The Hampshire Acute Kidney Injury Study

Abstract

Acute kidney injury (AKI, rapid reduction in kidney function) is common and under-recognised in the NHS and associated with poor clinical outcomes and high healthcare costs. A significant proportion of AKI is potentially preventable and two thirds of AKI seen in hospital is estimated to have arisen in the community. This study aims to use data in the Hampshire Health Record (HHR, an anonymized shared clinical database) to identify the incident rate, risk factors and outcomes of AKI, to develop and validate a predictive score for community-acquired AKI and to evaluate the effect of the introduction of hospital and primary care AKI e-alerts. It will also evaluate the effectiveness of an AKI-education intervention for hospital clinicians and GPs, and estimate the costs of AKI in Wessex and the cost-effectiveness of the education interventions. To achieve these aims, it will use a cohort design incorporating all people in HHR GP practices (estimated about 600,000 people with complete data) followed for up to five years and assess those admitted to hospital and those not admitted for AKI using a standardized national algorithm based on changes in serum creatinine values. It will link with the Wessex Cardiovascular Disease Network’s AKI initiative in order to inform and evaluate the education interventions. Outcomes from the study will be disseminated locally and nationally and influence clinical practice in Wessex to improve the prevention, identification and management of AKI.
## Background

Acute kidney injury (AKI), rapid reduction in renal function of varying cause, is independently associated with significant morbidity, mortality, increased length of hospital stay, progression of chronic kidney disease (CKD), need for renal replacement therapy (RRT, dialysis and transplantation) and health care costs.\(^1\)\(^-\)\(^5\) It is common; incidence estimates vary between 7 and 15% of hospitalised patients in developed countries and there is some evidence of rising incidence (though some of the increase may relate to increased AKI diagnosis and coding).\(^6\)\(^-\)\(^11\) The National Service Framework for Renal Services (2005) recognised the need for prompt identification and referral of people with AKI, and AKI is now regarded as a priority for clinical practice, policy and research.\(^12\)\(^-\)\(^14\) AKI has been estimated to cost the National Health Service (NHS) over £1 billion per year.\(^8\) It has a variety of causes, described as pre-renal (decline in glomerular filtration due to renal hypoperfusion), intrinsic (structural damage to the kidney including acute nephritis (many causes)) and post-renal (obstruction of urinary outflow).\(^15\)

More severely ill patients are at greater risk of AKI, with incidence of over 30% described in intensive care populations.\(^16\)\(^,\)\(^17\) Other risk groups include the elderly, people with sepsis, dehydration or volume depletion (including post-surgery), cardiac surgery, nephrotoxic drugs, renin-angiotensin aldosterone inhibitors (RAASi), contrast, ethnicity (blacks may be at greater risk), people with CKD and people with other chronic conditions including diabetes, CVD and cancer.\(^18\)\(^,\)\(^19\) A Scottish study found that at least a third of people with AKI had pre-existing CKD.\(^20\) Uniacke and colleagues showed that AKI contributes to the CKD population by permanently reducing renal function in people with and without prior CKD, and that AKI can be recurrent.\(^21\) It also contributes to the incidence and progression of CKD.\(^22\)\(^,\)\(^23\)

### Care quality

In a prospective UK study, a significant proportion of AKI was found to be iatrogenic in origin and that about 20% of AKI may be preventable.\(^14\) The National Confidential Enquiry into AKI-related hospital deaths identified the need to improve aspects of the care of patients admitted as an emergency.\(^24\) Potential areas included initial assessment of fluid status and urine output, testing of electrolytes, imaging for urinary tract obstruction and avoidance of nephrotoxic drugs. There is also evidence of under-recognition and recording of AKI. One study found AKI recorded in about 2% of hospital admissions in Hospital Episode Statistics, but age- and gender-standardized estimates derived from laboratory data suggested a true prevalence of over 14%.\(^8\)

While many cases occur in hospital, about two thirds of patients with AKI are identified as already having kidney injury on admission (i.e. community-acquired).\(^25\)\(^-\)\(^29\) The epidemiology of community-acquired AKI is not fully understood,\(^30\) and some people with community-acquired AKI are not admitted to hospital.\(^30\)\(^,\)\(^31\) RAASi stopped in hospital because of AKI are often not restarted in the community.\(^32\) In order to identify interventions that may be applied in the community to reduce the rate and severity of AKI (and associated hospital admission), a better understanding of the incidence of community-acquired AKI and its predisposing factors is needed.
Aims

Overall aim:
To understand the epidemiology and consequences of AKI, to inform future research to prevent community acquired AKI, and to assess the impact of Wessex CVD Network AKI initiatives

Objectives:

1. To identify the incidence rate of AKI in people admitted to hospital (both community-acquired AKI and in-hospital AKI), with and without CKD.
2. To determine the clinical outcomes of AKI including development of need for acute and chronic renal replacement therapy (RRT), mortality, recurrent hospitalisation and recurrent AKI, impact on incidence of CKD or worsening of pre-existing CKD.
3. To identify the risks for community-acquired AKI including comorbidity, CKD and rate of decline, prior AKI, to identify potentially preventable factors such as the use of use of renin-angiotensin aldosterone inhibitors (RAASi) and diuretics - see objective 4), nephrotoxic medication (e.g. non-steroidal anti-inflammatory drugs) and presence of acute infection / protective factors (including vaccination for influenza and pneumococcus).
4. To develop and internally validate a predictive score for community-acquired AKI.
5. To evaluate the effect of introducing the nationally recommended AKI e-alert system (and associated hospital clinician education) in Wessex hospitals on AKI outcomes.
6. To evaluate the effectiveness of an AKI education intervention and e-alerts in primary care on community-acquired AKI identification, management and prevention.
7. To estimate the costs of community and hospital acquired AKI in Wessex, cost-effectiveness of the education intervention compared with current care and explore the potential savings of earlier diagnosis.

This proposed AKI work is integrated with the Wessex Cardiovascular Disease Network’s AKI initiative, which seeks to improve the prevention detection and management of AKI in Wessex. The community and hospital interventions proposed here aim to reduce the incidence and severity of hospitalised AKI (community and hospital acquired), with impact on hospital length of stay, need for RRT, mortality and subsequent CKD.
Methods/analysis

_The Hampshire Health Record_

The research will use data from the Hampshire Health Record Analytics dataset (HHRa) - a resource containing linked primary and secondary care data. The HHRa includes clinical biochemistry laboratory data including serum creatinine from two acute hospitals (University Hospital Southampton and Portsmouth Hospital Trust), allowing for more accurate and complete identification of AKI than relying on hospital coding. The eligible population is estimated as 600,000. It is possible that this population base will be extended if Hampshire Hospitals Foundation Trust provide similar laboratory data, this is under negotiation.

_Study cohort_

All adults aged ≥18 registered with one of a defined catchment of GP practices covered by the two hospitals with data available in the HHRa. We will first assess the baseline position 2012-14, for impact of the intervention which start in 2015 we will repeat the AKI incidence for 2015-16 (see timeline).

We will identify two groups:

1. All hospitalisations divided into
   i. AKI group – people with no history of CKD (eGFR≥60 ml/min/1.73 m²) who have evidence of AKI on admission or arising during their hospital stay.
   ii. AKI on CKD group – people with a background of pre-existing moderate to severe CKD (eGFR< 60 ml/min/1.73 m² on two occasions at least 3 months apart i.e. CKD 3 - 5) who have evidence of AKI on admission to hospital or arising during their hospital stay.
   iii. People with and without CKD with no AKI on admission to hospital.

2. People not admitted to hospital - a sample of the adult population for comparison

AKI incidence

- Admission to hospital for any cause in which biochemically-defined (community-acquired) AKI is observed at the point of admission.
- Admission to hospital for any cause during which AKI is observed (hospital-acquired AKI).

AKI outcomes

- Death – this will be considered as occurrence during admission / within a month of discharge / within a year of discharge
- Hospital length of stay
- Permanent reduction in renal function and development / progression of CKD
- Development of requirement for RRT (either acutely i.e. within the index admission or subsequently)
• Admission to intensive care
• Recurrent admissions to hospital within one month of an initial episode of AKI
• Recurrent AKI (community or hospital acquired, including recurrent ITU admission)

Other outcomes
• Medication changes post AKI and over time (including RAASi use)

Defining exposures

Age will be defined as the age at study entrance.
Socioeconomic status will be defined as national quintile of IMD.
Ethnicity is known to be poorly recorded in routine data and exploratory analyses will be conducted to assess the extent of missing data.
Behavioural aspects including smoking, alcohol and body mass index will be included where data are available, (though missing data on these variables will be a limitation and imputation of missing variables will be considered where appropriate).
Co-morbidities will be identified from the appropriate coding in the GP record component of the HHRAs. Comorbidities will be defined by people having the relevant Read code for each diagnosis and will include hypertension, diabetes, structural kidney disease (e.g. polycystic kidneys), cardiovascular disease (e.g. ischaemic heart disease, cerebrovascular disease, peripheral vascular disease), chronic obstructive pulmonary disease, asthma, chronic neurological disease (e.g. dementia, Parkinson’s disease), chronic mental health problems (e.g. schizophrenia, depression), cancer, benign prostatic hypertrophy.

Previous moderate to severe CKD will be defined by the presence of at least two values of eGFR< 60ml/min/1.73m² at least 3 months apart (i.e. CKD 3 – 5) with no intervening values ≥60ml/min/1.73m². In order to avoid classifying people as having CKD who had in fact had two isolated episodes of AKI, an upper limit of 1 year will be applied to this definition and other values of eGFR taken into account where available in order to define ‘stable’ low eGFR.

Current medication status prior to development of AKI will be determined from evidence of repeat prescription of relevant drugs in the GP record component of the HHRAs. Vaccination status prior to development of AKI will be identified from record and / or prescription of influenza and pneumococcal vaccination in the patient record (to include assessment of currency of vaccination status).
The primary cause of admission will be identified from the hospital discharge record and admissions will be categorized as ‘routine’ and ‘emergency’.
Occurrence of surgical events will be ascertained from hospital coding in the HHRAs.
Death is recorded in the HHR although cause of death is currently not (though this is being explored with ONS at the moment).
Recurrent AKI, hospitalisations, ICD code-defined AKI will be captured for all hospitals in the region. AKI by biochemical criteria will only be available from Southampton and Portsmouth hospitals. There may be scope for this extending to include Hampshire Hospitals NHS Foundation Trust (currently under consideration)
In hospital dialysis will be identified from procedure codes, and chronic dialysis from GP Read codes.
Defining AKI

Baseline kidney function will be defined using the same method as that used for the NHS England/Renal Association National AKI detection algorithm (developed from the KDIGO definition, see appendix).

For hospital admissions, assessment will be made as to whether a previous serum creatinine measure taken in the outpatient or GP setting (within 365 days) exists. A creatinine reference value will then be established depending on whether the previous creatinine value was within 0-7 days or between 8 and 365 days (using the lowest value for the former and the median value for the latter). The ratio of the index creatinine value (value on admission) to this reference value will then be calculated and used to determine the presence and degree of AKI as per the algorithm.

It is recognised that some patients will present with AKI without a reliable baseline serum creatinine on record. Where no previous readings are available or if the available data does not meet study criteria the cases will be recorded as ‘possible’ AKI for separate analysis as shown in the algorithm. Previous work suggests that this group will make up about 15% of the population under study.

Normal renal function: At least one eGFR ≥60ml/min/1.73m² taken as an outpatient. Variation in the timing of baseline eGFR will give varying probability of a person having AKI. We will therefore describe the certainty of the presence of AKI from definite to possible. Index AKI will be the first in the time period. Patients with diabetes and normal renal function but with evidence of microalbuminuria will be recorded and explored separately.

We will also identify those with an AKI diagnosis in the hospital record (defined as use of the International Classification of Disease (ICD) N17 code ‘Acute kidney failure’ as one of the diagnostic cause of admission codes). People with CKD will be defined as those with at least two eGFR values, both below 60 ml/min/1.73m² occurring at least three months apart (without values above 60 ml/min/1.73m² in between those values and not differing by more than 5mls/min). We will undertake a separate analysis of people with a single eGFR below 60 ml/min/1.73m² who we will define as ‘possible CKD’. Recovery of renal function will be defined as recovery to within 26.5µmol/l of baseline creatinine. Southampton and Portsmouth hospital laboratories report eGFR that is currently calculated using the simplified MDRD equation. Creatinine assays use calibration traceable to a stand reference material (IDMS).

Statistical analyses

Descriptive statistics will be used to identify the characteristics of people developing community and hospital-acquired AKI (compared to those not developing AKI). Poisson regression analyses will be used to identify relative risk of predisposing and protective factors (see figure 1) for incident AKI (community and hospital, objective 3)) and to describe the occurrence and predisposing factors for new events occurring in the months after AKI such as recurrent episodes of AKI, chronic RRT, newly occurring or worsening CKD. Comparison will be made between the occurrence of such events (and to include the clinical identification and coding of AKI) pre and post the introduction of e-alerts in Wessex hospitals (objective 5). Incidence rates of AKI in people admitted to hospital will be
The new prediction rule will then become part of the programme of education and implementation being offered to GPs. This will allow for evaluation of the impact of introducing the new prediction rule in the clinical practice and its influence on the on the incidence, management, referral and outcomes of AKI.
As the AKI education intervention proposed by the Wessex AKI network is rolled out across Wessex hospitals and in primary care, we will use a before and after design to identify changes in the rates, detection and coding of AKI and subsequent effects on the outcomes defined above (objective 6)

*Health economic analyses*

Health economic analysis will be taken from the NHS and social service perspective. These will include medication, community nurse visit, primary care visit, diagnostic tests, outpatient visit, A&E attendance and hospital inpatient. Such information will be extracted from the HHR and costed using appropriate national cost data (including BNF, PSSRU and NHS reference costs). All itemized use of each resource will be weighted by its unit cost to calculate the aggregate cost per patient.

In addition, the study will collect resource usage of the intervention (training, staff cost, and e-alert system). The mean cost per patient for the study period will be estimated according different patient groups (those admitted/not admitted for AKI) and at later stage of intervention groups. Cost comparison will be made by controlling for disease severity. Once the risk factors for community acquired AKI are established (objective 3), comparison will be made between people at different levels of AKI risk. Hence, the cost-saving potential of early detection of community acquired AKI will be investigated.

A later stage will include assessing the cost effectiveness of introducing:

a) the clinical prediction rule  
b) an educational intervention for GPs aimed at early identification and prevention of AKI  
c) in-hospital e alert system in the two hospitals  
(objective 7)
Conceptual and analytic framework

In understanding the objectives of this research, it is helpful to have a conceptual model of the development of community and hospital-acquired AKI and of its consequences in relation to hospital admission (see Figure 1). This figure shows that AKI in hospital inpatients can arise pre-admission as well as in hospital and has a number of predisposing and precipitating factors. It also illustrates the risk of recurrent AKI and complications precipitating re-admission.

**Figure 1. Conceptual model of AKI development and consequences in relation to hospital admission.**
(Study aims are indicated in red)

A flow diagram of the study process is shown in Figure 2
Figure 2. Flow diagram of the Hampshire Acute Kidney Injury Study

2012

Total over 18 population of eligible HHR practices in 2012

Existing CKD? Yes / No

Had at least one hospital admission

Hospital-acquired AKI

AKI group (community and hospital acquired, with and without previous CKD)

Community-acquired AKI

No hospital admission

No AKI

No AKI group (with and without previous CKD)

Total over 18 population of eligible HHR practices in 2014

2014

Identify same groups as above. Assess post e-alerts and education intervention

Total over 18 population of eligible HHR practices in 2016

2016
**Grouping for comparison**

Comparison will be made between the following groups:

A. People not admitted to hospital who have no evidence of AKI and no previous CKD (control group)

B. People who had a hospital admission but no evidence of AKI (with and without previous CKD)

C. People not admitted to hospital but having evidence of community AKI (with and without previous CKD)

D. People who were admitted to hospital with evidence of hospital-acquired AKI (with and without previous CKD)

E. People who were admitted to hospital with evidence of community-acquired AKI (with and without previous CKD)

(see Figure 3)

**Figure 3. Comparison groups for the HHR AKI study**
Patient and Public Involvement

Advice on patient and public involvement for this study has been sought through the Research Design Service (RDS) South Central. A suitable PPI reviewer was subsequently identified who is willing to review the protocol. The PPI reviewer has been invited to comment on the proposal, following which he / she will be invited to a meeting with the research team in order to discuss the protocol further, clarify areas of uncertainty, gather opinions and make appropriate amendments or additions to the research plan. Later stages of the research will involve patient representation during the development of the education intervention for clinicians. This will link with qualitative work being carried out by the NIHR CLAHRC for Greater Manchester.

Relation to ongoing research projects and CLAHRC programme

This research project forms part of the Primary Care and Public Health theme of the Wessex CLAHRC. An underlying principle of the theme is that better prevention impacts on the health of local populations and use of health care resources downstream.

It links conceptually to other themes in the Wessex CLAHRC, particularly the Fundamental Care in Hospital theme (evidence for effective strategies to address deficiencies in areas such as safety and hydration), the Complexity at the End of Life theme (improving management of people with complex morbidity), and the Ageing and Dementia theme (improving the assessment and quality of care of older people).

It also links to the Wessex AHSN priorities, particularly developing a ‘whole system’ approach for older people by making links across primary and secondary care to prevent a common and important clinical problem among older people, and the AHSN’s Patient Safety Initiative.

Prevention of AKI is an important agenda across the NHS, and policy developments to address AKI include the development of AKI networks across the country. This work is fully integrated with the Wessex Cardiovascular Disease Network’s AKI initiative (of which Dr Uniacke is clinical lead), which seeks to improve the prevention, detection and management of AKI in Wessex, with a focus on preventing AKI in the community and the use of e-alerts in acute hospital admissions to detect and reduce severity of AKI.

Unique aspects of this proposal are:

1. Its use of a linked routine data resource, which makes it ideally placed to reflect what is happening in clinical practice and to monitor changes in practice.
2. Its focus on community AKI, facilitated by access to biochemical results both arising in hospital and in the community.
Feasibility

Feasibility of this study is improved by the direct access to the HHRa from within the CLAHRC hub. This study will be supported by the CLAHRC hub data analyst and statistician. Given the demands on the time of the CLAHRC hub staff, and in order to for this to be feasible, it is anticipated that the research fellow to be appointed within the theme will have adequate statistical skills to be able to work on the project independently with mentoring from the CLAHRC hub statistician.

The anticipated timeline of the study and its outputs is shown in the appendix

Feasibility will be enhanced by building on the experience and knowledge of our collaborators. Qualitative work being undertaken with clinicians on AKI knowledge and perceptions of sick day rules and other potential interventions as part of the NIHR CLAHRC for Greater Manchester will inform the development and implementation of the AKI education interventions being developed for clinicians in Wessex. We will work with our collaborators in the Manchester CLAHRC on the evaluation of these interventions as part of objectives 6 and 7 of this proposal.
In addition, we will explore the feasibility of conducting external validation of our clinical prediction rule in the Salford database (a linked database with similar characteristics to the HHRa)
Summary of costs

In view of the complexity and extent of this work, we estimate that it will require a Level 5 research fellow at 0.5 wte for 4 years to allow adequate time for the follow up stages of the study, particularly relating to the timing of the introduction of hospital and GP e-alerts (in 2015).

Estimated cost: £112,045.44

The research fellow will need the following equipment:
A laptop, estimated cost £683

Support will also be needed from members of the Wessex CLAHRC hub:

- Matthew Johnson HHR-A analyst for data extraction and cleaning. Estimated time requirement: 1.25 days per week (25%) for the first 6 months of the project to develop queries (with multiple iterations/revisions) and extract / validate data. Second period of data extraction: 1.25 days per week for 3 months (first quarter of 2017) to extract data following the roll out of e-alerts and the education interventions.
- David Culliford (hub statistician). Estimated time requirement throughout the project: 5% FTE (0.25 days per week).

Open access journal fees will also be needed, estimated at £3000 across the first two years

PPI funding will be provided for attendance at meetings according to the INVOLVE guidelines

The total funding required is therefore £179,830.44

See attached excel spreadsheet for full costings
Value and relevance to the NHS, the Public/Patients and policy locally and nationally and to public health.

A risk score that predicts high risk of AKI within 7 days of admission based on a set of clinical factors (the Acute kidney injury Prediction Score – APS) has been developed by Forni and colleagues. However, this score was developed at a single centre and was not able to access primary care data. It also relies on clinical information obtained at the point of admission (such as respiratory rate) and does not address prediction of community-acquired AKI. Given the high proportion of AKI that is thought to originate in the community, the development of a community-acquired AKI risk score in this study has the potential to greatly improve the detection of people at risk of AKI and to facilitate interventions to avoid / mitigate AKI and other important outcomes. This would be of great value at both local and national levels to reduce the incidence of AKI.

The community and hospital education interventions aim to improve clinician awareness and understanding of AKI in order to reduce the incidence and severity of hospitalised AKI both community and hospital acquired, with impact on hospital length of stay, need for RRT by dialysis for AKI, mortality from AKI and subsequent CKD.

The main value to patients will be in the improved ability of clinicians to detect community AKI, potentially avoid hospital admission (and other adverse outcomes) and reduce the need for RRT. There will also be benefits in hospital settings where the education package will aim to improve aspects of basic care such as hydration and monitoring to prevent deterioration of kidney function.

The wider NHS will benefit from the reduced costs and improved outcomes associated with reducing AKI incidence.

Implementation

Work on preventing AKI in the community will involve the roll out of e-alerts to GPs based on detection of rapid elevation of serum creatinine. In order for this initiative to be effective, a subgroup of the Wessex AKI Clinical Forum comprising three GPs with interest in renal medicine and a consultant physician has already met to map out the needs of primary care when receiving these new alerts. Central to success is a programme of education for GPs about AKI and recommended steps to be taken on receipt of an alert, including clinical assessment of the patient and review of medication. It will also address ‘sick day rules’ (i.e. empowering patients on certain medications to stop them if they become acutely unwell though the risk and benefits of this approach need to be established) and steps to prevent recurrent AKI including formal review of patients post discharge with AKI. This will build on the experience of the local implementation of the National Awareness and Early Detection Initiative (LAEDI) - an NHS England funded partnership project of GP peer-to-peer education for the early detection of cancer. To support this, one of the GP members of the AKI primary care subgroup is Dr Richard Roope who has led the Wessex LAEDI initiative. This work will also be supported by an existing collaboration with Dr Tom Blakeman at the University of Manchester who is conducting qualitative research on the management of CKD in primary care, including AKI prevention in the community. Simon Fraser will also be involved in this due to previous experience as a GP and to facilitate linkage with the others aspects of this project.
Deliverables

By the end of two years (2016) we anticipate that the following will have been delivered:

• Robust identification of the baseline study cohort
• Ability to summarise the incidence of community and hospital-acquired AKI in Hampshire and the key risk factors
• Development of the clinical prediction rule with internal validation
• Education intervention to hospital clinicians and GPs underway

Publication of the findings in three papers:
1. A methodological paper on the identification of AKI in routine data
2. A paper describing the incidence, associations and outcomes of community vs. hospital acquired AKI in Hampshire
3. A paper describing the development and internal validation of the clinical prediction rule

Subsequent output comparing first and second cohorts (before and after) will include:

A paper describing the evaluation of the effectiveness of hospital AKI e-alerts
A paper describing the evaluation of the effectiveness of community AKI e-alerts
A paper describing the dissemination and evaluation of the education interventions
A paper describing the health economics of AKI in Wessex (community and hospital acquired)

Dissemination plans locally (Wessex are and organisations), and nationally.

It is estimated that the first paper (methodological) will be published towards the end of year 1 (2015) / beginning of year 2 (2016)

During year 2, we anticipate that two further papers (incidence, associations and outcomes of AKI and community AKI clinical prediction rule) will be published.

Within Wessex, progress on this project will be disseminated regularly at the Wessex AKI Clinical Forum (comprising hospital clinicians and GPs from across Wessex). We hope that this study will demonstrate the potential of the HHR to be used to assess quality improvement interventions and improvements in patient care. We will endeavour to use the information to stimulate debate about developing linked data systems in Dorset to increase the scope of the analysis across Wessex.

The community education intervention will be disseminated to GPs via the mechanisms described above.

At a national level, this work will be reported at academic conferences:
Primary care conferences (such as the Society for Academic Primary Care conference), public health conferences (such as the Public Health England National conference) and nephrology conferences (such as the British Renal Society / Renal Association conference).
It will be reported regionally via Public Health England working with Mary O’Brien, consultant in healthcare Public Health at PHE Wessex.

It will also be reported to NHS England via Richard Fluck, National Clinical Director for Renal Disease for NHS England (with whom our group collaborates on other studies), and to Public Health England.

The clinical prediction rule will also be disseminated by inclusion on an international register of clinical prediction rules for use in primary care.  

**Details of plans to support the local implementation of research findings.**

There will be feedback to Wessex clinicians, commissioners and providers via the Wessex Acute Kidney Injury Network. This will include feedback to GPs via Clinical Commissioning Groups and ‘TARGET’ education sessions. The findings will also inform the Wessex Patient Safety Initiative led by Wessex AHSN.

Local clinicians (both primary and secondary care), the Wessex AHSN, and PHE Wessex are all represented on the Wessex Acute Kidney Injury Network board. This will be used as a vehicle to discuss the optimal implementation methods.
Project staffing and leadership (CIs and PIs)

CLAHRC theme: Public Health and Primary Care
Specific CLAHRC projects addressed in this study:
- Using routinely collected information to look at the impact of Acute Kidney Injury
- Design implement and evaluate prevention strategies for Acute Kidney Injury

Investigators:
PI: Simon Fraser (Public health, epidemiology and previously a GP) email: s.fraser@soton.ac.uk
Paul Roderick (Public health, epidemiology)
Mark Uniacke (Nephrologist)
Matthew Johnson (Information analyst)
Borislav Dimitrov (Medical statistics)
David Culliford (Medical statistics)
Lily Yao (Health economics)
Research fellow (to be appointed)

NHS organisations:
Wessex hospitals (University Hospital Southampton NHS Foundation Trust, Portsmouth Hospitals NHS Trust, Royal Bournemouth and Christchurch Hospitals, Poole Hospital NHS Foundation Trust, Hampshire Hospitals NHS Foundation Trust) via Wessex Acute Kidney Injury Network

Primary care – represented by several GPs on the Wessex Acute Kidney Injury Network and involvement of Dr Nigel Watson, Chief Executive of Wessex LMCs
Appendix

Algorithm for detecting Acute Kidney Injury (AKI) based on serum creatinine changes with time (from NHS/Renal Association)

This algorithm relates to the NHS England patient safety alert: NHS/PSA/D/2014/010

RV = Reference value. Defined as: the creatinine value with which an Index creatinine value is compared

D = difference between current and lowest previous result within 48hrs
# Hampshire Acute Kidney Injury Study Timeline

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**Outputs**

- Trial dissemination to Wessex
- Health Economic paper and Economic evaluation paper
- Community AKI paper
- Hospital AKI-e alerts evaluation paper
- Dissemination of clinical prediction rule paper and community AKI paper
- Customer paper
- Methods paper
References


