


BMJ Open Quality Improving outpatient clinic experience: the future of chronic kidney disease care and associated multimorbidity

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ABSTRACT

Background Chronic kidney disease (CKD) is estimated to affect more than 2.5 million adults in England, and this is expected to rise to 4.2 million by 2036 (1). Population-level digital healthcare systems have the potential to enable earlier detection of CKD providing an opportunity to introduce interventions that attenuate progression and reduce the risk of end-stage kidney disease (ESKD) and cardiovascular diseases (CVD). Services that can support patients with CKD, CVD, and diabetes mellitus (DM) have the potential to reduce fragmented clinical care and optimise pharmaceutical management.

Methods and results The Salford renal service has established an outpatient improvement programme which aims to address these issues via two projects. Firstly, the development of a CKD dashboard that can stratify patients by their kidney failure risk equation (KFRE) risk. High-risk patients would be invited to attend an outpatient clinic if appropriate. Specialist advice and guidance would be offered to primary care providers looking after patients with medium risk. Patients with lower risk would continue with standard care via their primary care provider unless there was another indication for a nephrology referral. The CKD dashboard identified 11546 patients (4.4% of the total adult population in Salford) with T2DM and CKD. The second project is the establishment of the Metabolic CardioRenal (MRC) clinic. It provided care for 209 patients in the first 8 months of its establishment with a total of 450 patient visits. Initial analysis showed clustering of cardiorenal metabolic diseases with 85% having CKD stages 3 and 4 and 73.2% having DM. In addition, patients had a significant burden of CVD with 50.2% having hypertension and 47.8% having heart failure.

Conclusion There is a pressing need to create new outpatient models of care to tackle the rising epidemic of cardio-renal metabolic diseases. This model of service has potential benefits at both organisational and patient levels including improving patient management via risk stratification, increased care capacity and reduction of variation of care. Patients will benefit from earlier intervention, appropriate referral for care, reduction in CKD-related complications, and reduction in hospital visits and cardiovascular events. In addition, this combined digital and patient-facing model of care will allow rapid translation of advances in cardio-renal metabolic diseases into clinical practice.

INTRODUCTION

Chronic kidney disease (CKD) is estimated to affect more than 2.5 million adults in England, and this is expected to rise to 4.2 million by 2036.¹ Population-level digital healthcare systems have the potential to enable earlier detection of CKD providing an opportunity to introduce interventions that attenuate progression and reduce the risk of end-stage kidney disease (ESKD) and cardiovascular diseases (CVD). There is also an unmet need to support patients with multiple long-term conditions. Services which can support patients with CKD, CVD and diabetes mellitus (DM) have the potential to reduce fragmented clinical care, optimise pharmaceutical management, and rapidly respond to future evidence.

The Salford renal service has established an outpatient improvement programme, which aims to enhance support for people with cardiorenal metabolic diseases. The service has been redesigned by creating a model of care that enables early identification of patients with DM who are at risk of progressive CKD (using a CKD dashboard) as well as a su-specialty, Metabolic CardioRenal (MRC) outpatient clinic (*figure 1*). This model identifies opportunities for prevention of progression at a population level in low-risk to medium-risk patients. In addition, the model provides a specialist service for patients with multiple long-term conditions. The aims of the programme align with National Health Service (NHS) England's recommendations to prioritise the management of long-term conditions at a national level.²

PROJECT ELEMENTS

Development of CKD dashboard

A digital CKD dashboard was built on the Greater Manchester Analytics and Data Science Platform hosted by Greater Manchester Health & Social Care Partnership.



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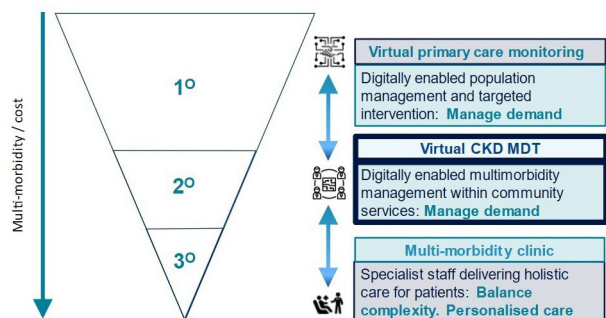


Figure 1 The design of CKD service. CKD, chronic kidney disease; MDT, multidisciplinary team.

Key inclusion criteria included all adult patients with type 2 DM (T2DM) who are actively registered with a general practitioner and have either a coded CKD diagnosis, a measured estimated glomerular filtration rate (eGFR) $<60\text{ mL}/\text{min}/1.73\text{ m}^2$ or a measured albumin-creatinine ratio $>3\text{ mg}/\text{mmol}$. Patients who opted out from the NHS data sharing agreement and patients on end-of-life care pathways were excluded. The dashboard presents patient level data as well as population level data to enable it to identify, but also manage, patients at high risk of progressive CKD. The dashboard includes demographics, medications, biochemistry and physiological measurements, for example, blood pressure (BP); this enables clinicians to provide individual care plans. The dashboard can stratify patients by their kidney failure risk equation (KFRE) risk to proactively manage patients with medium (KFRE risk of 2%–4.9%) and high risk (KFRE $\geq 5\%$) of developing ESKD in 5 years.³ High-risk patients would be invited to attend an outpatient clinic if appropriate. Specialist advice and guidance would be offered to primary care providers looking after patients with medium risk. Patients with lower risk (KFRE $< 2\%$ in 5 years) would continue with standard care via their primary care provider unless there was another indication for nephrology referral as outlined in the UK National Institute for Health and Care Excellence CKD guidelines.⁴

The CKD dashboard identified 11 546 patients (4.4% of the total adult population in Salford) with T2DM and CKD. Data were missing for 1812 patients (15.7%) to calculate the KFRE risk. Initial analysis identified 63.6% of patients were prescribed renin–angiotensin–aldosterone (RAAS) inhibitors, 19.8% were on sodium-glucose cotransporter-2 (SGLT2) inhibitors and 81.4% were prescribed statins. The Plan-Do-Study-Act (PDSA) cycles are being undertaken to understand how to integrate the CKD dashboard into routine practice.

Establishing a multimorbidity clinic

The MRC clinic was founded by a team of nephrologists with a special interest in cardiorenal disease. The clinic includes a diabetologist and diabetic specialist nurse. Cardiology input is provided via multidisciplinary team (MDT) meetings.

The MRC clinic provided care for 209 patients in the first 8 months of its establishment with a total of 450 patient visits. Initial analysis showed high prevalence of cardiorenal metabolic diseases with 85% having CKD stages 3 and 4 and 73.2% having DM. In addition, patients had a significant burden of CVD with 50.2% having hypertension and 47.8% having heart failure. The use of key evidence-based medications was variable at baseline with 59.8% receiving RAAS inhibitors (RAASi); 22% on SGLT2 inhibitors and 23.9% receiving mineralocorticoid antagonists (MRAs). Potassium binders were prescribed for 24 patients (11.5%) to facilitate optimisation of RAASi and MRA use.

The clinic provides an opportunity to improve medicines optimisation as well addressing risk factors for disease progression, for example, anaemia management, BP control and glycaemia control. The following data are being monitored: outpatient hospital visits, biochemical parameters such as glycated hemoglobin (HbA1c), serum potassium and eGFR, clinical parameters such as BP, weight, and body mass index, and cardiovascular outcomes. These data will be analysed by comparing it to a control group at the end of 2 years follow-up.

DISCUSSION AND FUTURE DIRECTION

The redesign of services for patients with CKD aims to enhance care of patients with multiple long-term conditions by using a system-wide approach. The combination of a population-level health monitoring tool coupled with a multimorbidity clinic enables patients to access specialist services in a potentially timely and efficient manner.

The benefits of multimorbidity clinics have been described in centres in Sweden and Canada. A (heart/cardiac, nephrology, DM) clinic was established in Sweden which benefited from input from senior specialists in all three specialties.⁵ A retrospective analysis of 74 patients who attended the (cardiac and renal endocrine) clinic in Canada showed improvement in lipid profile and HbA1C with higher uptake of key medications when comparing data from first and last attended clinics.⁶

Future work will build on the foundation of this programme. This includes extension of the dashboard by incorporating a digital platform to monitor patients' clinical parameters. Parameters such as BP can be undertaken by patients and recorded in a smartphone application and monitored remotely by a healthcare professional. In addition to collecting research data for clinical outcomes, data focusing on quality of life and patient-reported experience will also be collected. A mental health questionnaire will be incorporated into the MRC clinic visit to explore the impact of multimorbidity on mental health. Currently, agreed interventions include pharmacy-led medicine optimisation clinics as well as virtual MDTs between primary care physicians and nephrologists.

CONCLUSION

There is a pressing need to create new outpatient models of care to tackle the rising epidemic of cardiorenal metabolic diseases. This model of service delivery has potential benefits at both organisational and patient levels including improving patient management via risk stratification, increased care capacity and reduction of variation of care. Patients will benefit from earlier intervention, appropriate referral for care, reduction in CKD-related complications and reduction in hospital visits and cardiovascular events. In addition, this combined digital and patient-facing model of care will allow rapid translation of advances in cardiorenal metabolic diseases into clinical practice.

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