Territory Kidney Care

Six monthly progress Report

January-June 2021

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Project Overview

Territory Kidney Care (TKC) is an integrated clinical decision support system aiming to assist primary health services with the early identification and management of people with chronic kidney disease (CKD) to improve health outcomes and delay or prevent the requirement for dialysis. TKC is not an 'off-the-shelf' product but is being designed and developed in consultation with clinicians.

The majority funding for the design and development of TKC was secured from a non-government source with funds allocated in four stages based on the successful attainment of pre-determined milestones and deliverables. All funding for the program has been received and was initially expected to be fully expended by December 2020. In-kind support from the Department of Health (DoH), the Top End Health Service and the Central Australian Health Service has facilitated the efficient use of the remaining funds.

This report covers the activities for January-June 2021.

Summary

The development of functionality within TKC is an ongoing process. We have continued to engage with individual Aboriginal medical services regarding the implementation of TKC or the outputs from the system. More than 85% of Aboriginal community controlled health services (ACCHS) are now partnering in TKC and for ACCHS currently not participating in TKC, engagement has been at a pace determined by them and appropriate for their particular context. The capacity of some health services has been significantly impacted by activities related to COVID19 preparedness and embargo on community visits has provided some challenges with assisting health services on the ground with implementation. However, we have continued to support services through virtual meetings using Zoom and Teams.

All government hospitals (five) and primary health services (approximately 56) contribute data to TKC. TKC's ability to integrate primary and tertiary data, particularly the automated summation of longitudinal information has led to a significant expansion in the number of users and variety of disciplines now accessing TKC. There are over 60 specialist clinicians regularly using the system for patient care, providing feedback on functionality and driving development to improve the user experience.

In preparation for transition to a more sustainable model we continue to seek funding for the ongoing development of TKC. In the last 12 months we have been successful with two applications. The most recent and important, a Medical Research Future Fund (MRFF) grant to extend TKC to all preventable non-communicable diseases and urban private GP practices in the NT, will provide an additional $1.96 million towards development and the opportunity to develop a truly unique clinical decision support system for the NT population.

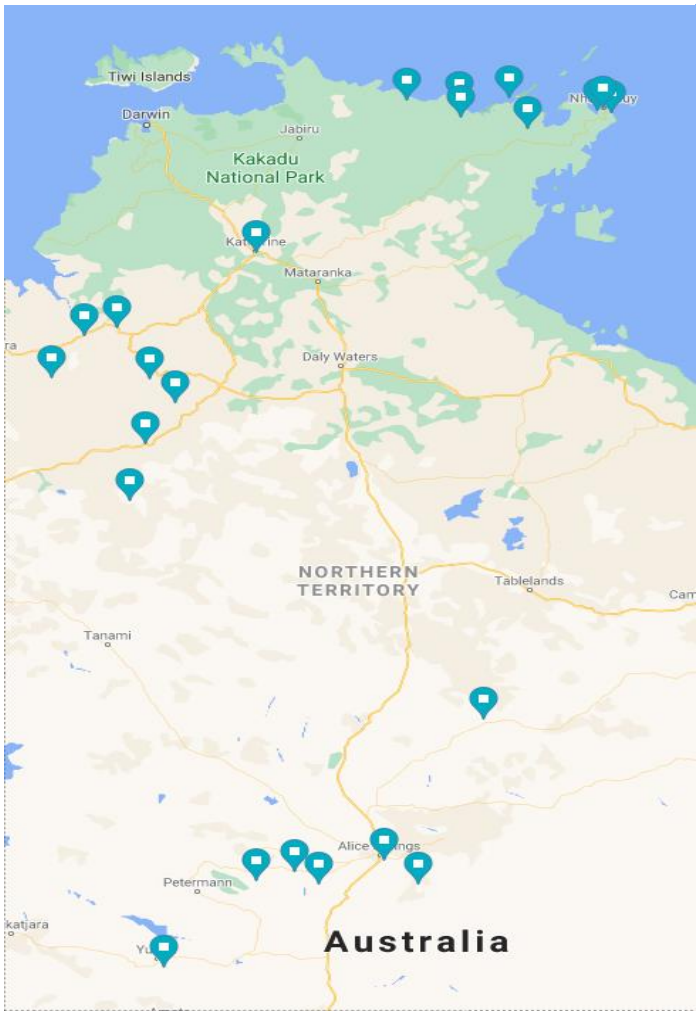
The requirement for a comprehensive evaluation of TKC data is acknowledged and agreed to in the TKC Data Partnership Agreement. Ethics approval from the relevant NT bodies including the peak body for Aboriginal medical services (i.e. Aboriginal Medical Services Alliance Northern Territory-AMSANT) is in progress.

Participation of Aboriginal Medical Services

Aboriginal medical services provide approximately 60% of primary health care services to Aboriginal people in the NT. This percentage is growing as more health care services transition from the Department of Health (DoH) to Aboriginal community controlled. TKC currently includes all primary health services under the DoH (56) as well as the five tertiary hospitals, eight ACCHS (overseeing care in approximately 20 health clinics). For ACCHS participating in TKC, this partnership has been formalised through a Data Partnership Agreement, and we are providing 6 monthly population health service reports through an iterative process that allows the health service to modify reports according to their needs (Figure 1).

In addition, the Project Team are currently in discussions with two further health services regarding their participation in TKC and expect Agreements to be signed in the near future.

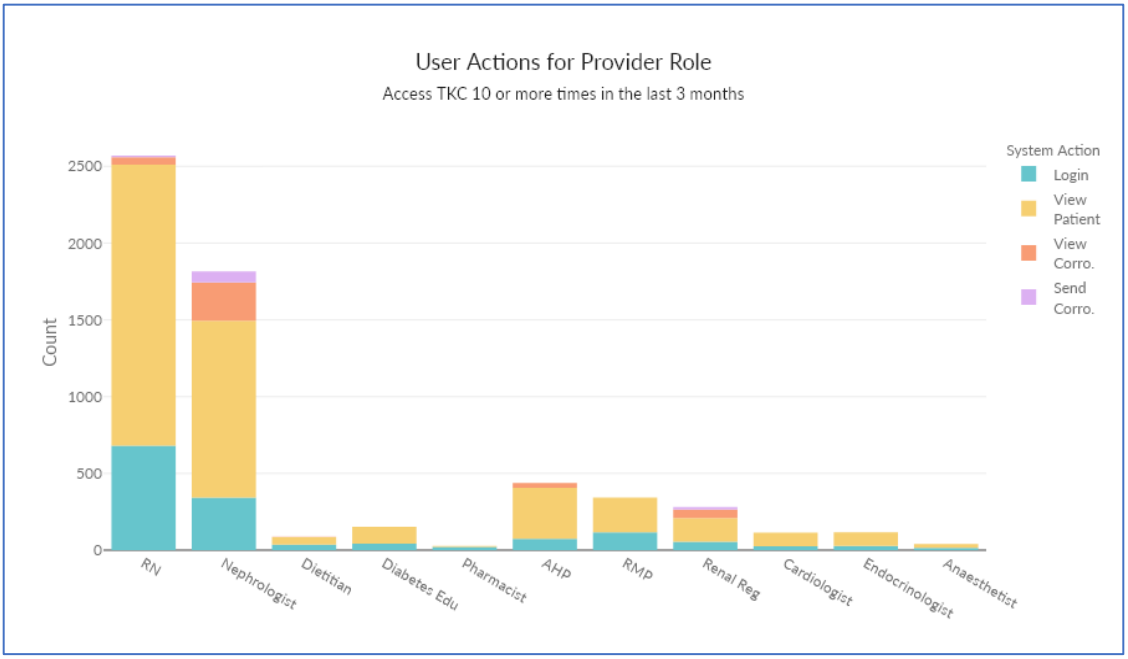
Figure 1. Aboriginal health services participating in TKC



Clinician Uptake

Currently, access to TKC is restricted to clinicians with an NTG access account. As some clinicians work across organisations and services, there are a number of GPs (7) working in ACCHS that also have access to TKC. The worth of TKC, beyond the management of renal disease, is evidenced by the increasing number of clinicians from other specialties utilising TKC for patient care. As of 31 July, there were 195 registered users with access to TKC although many users have not logged onto the system more than once. In the last three months, 65 users have used the system at least once for patient care while 35 users have logged on more than 10 times to review summary reports, correspondence or send correspondence. The correspondence functionality is in an early iteration and is constantly being modified according to user requirements.

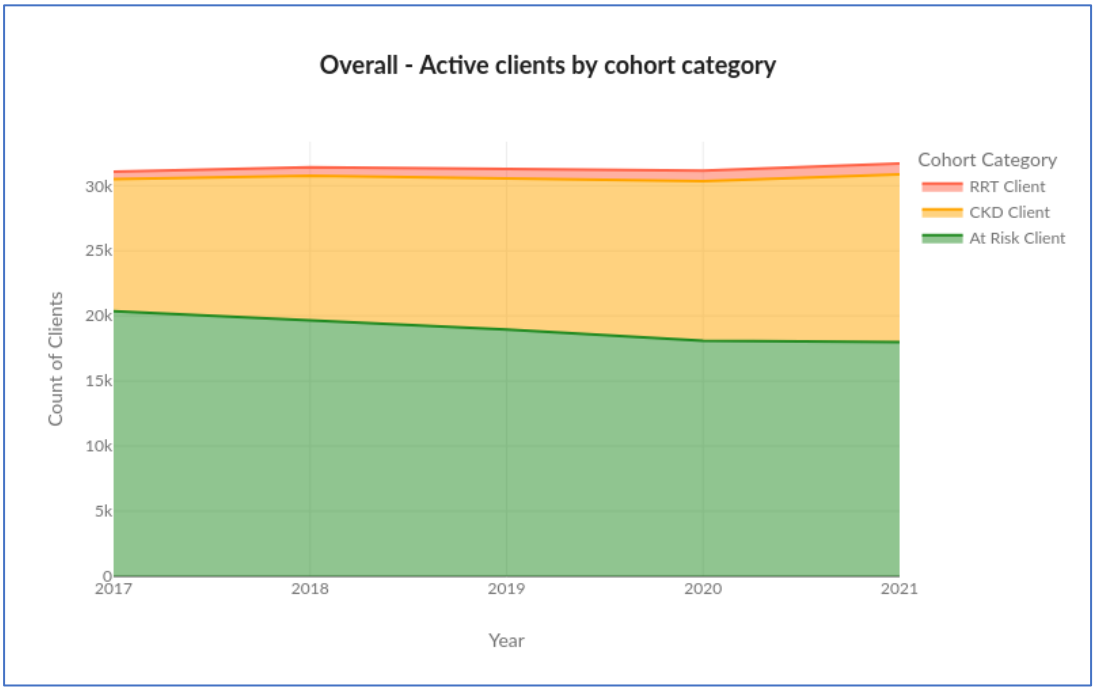
Figure 2: User actions in TKC by provider status



Number of CKD Patients within TKC Database

As of June 2021, there were just over 13,500 active CKD patients registered in TKC. The majority of these are in the early stages of the disease (CKD stage 1 and 2) and, with appropriate evidence-based care, progression to end stage kidney disease may be averted. As we achieve full coverage and integration with Aboriginal Medical Services across the NT our understanding of the burden of CKD will be enhanced. This information is now being shared with individual health services and the DoH in a process of validation.

Figure 3: Active CKD clients by stage - identified by ICPC codes results

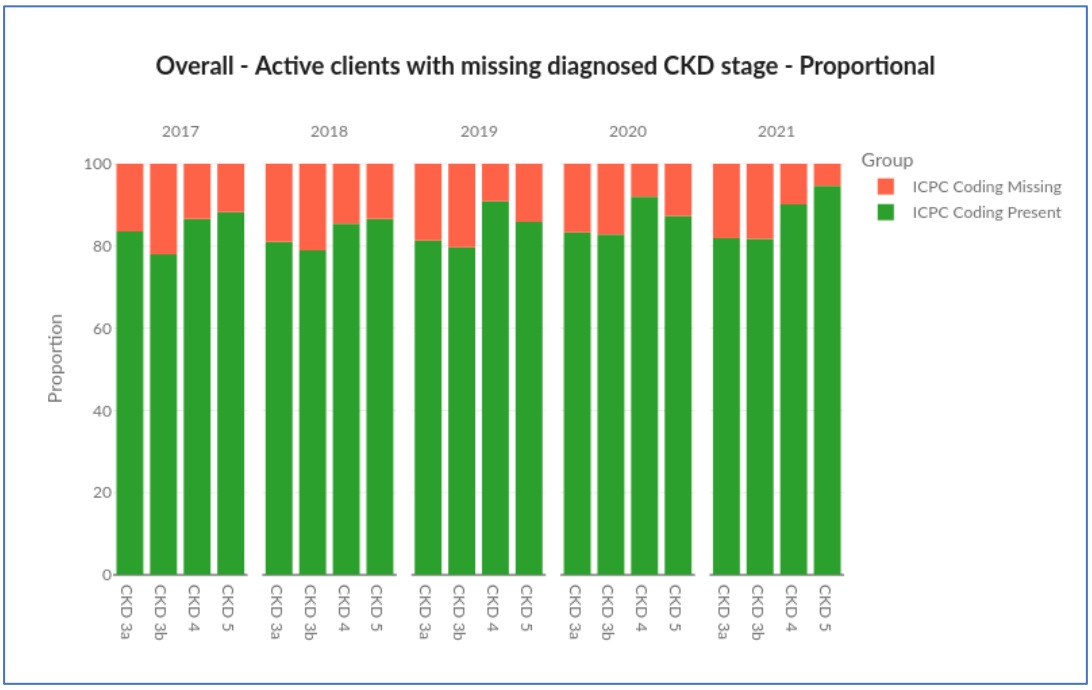


Filling the Gap between Diagnosed and Undiagnosed CKD

The earlier identification and implementation of evidence-based management strategies for people with CKD stages 3a and 3b is the best method to prevent progression to dialysis. This is now possible through TKC. Patients with CKD in TKC are identified through classification based on pathology results, as well as recorded diagnoses in the electronic record system. This method aims to fill gaps where there had previously been significant delays in diagnosing patients and therefore facilitate earlier management.

Our analysis of 'diagnosed' CKD versus 'undiagnosed' CKD, based on pathology results has highlighted the number of people still falling through the gaps. Critically, a small number of people in the very advanced stage of CKD ie CKD stage 5, do not have a corresponding diagnosis in the source system. TKC simplifies and creates a time and resource efficient surveillance and monitoring process for the earlier identification of people with CKD. The Clinical Support Unit are now identifying these patients and referring them promptly and appropriately to the Nephrologists and GP. We expect to see the proportion of people with missing relevant ICPC codes to decrease over the next year.

Figure 4: Number of NT people with advanced stage of CKD - diagnosed and undiagnosed



The progress of an individual from chronic kidney disease to end stage kidney disease and the requirement for dialysis, often occurs over several years with opportunities for intervention along the patient journey. However, the relationship between an intervention (such as the implementation of evidence-based treatment recommendations through TKC), and an outcome (such as the avoidance of dialysis), will not become fully evident immediately. The five-year evaluation, focusing on a number of key indicators, will provide the data points necessary to assess this metric.

Full transition of TKC to NT Department of Health

The transition to the Department of Health (DoH) is in train with clinical staff (Clinical Lead/technical expert, Health Informatics RN, Consultant Nephrologist and clinical staff based in Alice Springs) no longer being funded by Menzies and re-absorbed into DoH's business as usual processes.

The DoH hosts the system and provides the IT infrastructure, licensing, maintenance, security and technical support for the server. The TKC project team, which besides the above-mentioned clinical team, also includes a small number of project staff focused on stakeholder engagement, analysis/reporting and system development, continue to be funded and supported by Menzies. The timeline for the full transition of TKC has not been finalised although TKC has been scheduled for placement within the DoH's new clinical information system (Acacia).

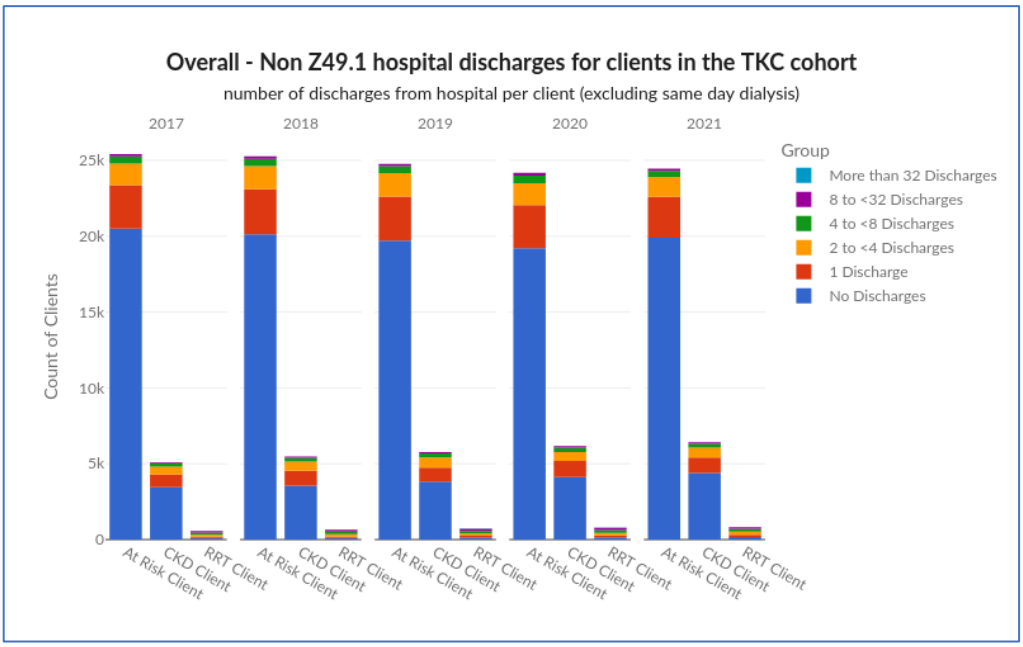
TKC will very shortly be accessible through the DoH's intranet page in the same way access to other clinical information systems (Caresys/PCIS) for clinicians is provided. This is a major step in providing a more user-friendly system and ready access to clinicians.

A number of technical issues have arisen (largely in relation to the ongoing work to replace the clinical information system within the DoH) and are or have been addressed. For instance, in 2020, DoH advised that the new Enterprise Data Warehouse (EDW) would be replaced with a Microsoft SQL Server (MSSQL) backend. To meet the need of migration of the TKC backend from the Oracle Database to the new MSSQL Database, TKC team commenced work on rewriting and testing of all extraction scripts to ensure correct function against the new MSSQL database. This has required a refocus of resources (time and funds) but provided an opportunity to future proof TKC by creating interoperability between systems through the rewriting of the code.

Looking at Avoidable Preventable Hospital Admissions

We are now able to identify the number of people who have a hospital admission (by health service and district) and the frequency of hospital admissions per year. This will provide opportunities for health services to focus on patients with frequent admissions and target resources to reduce the number of avoidable admissions. The below graph shows the number of admissions per year, stratified by CKD status, for anyone who had a hospital admission (excluding Z49.1, the code for a same day dialysis admission). Through earlier identification of CKD, TKC will reduce those who have these most challenging, unplanned and costly transitions to end-stage kidney disease care.

Figure 5: Number of hospital admissions (excluding same day dialysis admission) per year by CKD status



Evaluation of TKC

The evaluation of TKC system has been planned and involves process, summative and outcome evaluations. The evaluation will be conducted in phases over five years and is made possible by funding from two project streams. Stream 1 funding will focus on a Process Evaluation and full Outcome evaluation including economic impact to be conducted on TKC. Stream 2 funding will focus on a comparative analysis of the impact of clinical decision support (CDS) systems on supporting adherence to CKD management guidelines across three jurisdictions in Australia. These CDS systems include TKC in the Northern Territory (NT); CD-Impact in Victoria and CKD.TASlink in Tasmania. Evaluation of TKC system will provide important information to inform the development, uptake, and transition of the system to Department of Health platforms.

The activities under both funding projects are independent of each other but are aligned with the overall objectives of the evaluation of TKC agreed to by the TKC Steering Committee and participating ACCHS in the TKC Data Partnership Agreement. Ethics approval for evaluation from the relevant NT bodies including AMSANT is in progress.

Achievements and Next Steps

We continue to explore ways to fund the ongoing development of TKC to ensure the system can reach its full potential. Part of this process is to work with likeminded organisations, departments and people.

We have submitted a number of grants in the last 12 months, two have been successful and we are waiting on the outcome of the third. The Medical Research Future Fund (MRFF), is an Australian Government initiative to fund the creation or extension of national digital infrastructure, to improve linkage, sharing and analysing health data to make evidence-based care easier for health professionals. Our successful application secured $1.9 million over three years to extend TKC to urban private GP practices and expand the inclusion criteria to preventable non-communicable diseases. This grant is a collaborative effort between the DoH, NT Primary Health Network and several GP practices.

The funding we have secured will also allow us to engage a biostatistician who will be instrumental in assisting with the analysis of the impact of TKC as well as providing support for health service specific reports.

We have also partnered with the College of IT, Engineering & Environment at the Charles Darwin University to submit an “Ideas Grant” under the National Health and Medical Research Council (NHMRC) funding round in May 2021. This grant is aimed at extending our knowledge of the application of machine learning in TKC to improve prediction of disease progression and identification of people at risk of adverse health outcomes, such as rapid loss of kidney function necessitating dialysis, therefore facilitating appropriate interventions. While we wait for the outcome of this submission, we have taken on two PhD students. One student will test application of machine learning to pre-emptively identify certain renal clinical conditions that will contribute to

better prediction of CKD outcomes and the other will work on an interactive web and system interface in preparation for transitioning TKC to a more sustainable model within the DoH platform. We are also supporting Master students with small projects critical to our expansion, such as penetration testing for a web interface.

The profile of TKC is increasing and we continue to seek ways to partner and expand the capability of the system. We are currently working with the National Digital Health Agency (through the DoH) to determine the logistics (including consent model) of having the TKC synopsis reports uplifted to the My Health Record. This will make the outputs of TKC far more accessible to clinicians and patients and add a dimension to TKC not previously envisaged.

There is a growing recognition that TKC offers a unique and innovative mechanism to improve integrated care between tertiary and primary health services and improve the clinical and patient experience.