strategy and wanted to work together to develop their thinking around this; to capitalise on joint intelligence and avoid duplication. Working together with the UKRR and the Think Kidneys programme would be essential.
- The PSCs needed structure, process and outcome data around AKI to support and direct their regional quality improvement (QI) initiatives.
- The UKRR has established a robust mechanism for populating a master patient index (MPI). Linkage with the ONS, HES, ICNARC databases and the UKRRs dialysis and transplant database will enable a comprehensive analysis of outcomes associated with AKI.
- It seemed sensible for all parties to maximise the use of this AKI outcome resource as (i) it would avoid duplication of existing resources and interfaces and (ii) it would underpin universal reporting to the MPI by delivering functionality for quality assurance and quality improvement
- The PSCs wanted to co-design the systems for collecting outcome data from the UKRR AKI MPI so that it had greatest utility and impact with QI teams and front line clinicians. The PSCs could also assist with wide dissemination of and clinical engagement with the data, supporting improvement activities.
- The UKRR do not collect detailed structure and process data. However PSCs and SCNs already have insights into process measures and commissioning of acute services at a local and regional level. It was agreed that this could be where the PSCs may usefully focus their local measurement activity.
- Existing information governance permissions should allow PSCs to use UKRR AKI MPI (outcome) data, once available in anonymised/aggregated format.
- Explore the relationship with Central Measurement Unit currently being established for PSCs under the direction of NHS Improvement.
4. Objectives for the workshop:
A wide range of expertise from individuals and organisations contributed to the design and delivery of the day including; UKRR, Think Kidneys programme board and work stream leads, NICE, NHS England, NHS IQ, Nephrologists/clinical leads, AKI nurse, pathologists, GP, information analysts and improvement leads. The day was chaired by Deborah Evans, Managing Director of West of England AHSN.

- To achieve a common understanding of the potential data sets available from UKRR to support a long term measurement strategy for PSCs, SCNs and others working on AKI improvement and to establish broad agreement on a common set of metrics that are deliverable from that data set.
- To discuss limitations and assumptions associated with the data.
- To establish broad agreement on data access and availability of reports, their format, frequency
- Enable better engagement with and understanding of the benefits of reporting data to the UKRR and how it can be used in an effective way.
- Consider process measures that can be used to support work locally

5. Outputs from the workshop:
There was a consensus and great enthusiasm for working together to develop a comprehensive and sustainable measurement strategy to support quality improvement activity for AKI. It was agreed that the timing was perfect as the UKRR develop their MPI and reporting functions. It should be possible to create streamlined reports demonstrating change over time on key outcomes for patients with AKI that can be used locally to inform and support improvement work.

Information pertinent to the whole system was important and further work will be required to detail the most relevant outcomes that are meaningful in different healthcare sectors.

There was interest in adapting the RADAR patient level data entry system developed by the UKRR to record process measures. KSS PSC will operationalise this approach and UCLP PSC are considering a pilot. The benefits would be the ability to link process measure delivery at patient level to outcomes.

NICE are in the process of developing AKI Indicators and it was agreed that the workshop group would act as a sounding board and help to inform this work. KSS PSC will act as a conduit to support the activity.

The day was divided into three main sections:

5.1 Meaningful and evidence based outcome measures.
There was a surprising degree of consensus in the workshop on the key outcome measures to be employed in measurement for improvement in AKI care. There was discussion of the nature of variation in these outcomes and the degree to which they reflect comorbidity or disease severity and how much they reflect the quality of care. There was also discussion of the need for measures to have clinical significance and for the measures to be comprehensible

- Reduction in the number of people dying with AKI present.
• Reduction in the number of people with residual chronic kidney disease after an episode of AKI
• Reduction in overall incidence of AKI.
• Reduction in rates of hospital acquired AKI
• Reduction of progression of AKI severity in hospital
• Length of stay in admissions where AKI was a coded diagnosis

5.2 Reporting and access to data. The key messages from this session are summarised as:

• The purpose of the enterprise was re-iterated. Measurement was to support quality improvement and not as a tool for performance management.
• Information needs to be accessible in a range of report formats (funnel plots/run charts (SPC) / infographics) but importantly needs to be able to be configurable for local analysis and presentation.
• Information needs to be available in a timely fashion with system design giving some priority to limiting the time necessary for clean up or validation of data.
• Information can be aggregated and anonymised to be shared at regional level
• Submitting organisations should have access to their data as both raw data and in a benchmarked format.
• Needs to be possible to demonstrate change in process, outcome and balancing measures over time in all participating organisations or within a region/programme. Analysis of why high performing participants or those changing rank might support peer-assist interventions.
• Information should be anonymised initially but with the expectation that once mechanisms to report data with confidence mature and opportunities to support QI have been in place over time that trajectories are identified for regions or organisations

5.3 Process measures

There was discussion about how to balance the clinical significance and ease of ascertainment and data extraction in the choice of process measures for AKI QI. Where possible the measures should not require clinical expertise amongst the staff collecting data and responses should be binary or at least unambiguous.
Proxy measures for clinical interventions such as completion of a fluid balance assessment or medication may be embedded in clinical documents. The time to completion of interventions is used in UCLP AKI programme whilst performance in a prescribed time interval is employed in other existing AKI QI initiatives. Process measures are supported by a data dictionary in some regions with existing AKI QI initiatives. RADAR was reviewed as a cost-effective possibility for collection of process measures and this approach might allow collation and comparison with temporal trends in outcome measures facilitated by UKRR MPI linkage to other datasets. These will be subject to further work and testing. (See appendix 3 for further detail)
Conclusion

The AKI Cluster will capitalise on the momentum of the workshop; continue to partner UKRR and TK to refine and finalise a set of outcome and core process measures that can be reported from UKRR and used locally by PSCs, SCNs, acute providers and commissioners to support QI. The group have agreed to continue to collaborate on this topic.

Note: Schedules on process and outcome measures from the workshop are not included. They are available from Jo Wookey on jowookey@nhs.net

Date: 12/04/2016

Authors: EK / JW / KM /FC /CL/TR
## Appendix 1

### AKI Measurement for Improvement Event: Session 1: Outcomes for AKI Improvement Available From The UKRR

List 3 Outcome Measures for AKI Improvement work, how they can be measured, rationale and potential issues

<table>
<thead>
<tr>
<th>Possible Outcome Measure:</th>
<th>Rationale:</th>
<th>Potential Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>New residual chronic kidney disease (CKD) after AKI episode OR progression of CKD after an episode of AKI</td>
<td>CKD could be identified by renal UKRR Relatively easy to collect and of great significance to patient outcomes and commissioners. CKD and risk of • Death • Renal replacement therapy</td>
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<tr>
<td>AKI progression of severity</td>
<td>Cardiovascular events</td>
<td>When does hospital acquired AKI start - diagnosed 24-48 hrs after admission</td>
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</table>
| - No AKI or AKI1 or 2 to AKI 3  
- Progression of AKI 1 to 2, 1 to 3  
- In hospital progression of AKI 1,2 to 3 | | How do we handle primary care AKI? |
|                             | - Non-contentious interventions which should occur more commonly (fluid management, medicines management and relief of obstruction, prompt treatment of sepsis and primary renal disease) | Is hospital-acquired AKI different from hospital-managed AKI? |
|                            | | Scenarios in which a change in creatinine may not have the same prognostic significance (post-partum, Heart failure) |
| Length of Stay             | Easy to identify     | Survival rates may influence                                           |
|                            | Recognition and early management may be important but may segregate with other positive behaviours or favourable infrastructure | - LOS  
- ITU admissions |
<p>|                            |                      | Unmeasured influences                                                  |</p>
<table>
<thead>
<tr>
<th>Mortality</th>
<th>Despite any reservations about practicalities, the 30day and longer term mortality seen in association with AKI is so sizeable that mortality will be of great interest</th>
<th>? Ascertainment of out-of-hospital death event: Discriminating AKI associated deaths and deaths caused by AKI</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td>• Influence of type and severity of primary medical problem and comorbidities</td>
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<td>• Adjustment of denominator by exclusion of cases in which palliation was thought appropriate on clinical grounds (Timing of assignment – before or after AKI diagnosis)</td>
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<td></td>
<td></td>
<td>• Effect of use of national algorithm on AKI ascertainment and coding</td>
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<tr>
<td></td>
<td></td>
<td>?predictable/avoidable/inevitable</td>
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<td></td>
<td></td>
<td>?Differences between primary and secondary care outcomes</td>
</tr>
<tr>
<td>Community acquired AKI Incidence and outcomes</td>
<td>Natural history of community acquired AKI is imprecisely understood</td>
<td>Currently not clearly defined, what is hospital v community</td>
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<td>There may be targets for intervention or risk recognition in the community setting</td>
<td>Need to understand the baseline and what background variation there is</td>
</tr>
<tr>
<td>Patient reported outcome or patient experience measure</td>
<td>We know almost nothing about patient experience of AKI and how variation influences long term outcomes</td>
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Comments/ things to consider:

- How do we demonstrate benefits of work done?
- Lots of noise in mortality
- Need to understand the baseline
- What matters to patients?
- Matrix of outcome measures “dashboard approach”
- Need to understand the relationship between CKD and AKI
## AKI Measurement for Improvement Event: Session 2: Getting the data to the frontline and PSCs from the UKRR

<table>
<thead>
<tr>
<th>1) What do we want to ask?</th>
<th>National level narrative and understanding of the data Viewing modules via UKRR</th>
</tr>
</thead>
</table>
| Do we understand background and secular variation | - Getting better/worse over time? Where are we compared to “the best”/others?  
- Prevalence – where? Socioeconomics and demographics, CKD, DM, HF (comorbid population) Who is detecting AKI? (ED, Primary care, ward) What is the primary diagnosis? Are we improving?  
- To reduce harm associated with AKI (and inequality and unwanted variation) How much harm there is? How it varies over time and across geography. How does service configuration influence this  
- Having data the trusts submit in a format that allows it to be cut as wished. Flexible to allow for individuality of approach. |
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<tbody>
<tr>
<td><strong>2) What is the most useful way of presenting the data?</strong></td>
<td><strong>- Infographics, Open discussion</strong>&lt;br&gt;&lt;br&gt;<strong>Eg. Run charts, funnel plots, central analytical outputs</strong>&lt;br&gt;&lt;br&gt;- <strong>Infographics, Run charts and funnel plots, trends analysis (prevalence, outcomes) for non-judgemental comparison.</strong>&lt;br&gt;&lt;br&gt;- <strong>Infographics, Funnel plots and benchmarking tables (initially anonymised in the public domain until data is robust)</strong>&lt;br&gt;&lt;br&gt;Run charts and SPC charts: outcomes, process and balancing. Basic demographic and epidemiological data in usual formats.&lt;br&gt;&lt;br&gt;- Raw data organisations can cut dependant on their approach. Benchmarking for comparison, so would want everyone’s data. Manipulate locally.</td>
</tr>
<tr>
<td><strong>3) What level of information is required?</strong></td>
<td><strong>- Hospital, in-pt, out-pt and GP</strong>&lt;br&gt;&lt;br&gt;- Trust level as starting point&lt;br&gt;&lt;br&gt;- CCG, GP, Trust, Hospital, admitting specialty plus ability to group into whole systems. STPs, Vanguards need to understand population levels. <strong>Data for improvement not judgement!</strong>&lt;br&gt;&lt;br&gt;- Ward and practice level, specialty level, CCG level (ask GPs) and geographical data. Organisation identification</td>
</tr>
</tbody>
</table>

Eg. Ward level/GP practice/Trust/Hospital
### 4) Frequency and timing of the data?

<table>
<thead>
<tr>
<th>Monthly</th>
<th>Current data as soon as possible (UKRR for AKI within 6/52 but linkage would take longer) If in MPI- live/dead. Need info as soon as available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly</td>
<td>- Quarterly reporting as close to real time as possible. Bear in mind need to clean data. Varies by source, depends on how electronic/automatic the process is.</td>
</tr>
<tr>
<td>Monthly</td>
<td>- Monthly, to update dashboards. In a timely manner as close to real time as possible.</td>
</tr>
</tbody>
</table>

No lag for report if possible  
As quickly as able

### 5) Access to the data?

**a. Who has access?**

- CCG, Hospital, PSC  
- Research under ethics, NHS organisations  
- Every reporting unit should have access to their data, should be able to see summary comparator data. (rate per 1,00 pts, for example, rather than %AKI against list size)  
- People who submit data should get it back in a timely way  
- Would it be possible to integrate the RR? Information governance vital

**b. How we have access?**

- Permissions: “to view”- PDF reports on website. Governance  
- Open access, Application process for governance.  
- ability to download region/patch info “dump”  

Anonymity initially – can be more open once data is robust
6) Process of data distribution /publication

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</table>
|   | - Could be mass download of permissions  
|   | - Online, Registry  
|   | - Link for interactive website…pick your indicator, see your data etc. Handling longer term trends  
|   | - Trust should be able to get access to their own data. 
|   | Network log on and use data in discussion where groups of organisations come together to look at common themes. Improvement delivering and comparison rather than judgement.  
|   | - **Narrative to staff**  
|   | - Trust level reporting |

- LIMS data about a 6 weeks process. Almost real time.
- Important to know where data source is: ?in-pt/ out-pt/community: not always in LIMS. If reliant on HES introduces 6 month delay.
- Converting codes from Lab is do-able
# Appendix 3

## AKI Measurement for Improvement Event: Session 3: Core Process Measures

Considering everything you have just heard re quality measures, minimum standards and audit measures; List 7 process measures, rationale and possible issues.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Rationale</th>
<th>Potential Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Urine dipstick within specified time of 1st AKI warning test result</td>
<td>Early detection of intrinsic kidney disease</td>
<td>Definition, “time to….” vs binary yes/no&lt;br&gt;-Urine dipstick- evidence in notes that medical team is aware of dipstick result&lt;br&gt;Automating DUA entry into health records&lt;br&gt;Reliable/consistent recording of results</td>
</tr>
<tr>
<td>2) Measurement of U&amp;Es within 6hrs in all emergency admissions</td>
<td>Recognition of association between acute admission and risk of AKI</td>
<td>How to automate&lt;br&gt;Defining acute/emergency admissions</td>
</tr>
</tbody>
</table>
| 3) Repeat blood tests within 24hrs of 1st AKI warning test result | Recognition of and response to AKI warning test results | How to automate<br>Recognising how AKI results are messaged to
<p>| | | |</p>
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<tbody>
<tr>
<td>4) <strong>Medication Review - Pharmacy review &lt;24hrs 1st alert</strong> - Has there been a meds review by appropriate HCP in primary and secondary care</td>
<td>Abundant evidence of harm from failures of medicine management and opportunities for gain from intervention</td>
<td>Multiple methods of assuring and documenting intervention. Intervention may be delivered by different professional groups</td>
</tr>
</tbody>
</table>
| 5) **Assessment of volume status** | Fluid balance key to management. Potential response:  
A. Hypo – needs fluid  
B. Normal – No fluids  
C. Hyper – diuretics  
D. Complex – Needs senior review | Difficult to extract from healthcare records. Analysis (Review of notes might suggest active choice of option B but failure to deliver option A or recruit D may also explain this). Potential culture change around recording of fluid balance |
| 6) **Ultrasound for those who need it.** (based on NICE guidance, at risk of obstruction or no clear reason for AKI) Ultrasound within 24hrs 1st AKI warning test result (< 6 hours if infected obstructed system suspected) | Early detection of urinary tract obstruction | Record of whether senior review says pt needs USS. Alternative AKI explanation, timing and risk require judgement |
| 7) **Time to treat:**  
• Sepsis - 6hrs  
• Toxins – 12hrs | Timely intervention | When does the clock start if AKI is not present at admission |
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<tbody>
<tr>
<td></td>
<td>Obstruction - 36hrs</td>
<td></td>
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<tr>
<td></td>
<td>Primary renal disease – 72 hrs</td>
<td></td>
</tr>
<tr>
<td>8)</td>
<td>Time to recognition – 4hrs</td>
<td>Timely intervention</td>
</tr>
<tr>
<td>9)</td>
<td>Specialist renal / critical care discussion within 12hrs of 1st AKI 3 alert</td>
<td>Timely intervention</td>
</tr>
<tr>
<td>10)</td>
<td>Stop ACEi/ARB &lt;24hrs 1st alert</td>
<td>Timely intervention</td>
</tr>
<tr>
<td>11)</td>
<td>Written self-management information prior to discharge..</td>
<td>Enhanced patient experience and opportunities for co-care planning &amp; better compliance/ activation</td>
</tr>
</tbody>
</table>

**Summary and Next steps**

- Opportunity to share
- Implementation of QI
- Explore opportunities of using RADAR
- Different targets for Primary and secondary care. Some similarities between the two.
- Event demonstrated the need and desire to collaborate
- Broad agreement national re outcome measures, process measures.
- Strong measure of consensus to work with the UKRR to develop core sets of themes
- NICE developing new AKI indicators, this group will help to inform/comment on these using KSS (cluster lead) as the conduit for information and ensure linkage with the UKRR
- Presentations will be put on KSS PSC website

Write up of the event for PSC board