***The Cornish Experience Of The ASSIST-CKD Project***

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**Declarations**

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**Abstract**

**Introduction:** The ASSIST-CKD project is a national quality improvement program, aiming to decrease the number of patients presenting late to Renal services by empowering laboratories to review up to 5 years of eGFR results graphically, and report deteriorating patients to their GP.

**Aim:** To assess the impact of the project on the laboratory, and patient reporting on GP management and the local Renal service.

**Method:** Each week two searches were performed (Search A: Max age 65 years, max eGFR 50 ml/min/1.73m2 and Search B: Age 66-120 years, max eGFR 40 ml/min/1.73m2) on patients with an eGFR requested by their GP within the last seven days. Patients showing deterioration in eGFR had a printed graph-report sent to their GP. Feedback on the graph-reports and their impact on patient management were obtained from the GPs via a questionnaire.

**Results:** A median of 37 patients/week were listed for review for Search A, with 32% being reported; and Search B a median of 227 patients/week listed, 32% being reported. Twenty-nine GP surgery questionnaires were reviewed and showed the reports were well received. Sixty-seven percent of GPs responding to the questionnaire had reviewed a patient earlier than intended, 54% had reviewed local guidance, 48% had emailed the Renal team and 48% had referred a patient on receipt of a graph-report. Thirty-four percent had shown a graph-report to their patient, and 70% found that useful.

**Conclusion:** Already there are tentative signs that ASSIST-CKD reporting has enhanced patient care; however, further long-term assessment is still required.

**Introduction**

Chronic kidney disease (CKD) is a common long-term condition that affects 6-7% of adults in the United Kingdom (UK) in its moderate to severe stages.1 CKD is associated with an increased risk of cardiovascular disease2 and progression to end-stage kidney disease (ESKD).3 Outcomes are particularly poor in those presenting late to Renal services within secondary care, as there is insufficient time to prepare patients adequately for renal replacement therapy (RRT). The risk of death in patients presenting late is approximately doubled, compared with those referred earlier.4 Data from the UK Renal Registry show major meaningful variation in late presenting rates (applied to patients who are first seen at a Renal centre less than 90 days before starting RRT). In 2013-2014, this proportion varied across UK Renal centres from 4.9-33.9%5 (Figure 1). Spreading and sharing best practice from high performing centres in order to reduce this variation is therefore an appropriate focus for quality improvement activity.

In 2004, a systematic disease management system was introduced for patients with diabetes attending outpatient clinics in the West Midlands (Heart of England Foundation Trust (HEFT)). Serum creatinine results were fed into a specifically designed computer program which calculated eGFR (MDRD equation) and generated cumulative charts of kidney function which were then reviewed. In 2012 the system was extended to provide population-wide surveillance, allowing trained laboratory staff to monitor all patients tested in hospital clinics and primary care, using a database which enabled large numbers of cumulative eGFR graphs to be reviewed quickly. Graphs that showed evidence of progressive decline in kidney function were reported to the referring General Practitioner (GP), prompting further action, for example specialist input, that might be needed.6  Since 2005 the number of patients starting dialysis per year at HEFT has fallen by 16%, compared to an increase of 8% in England as a whole.7 The HEFT Renal Unit also has the lowest percentage of patients presenting late for dialysis in the UK (Figure 2).5

ASSIST-CKD (**A** programme to **S**pread eGFR graph **S**urveillance for the early **I**dentification, **S**upport and **T**reatment of people with progressive **C**hronic **K**idney **D**isease) is a national quality improvement project, funded by the Health Foundation, in which the HEFT eGFR graph intervention will be rolled out to laboratories serving up to 19 Renal Units across the UK. The program has the potential to be highly cost-effective; implementing the service at a site covering a population of 800,000 costs approximately £10-12,000 per year, as compared with the annual cost of dialysis for one person of over £25,000, which can rise to over £30,000 if additional costs such as hospital transport are included.9

In August 2015 the Clinical Chemistry laboratory at the Royal Cornwall Hospital (RCH) was the first laboratory in the UK to go live with the project. As such we were keen to study the impact on the laboratory service, the GPs, the Renal team and patients. As any benefits on late presentation rates, and in particular dialysis, will not be immediately apparent, here we are exploring shorter-term effects. We specifically looked at the impact on patients by asking the GPs if the ASSIST-CKD reports had influenced their patient management; and also checked whether the Renal team had seen any changes in the numbers of GP queries and referrals.

**Aim**

To collate data on the number of patients being reviewed by the Clinical Biochemists per week and the time ASSIST-CKD took to perform, as well as the number of patients flagged. To also assess the impact of ASSIST-CKD patient reporting on GPs, the management of their patients and, in turn, any impact on the local Renal service.

**Methods**

**Population**

The Clinical Chemistry laboratory at RCH covers Cornwall (population of approximately 532,300);10 serving one main acute hospital, two peripheral hospitals and six community hospitals, including one Renal Unit, as well as 68 GP surgeries (including branches) that have a catchment population of approximately 453,000.11 Population demographics are 22% aged 0-19 years, 57% aged 20-65 years, 19% aged 65-84 years and 3% aged ≥85years old.10

**ASSIST-CKD Implementation, Searching and Reporting Protocol**

In August 2015 the Chronic Kidney Disease Monitor (ASSIST-CKD) program (version 1) was installed and, in order to provide full patient history, every eGFR (calculated by MDRD, and then Epi-CKD equation from June 2015) reported in the previous five years on patients ≥18 years old by our laboratory was uploaded into it. To keep patient history up-to-date, every Sunday an automated download was performed from the Winpath (Clinisys, Chertsey, UK) Laboratory Information Management System (LIMS) of all the eGFRs reported in the previous seven days. These were then manually uploaded into the ASSIST-CKD program by a Clinical Biochemist. Every week a Clinical Biochemist performed two patient searches as per the ASSIST-CKD protocol (Figure 3) on patients who have had an eGFR requested by their GP. The search dates were set to end with the Sunday just prior to the search being performed, and starting with the Sunday prior to that (i.e. 7-day search window). For each patient that fitted the criteria, the ASSIST-CKD program created a 5-year graph of all their results. Every patient graph (for Search A & Search B) was reviewed by the Clinical Biochemist, who looked primarily for long-term trends (i.e. across the 5 years), but also for shorter-term changes. Patients whose eGFR trend met the ASSIST-CKD criteria (Figure 3) were flagged as ‘inform clinician’ which added a triangle to the eGFR graph; graph-reports were created (Figure 4), printed and sent to the GPs. The reports included advice written by the Renal Team including where to find local guidelines and how to contact them. On 11th January 2016, version 2 of the program was installed, which included repairs to reported glitches and other improvements to the program.

**ASSIST-CKD Laboratory Data**

Every week the Clinical Biochemist who performed the ASSIST-CKD searches would record the number of patients pulled for both Search A and Search B, the number they flagged as ‘Inform Clinician’ and the time it took to do each run. The collected data was evaluated for the 17 weeks covering patient search dates 3rd Jan to 1st May. Furthermore, two searches were performed using the ASSIST-CKD program for the same time period, using Search A and Search B patient criteria, which were then filtered by those flagged as ‘Inform Clinician’. The patient data were transferred to Excel (Version 14, Microsoft Corporation ®) for statistical analysis of gender, age and eGFR.

**GP Survey**

In December 2015, four months after starting the ASSIST-CKD project, a questionnaire was created and posted to all 68 GP surgeries covered by our laboratory. In February 2016, a second printout was sent out to all the non-responding surgeries. The questionnaire included a short summary of the ASSIST-CKD service, 14 questions to be completed (multiple choice and a few free text) and the reason for the questionnaire being sent. Questions asked covered four main areas. Firstly, were the ASSIST-CKD graph-reports sent to the GPs clear and easy to understand, and was the information provided on the reports useful? Secondly, after receiving a report did the GPs look up local CKD guidelines, contact the renal team by email or phone, and/or refer patients? Additionally, did receiving ASSIST-CKD reports make them review patients earlier than intended, and did it have an impact on the way the GPs review long-term changes in their patient’s renal function? Thirdly, had the GPs shown any graph-reports to patients, and did they or their patient find it useful? Finally, would they prefer electronic reporting of the graph-reports in the future? The questionnaire also contained a large free text area for responders to provide any feedback. All the data from the responses were collated into Excel.

**Renal Team Feedback**

In May 2016, the Renal team were asked to provide formal feedback on the impact they felt the ASSIST-CKD reporting had on email/phone/letter queries and also on clinic referrals.

**Results**

**ASSIST-CKD Laboratory Data**

The Clinical Biochemist’s log for the service performed over the 17-week period was found to show a median of 37 patients were listed for review per week for Search A, with 12 (32%) being flagged as ‘Inform Clinician’; a median time of 8 minutes/week was taken to perform the patient search and review all the graphs. Search B had a median of 227 patients listed per week, with 72 (32%) being flagged, and taking a median time of 40 minutes/week to perform the patient search and review all graphs. Therefore, altogether 264 patients per week were listed by the two ASSIST-CKD search criteria as requiring review, taking approximately 48 minutes to perform. Further time was required for the ASSIST-CKD program to collate the ‘Inform Clinician’ patient list and convert into individual patient graph-reports; and then for these to be printed and sorted into the correct GP surgery pigeon holes for posting.

The ASSIST-CKD data pull for Sunday 3rd January to Sunday 1st May using Search A criteria listed 470 patients, of which 201 (43%) were flagged as ‘Inform Clinician’. Of these, there was found to be an equal gender split (51% female), with an age range of 23 to 65 years (median 59), an eGFR range of 2-50 (median 42) and spanning 54 GP requesting locations. Search B criteria listed 3,098 patients, of which 1,153 (37%) were flagged. Of these, there was an equal gender split (50% female), with an age range of 66 to 101 years (median 81), eGFR range of 2-40 (median 33) and spanning 62 GP locations.

**GP Survey**

Thirty-one questionnaires were returned, with three covering the responses of two surgeries (main & branch), and so the responses represented 34 of 68 surgeries (50%). Two of the surgeries stated that they had not received any reports. Of the remaining 29 questionnaires, 28 (97%) reported that they like the layout of the report and found it clear; 20 (n=28) (71%) found the text-advice given on the reports useful. A summary of the questions and the answers provided by the responders are summarised in Table 1. Twenty-six (90%) responded ‘yes’ to wanting electronic reports (versus paper) in the future. Sixteen (55%) of responders filled in the free text area of the questionnaire, 5 (31%) gave positive feedback and liked the service, 5 (31%) gave neutral or positive & negative feedback, and 6 (37%) gave negative feedback. Positive responses included *“Prompts me to be certain that adequate care being given”, “The GPs feel the reports highlights the results in a way that stand out from a simple set of numbers”* and *“Please continue. This is a reassuring back-up to our own monitoring.”* The responses that included positive and negative feedback included *"Reminds you to review patient but generally it has already been actioned"* and *"I think it is a good idea in principle, but in fact we have been aware (so far) of all the patients. One hopes that the occasional suddenly falling results will be an alert for us”.* The negative feedback included *“We review previous eGFR scores when filing results, so usually aware of patient before report arrives. We have a renal function support template that does this"* and *“None of the 3 GPs partners found the graphs helpful. We are already monitoring and referring our CKD3 patients very well".*

**Renal Team Feedback**

Feedback was sought from the Renal team who deemed that the ASSIST-CKD project had been successfully introduced. An innovative emailing system allowing GPs and other healthcare professional to easily and quickly contact the Renal Consultants for advice had been in place since 2010. Naturally this email point of contact was included in the ASSIST-CKD patient reports. In the initial few weeks of the project there was an influx of general inquiries from GPs via email (1-2 per week) on patients who had been identified; and informative and supportive information was provided. Furthermore, in response to the queries the information provided on the reports was amended to state that the ASSIST-CKD report was based on Biochemistry data and so did not take into account the current status or management of the patient, accordingly the number of queries fell.The Renal team believe that the GPs have used the ASSIST-CKD reports and the information provided on them (on seeking local guidance, using the email service &/or referring patients) sensibly, and in some cases this has prompted referrals to the Renal clinic. Likewise, in many other cases GPs have continued to manage patients in Primary Care, sometimes after seeking support and advice from the email advice line. There does not appear to have been an increase or decrease in the number of new patient referrals to the Renal department since the introduction of ASSIST-CKD nine months ago.

**Discussion**

The Clinical Chemistry laboratory at RCH was the first laboratory in the UK to go live with the ASSIST-CKD project. The previous HEFT project, that had run for over ten years, had suggested alerting GPs to long term falls in eGFR could delay the requirement for dialysis/transplantation, and/or over time reduce the number.6 The ASSIST-CKD project is designed to cover the UK (19 Renal Units) in order to collate further data and to statistically analyse the impact of flagging patients with deteriorating eGFR.8 However, changes to dialysis or transplantation numbers or trends will take a few years to be seen. We therefore wanted to find out what the short term impact was, particularly to try and assess the GPs’ reaction to the new service, including any benefits or downfalls, the impact on the Renal team and on the laboratory providing the service; all areas that have not been previously looked at.

We found that our laboratory, which covers a GP catchment of approximately 453,000 patients, listed each week a median of 264 patients to review as per the ASSIST-CKD criteria. It took a median of 48 minutes to search for the patient and then review all the eGFR graphs, of which 32% were flagged as ‘inform clinician’ by the Clinical Biochemist. As to be expected by the two different search criteria there was variation in the median age and eGFR, though the gender split was equal for both. The variation in the percentage of patients recorded as flagged ‘inform clinician’ in the Clinical Biochemist’s log (Search A: median 37 reviewed with 12 (32%) flagged and Search B: median 227 reviewed with 72 (32%) flagged) versus the ASSIST-CKD data-pull (Search A: median 470 reviewed with 201 (43%) flagged and Search B: median 3098 reviewed with 1153 (37%) flagged) is possibly due to the latter taking into account flagged patients that met the search criteria, but the flagging was performed prior to the search time window.

The GP questionnaire found that even after only a few months the ASSIST-CKD reporting was having an impact on patient care; with 67% of GPs reporting that the ASSIST-CKD graph-reports had prompted them to review a patient earlier than planned and 48% had referred a patient. However, 47% of responders also selected that there had been no impact on management. The main port of call for advice post-receipt of a graph-report was the local CKD guidelines (54%), followed by contacting the renal team via email (48%), referring a patient (48%) or contacting the Renal team by phone (12%). Though questionnaires by their nature cannot accurately assess a GP’s change in patient care, there does already seem to be a change occurring due to the ASSIST-CKD graph-reports. Furthermore, the feedback on the graph-reports was positive with 97% finding them clear and easy to read, and 71% finding the text information useful. Also 31% of the free text comments were positive and another 31% considered neutral. Another element of the graph-reports is that they lend themselves to being shown to a patient, with 34% of GPs responding to say they had done this and 70% of those finding it useful.

Another staff group we wanted to assess the impact of the ASSIST-CKD project on was the Renal team. We found their feedback to be very positive. After an initial flurry of queries after the initiation of the intervention, it settled down, and the possible flood of queries or referrals (as feared by other future ASSIST-CKD locations) never occurred. Some of this maybe due to the long established renal service email system at RCH and also to the flexibility of changing the information on the ASSIST-CKD graph-reports.

**Conclusions**

We have found that ASSIST-CKD reporting is already having an impact on patient care in the short time that we have been reporting since August 2015. The ASSIST-CKD project team are continuing to roll out the project to another 18 sites around the country, and further assessment to the impact on both short-term and long-term patient care and outcome will be evaluated.

**References**

1. de Lusignan S, Tomson C, Harris K, van Vlymen J & Gallagher H. UK prevalence of Chronic Kidney Disease for the adult population is 6.76% based on two creatinine readings. *Nephron Clin Prac.*

<https://www.karger.com/ProdukteDB/miscArchiv/000/320/341/000320341_sm_Erratum.PDF>

[Accessed July 2016]

1. Chronic Kidney Disease Prognosis Consortium, Matsushita K, van der Velde M, et al. Association of estimated glomerular filtration rate and albuminuria with all-cause and cardiovascular mortality in general population cohorts: a collaborative meta-analysis. *Lancet* 2010; 375(9731):2073–81
2. Fox CS, Matsushita K, Woodward M, et al. Associations of kidney disease measures with mortality and end-stage renal disease in individuals with and without diabetes: a meta-analysis. *Lancet* 2012; 380(9854):1662–73
3. Chan MR, Dall AT, Fletcher KE, Lu N and Trivedi H. Outcomes in patients with chronic kidney disease referred late to nephrologists: a meta-analysis. *Am J Med* 2007; 120(12):1063–70.
4. Gilg J, Caskey F and Fogarty D. UK Renal Registry 18th Annual Report: Chapter 1 UK Renal Replacement Therapy Incidence in 2014: National and Centre-specific Analyses. *Nephron* 2016; 132(suppl1):9–40.
5. Kennedy DM, Chatha K and Rayner HC. Laboratory database population surveillance to improve detection of progressive chronic kidney disease. *J Ren Care* 2013; 39 (suppl 2):23–9.
6. Rayner HC, Baharani J, Dasgupta I, et al. SA. Does community-wide chronic kidney disease management improve patient outcomes? *Nephrol Dial Transplant* 2014; 29(3): 644–9.
7. Lumsden A. A quality improvement project for chronic kidney disease. *Journal of Renal Nursing* 2015; 7(2):42-43
8. Kerr M, Bray B, Medcalf J, O'Donoghue DJ and Matthews B. Estimating the financial cost of chronic kidney disease to the NHS in England. *Nephrol Dial Transplant* 2012; 27(Suppl 3):iii73-80.
9. Cornwall Council, 2011 Census Page.

 <https://www.cornwall.gov.uk/council-and-democracy/data-and-research/data-by-topic/2011-census/> [accessed June 2016]

1. NHS Kernow Clinical Commissioning Group Localities Page. <https://www.kernowccg.nhs.uk/localities/> [accessed June 2016]

**Further information**

<https://www.kidneyresearchuk.org/research/assist-ckd>