ANNUAL REPORT 2021

Department of Renal Medicine
St George & Sutherland Hospitals

Website: stgrenal.org.au

NSW GOVERNMENT Health
South Eastern Sydney
Local Health District

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2. INTRODUCTION

It is with immense pride that I present the 2021 Annual Report of the Department of Renal Medicine, St George & Sutherland Hospitals. I wish to thank everyone in our Department for their contributions to this report and to the ongoing care of our patients.

The following pages highlight the key findings from our report. In brief, we are meeting most of our targets and exceed several, including our very low peritoneal dialysis and haemodialysis infection rates.

We have demonstrated good patient survival for all dialysis patients. The commissioning of our new satellite dialysis unit in Kogarah, managed by Fresenius Medical Care, has been a success and is now a model for public-private partnerships. Our transplant patient outcomes have improved and are above Australian comparators. This coincides with the appointment of Dr Karen Keung to the SESLHD as Transplant Nephrologist to both POWH and STGH. Our department is immensely grateful to the Renal team at POWH with whom we manage these patients collaboratively. We have been able to control or improve symptoms well for patients on dialysis and non-dialysis pathways with our Renal Supportive Care service.

Preparation for dialysis through our pre-dialysis education program is increasingly successful and necessary for patient-centred goals in the management of ESKD. The vascular access program has achieved primary access rates that remain higher rate than the national average. These data are discussed regularly within our department to ensure we maintain the highest standards of care. The M&M process is formalised as a regular quality improvement activity.

It should be noted that many of our teams and programs are headed by inspired, highly trained, dedicated and caring Clinical Nurse Consultants and other Senior Nurses, to whom I am very grateful.

I welcome any feedback.

A/Prof George Mangos

Head of Department, Renal Medicine

3. ESKD ACTIVITY OVERVIEW –ANZDATA

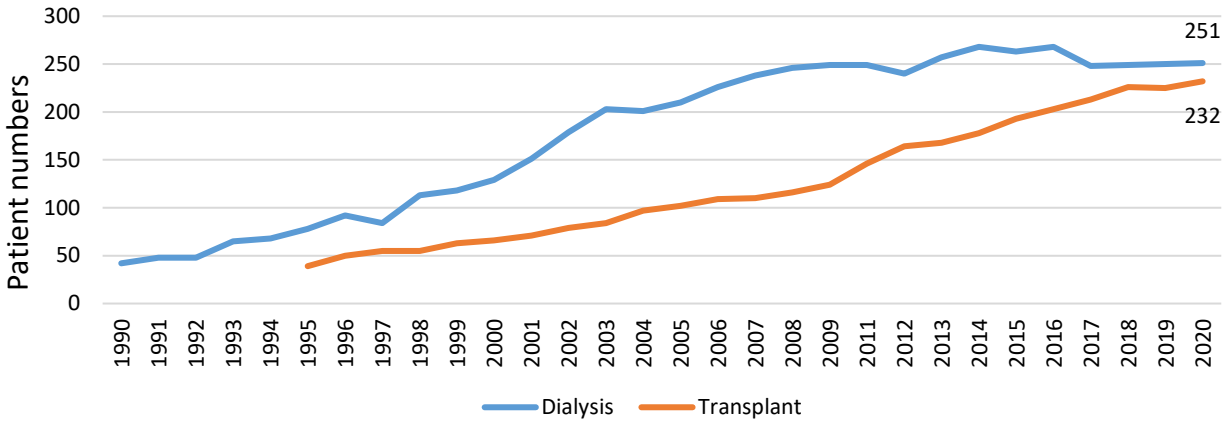


Figure 1. All Dialysis & transplant patients 1990-2020 (ANZDATA 31/12/2020).

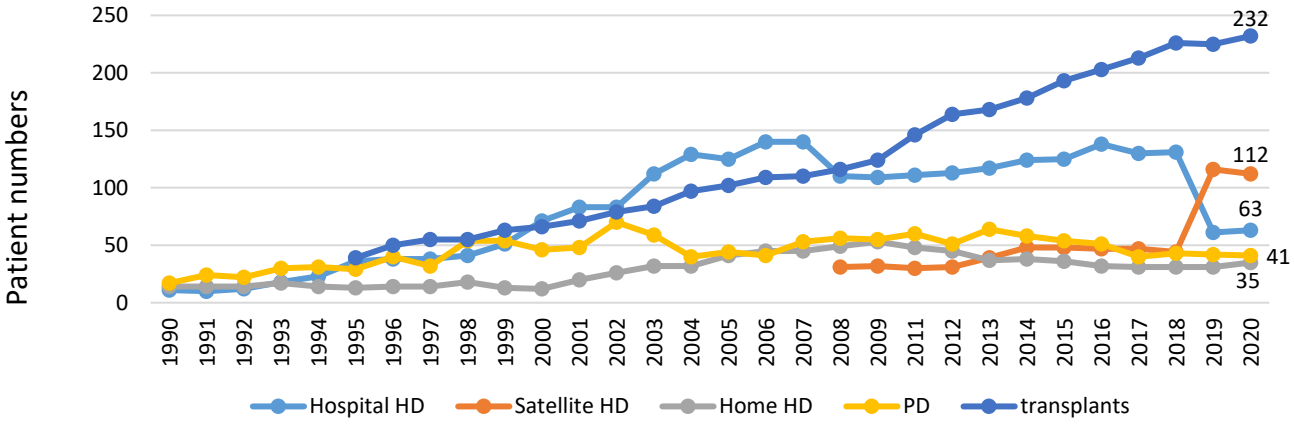


Figure 2. Dialysis & transplant patients 1990-2020 (ANZDATA 31/12/2020) NB. Sutherland Satellite unit opened in 2008, St George Satellite unit opened 2019.

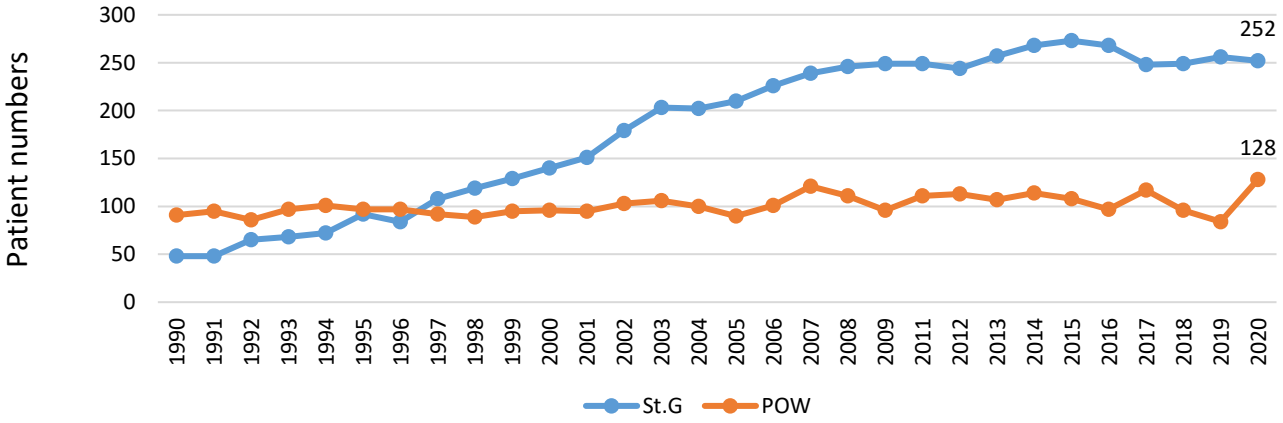


Figure 3. Dialysis patients South East Sydney LHD (ANZDATA 31/12/2020).

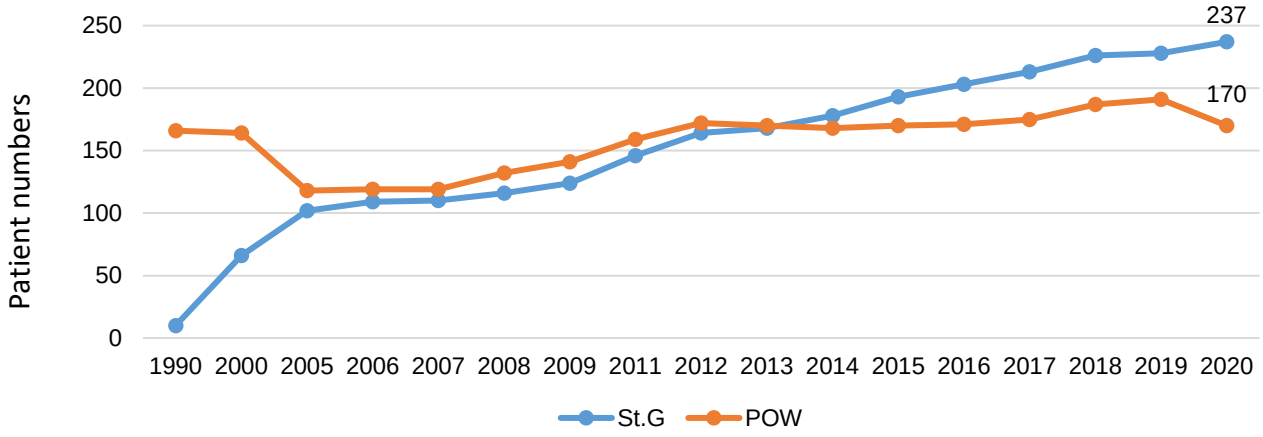


Figure 4. Functioning Transplants South East Sydney LHD (ANZDATA 31/12/2020).

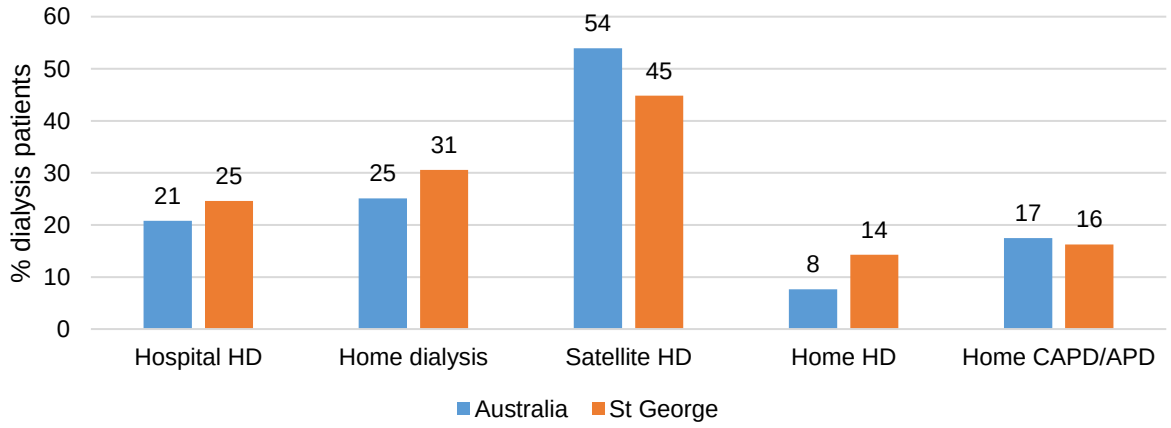


Figure 5. Mode of dialysis Australia & St George 2020 (ANZDATA 31/12/2020).

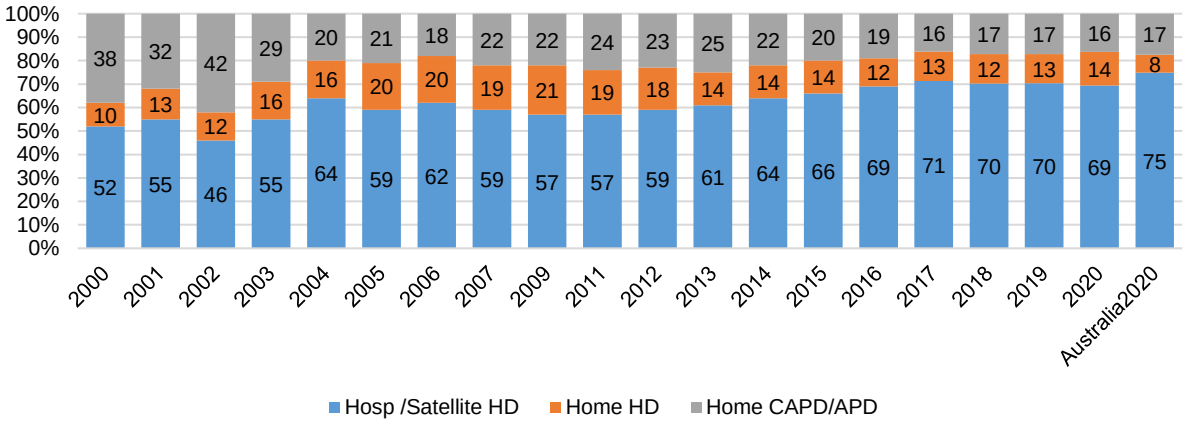


Figure 6. Mode of dialysis Australia & St George 2020 (ANZDATA 31/12/2020).

4. CHRONIC KIDNEY DISEASE

Kylie Turner, Saiyini Pirabhahar, A/Prof Ivor Katz

In 2021, a total of 418 new referrals were received to the renal outpatient department which was 29% higher than the previous year.

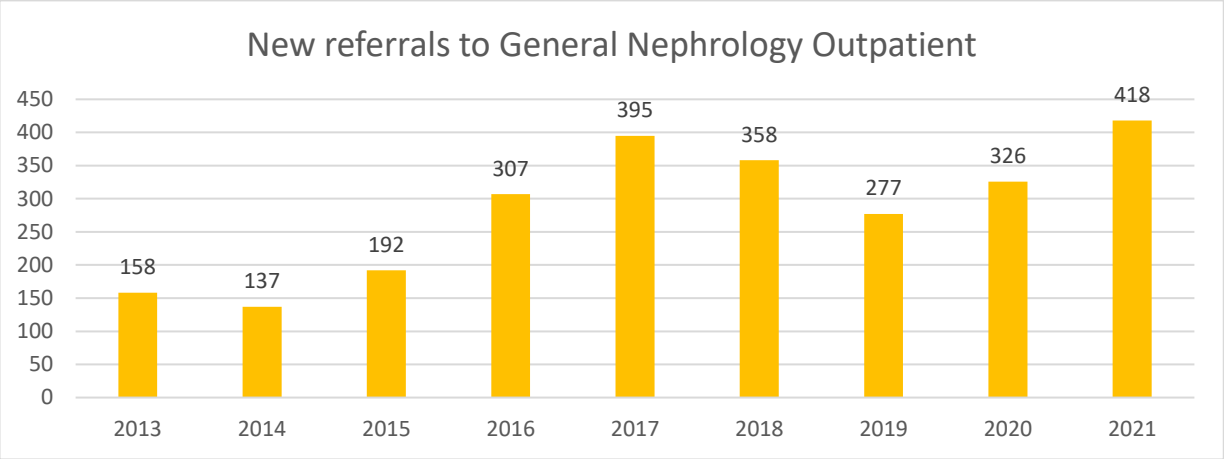


Figure 7. New referrals to General Nephrology Outpatient

5. ADVANCED KIDNEY DISEASE AND PRE-DIALYSIS EDUCATION CLINIC

Kylie Turner, A/Prof Ivor Katz

The Renal Department guideline for referral to the multidisciplinary Pre Dialysis Education Clinic is eGFR ≤ 15 or dialysis predicted in the following year. As of December 31st 2021, there were ***124 patients active within the Pre Dialysis Education clinic with a plan for renal replacement therapy***. This was a 1% decrease from the previous year.

Since April 2002 there have been 1218 people who have attended the clinic. In 2021 63 new patients attended the Pre Dialysis Education Clinic compared to 78 new attendees in 2020. There were 46 follow up appointments compared to 51 follow up appointments in 2020.

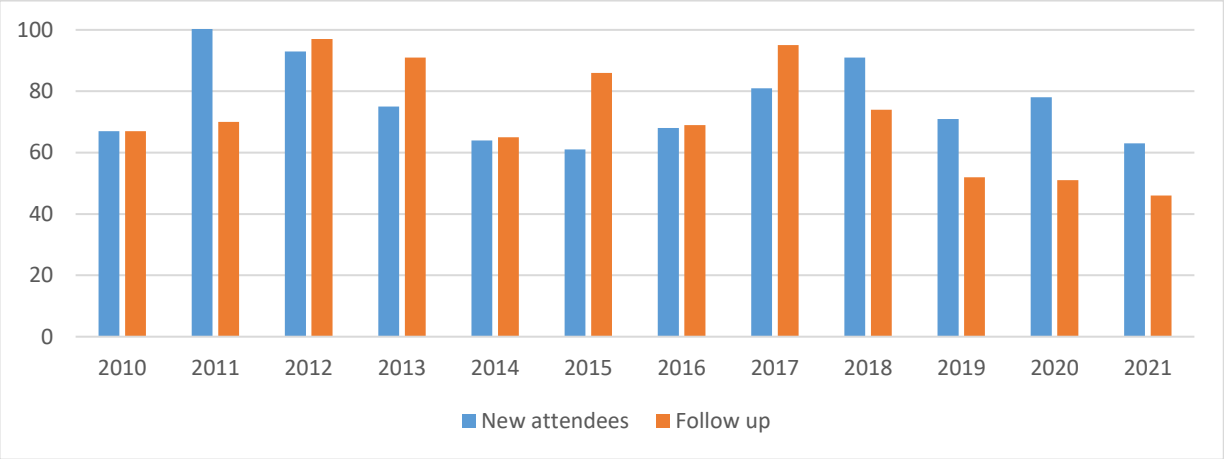


Figure 8. New attendees and follow up numbers for 2010-2021.

The age range of new patients seen in 2020 was 18-86 years. The average age was 64 years. There were 66 (53% Patients with eGFR <15 active in the Pre Dialysis Education Clinic at the end of 2021, with 73 patients at the end of 2020. Below are the percentages of those patients and their chosen treatment pathways.

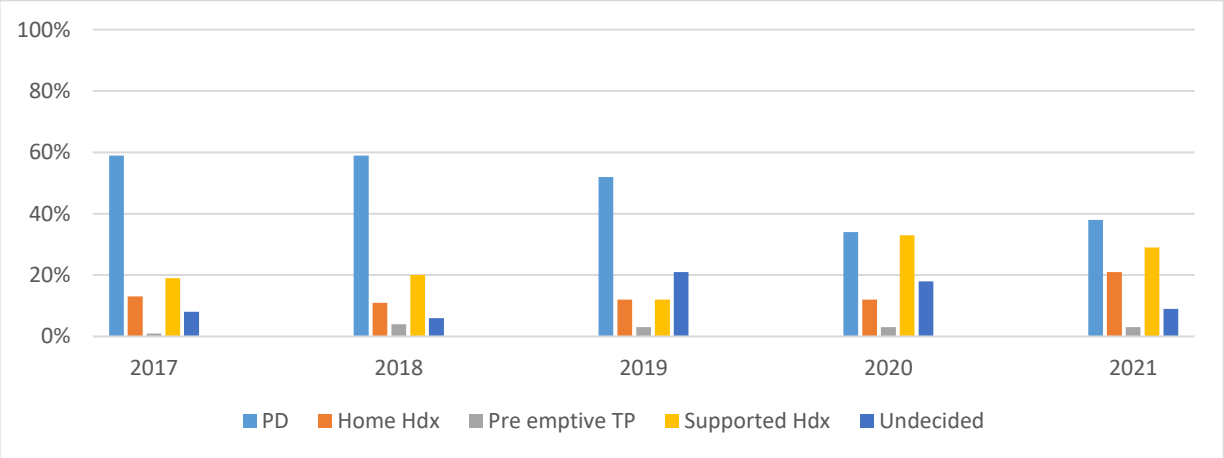


Figure 9. Percent of patients with eGFR <15 active in Pre Dialysis Education Clinic and chosen treatment pathways.

6. ACCEPTANCE ONTO DIALYSIS

Kylie Turner, A/Prof Ivor Katz

Out of 43 new patients who started dialysis in 2021, 10 (23%) patients commenced peritoneal dialysis, 4 (10%) started home haemodialysis and 29 (67%) started haemodialysis. Patients were analysed according to their first mode of dialysis.

- There were 7 (16%) late referrals and this was just below the National average 2020 (17%).
- Mean age at commencement in 2020 was 63 years for peritoneal dialysis and 66 years for haemodialysis. The average age of patients starting haemodialysis was the same as the previous year. The average age of peritoneal dialysis increased by 5yrs. This is still older than the National average age which is 68 years for HD and 63 years for PD (ANZDATA 2020).

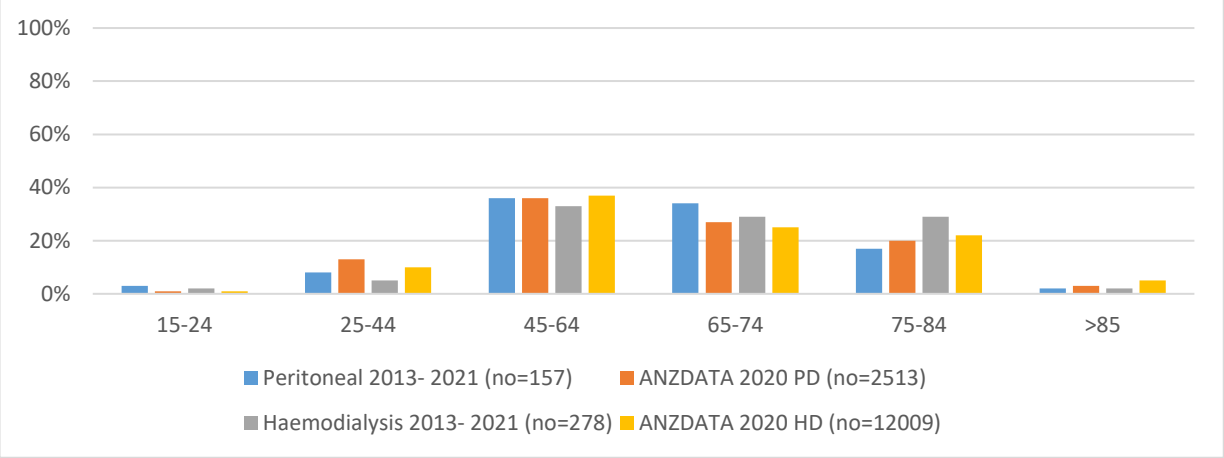


Figure 10. Age Groups of New Patients 2013-2021 compared to ANZDATA 2020.

We continue to start more patients than nationally in the 75-84 age groups.

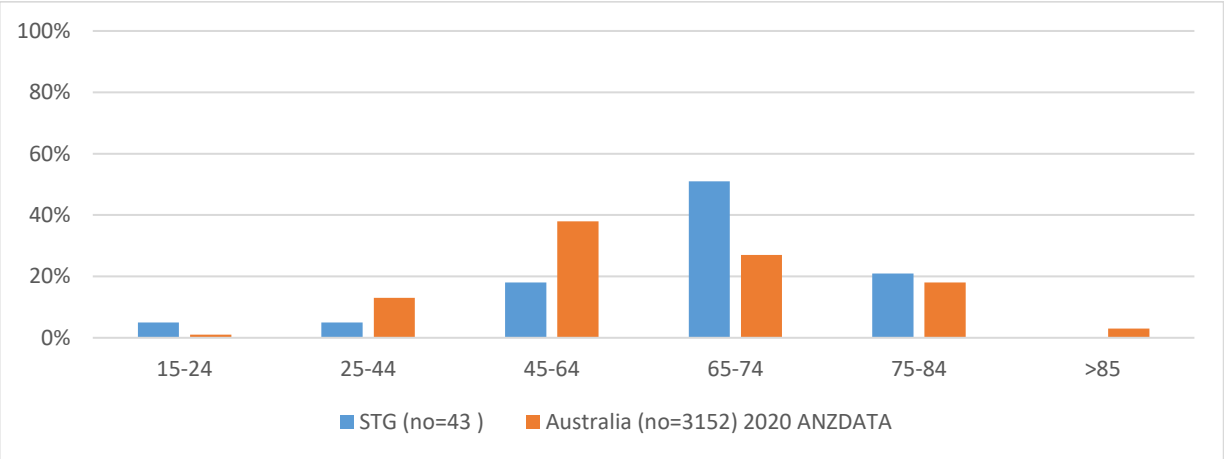


Figure 11. New Patients St George 2021 compared to ANZDATA 2020.

Glomerular filtration rate (GFR)

An eGFR is obtained from the serum biochemistry results taken immediately prior to commencing dialysis. The data are consistent with general recommendations following the IDEAL study, with the vast majority of our patients commencing at an eGFR below 10ml/min.

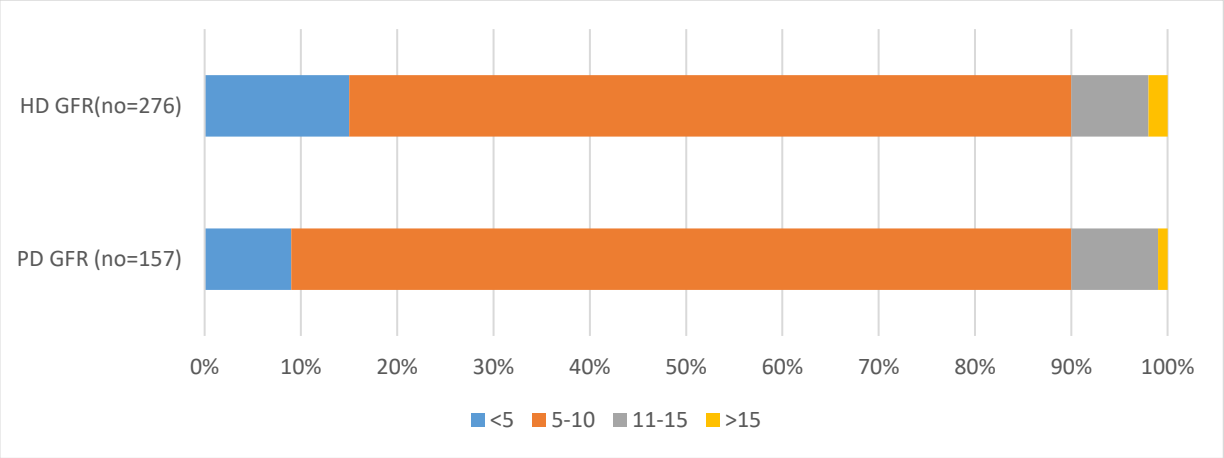


Figure 12. PD and Haemodialysis eGFR at commencement 2013-2021 (% in each range).

Baseline characteristics of new patients- Body mass index.

Table 1. *BMI for St George Hospital new patients*

#Body Mass Index (kg/m)	PD 2013 – 2021 (%) N=157	HD 2013 – 2021 (%) N=278
<18.5	2%	2%
18.5-24.9	36%	23%
25-29.9	26%	32%
30-34.9	26%	23%
≥35	10%	20%

According to ANZDATA, BMI <18.5 indicates underweight, 18.5-24.9 normal, 25-29.9 overweight, 30-34.9 is obese and ≥35 morbidly obese.

Table 2. *Baseline characteristics compared with ANZDATA- Excludes patients who had previous mode of dialysis.*

		St George HD 2013-2021 (n=278*)	ANZDATA HD 2020 (n=12010)	St George PD 2013-2021 (n=157*)	ANZDATA PD 2020 (n=2544)
Average Age	(years)	66	68	63	63
Gender	Male	67%	61%	68%	62%
	Female	33%	19%	32%	38%
Late Referral	(< 3 months before first treatment)	15%	29%	10%	24%
Comorbidities	Smoking (Current and former)	44%	38%	45%	53%
	Chronic Lung Disease (yes and suspected)	12%	20%	18%	14%
	Cerebrovascular Disease	7%	17%	11%	10%
	Coronary Artery Disease	37%	46%	42%	34%
	Peripheral Vascular Disease	13%	28%	17%	20%
	Diabetes	50%	55%	51%	44%

*Excludes patients who had haemodialysis prior to peritoneal dialysis.

Key Performance Indices for Advanced Kidney Disease and Pre-Dialysis Education Clinic and acceptance onto dialysis

The four benchmarks for pre-dialysis have been established on historical Renal Department data.

1. **Timely Referral to Pre Dialysis Education Clinic – 100% of patients referred with eGFR ≤20 or KFRE ≥20% at 2years and 3mths prior to commencing RRT**

In 2021, there were 80 patients referred for pre dialysis education, this was a decrease from 100 in 2020. Ninety three percent of patients were referred according to the department referral guidelines. This is a 10% improvement from 2020. The 7% of patients referred not meeting the referral criteria were predicted to start within 12-18mths of referral.
In 2021, 43 patients commenced kidney replacement therapy (KRT). Of these new patients, 98% received education. Excluded in this analysis were late referrals and patients who had already commenced KRT at time of referral.

2. **70% patients start planned modality within 18mths of commencing RRT**

For patients commencing dialysis in 2021, 91% started their planned dialysis choice compared with 88% in 2020. Two patients were on a home Hdx pathway and unfortunately their renal function deteriorated rapidly and were acutely unwell and therefore unable to start home training. One patient could not transition to home therapy for medical reasons and another had a renal transplant. An additional patient had fears around pre-emptive transplant and had 2mths of supported Hdx prior to transplant. The final patient was a 'late referral' and transitioned to the preferred treatment 3mths after commencing dialysis.

3. **60% patients starting RRT have vaccinated immunity**

This benchmark means 60% of patients starting KRT had 'vaccinated immunity' defined as 'anti-HBs ≥10 International units/L'. Those with natural immunity and chronic infection were excluded in this analysis. 26% of patients who commenced dialysis in 2021 had vaccinated immunity. This is a decline from the 60% in 2020.
In 2021 every patient seen in the Pre Dialysis Education clinic were verbally screened for Hep B vaccination. The nephrologists were notified by the CKD Clinical Nurse Consultant of the patient screening via the pre dialysis clinic letter.
Patients where a serology result was not current or available, were provided with a pathology form referred to a lab. If their Hep B levels were <10 IU a letter was faxed to the GP requesting initiation of Hep B immunization. We will likely need to review and change this practice in order to achieve our benchmark.

4. **100% patients commencing dialysis with a signed consent**

In 2021, 47% of patients consented within 1 month of the patient commencing dialysis. This was a decrease from 2020 where there were 67%. By the end of 2021 of the new patients commencing dialysis there were 93% of patients with a signed consent which was an increase from 67% in 2020. Patients attending the Pre dialysis Education Clinic in 2021 received a consent for dialysis form and information handout about dialysis and non-dialysis treatments. At their next nephrologist appointment, patients were encouraged to present this documentation for further discussion. We hope to see continued improvement with this benchmark as achieving the target may have been impacted by the COVID-19 pandemic and telehealth clinics.

Summary and Recommendations

The Pre-dialysis program continues to work extremely well, capturing the vast majority of patients who commence dialysis, providing good education and allowing the department to plan its dialysis resources accordingly.

All patients continue to be seen prior to commencing RRT with 91% starting their planned modality and the remaining 9% having an appropriate explanation as to why they did not commence their planned dialysis modality.

In 2022 we will focus on:

- Ensuring patients have a signed consent prior to commencing dialysis
- Implementing a yearly review via our tracking spreadsheet to ensure active patients currently meet the criteria for their planned dialysis pathway, in order to remain appropriately active in the pre dialysis education clinic
- Reviewing the current practice for Hep B screening and vaccination of pre dialysis patients in the hope of achieving our benchmark.

7. CKD VIRTUAL MEDICAL CLINIC (VMC)

Kylie Turner, A/Prof Ivor Katz

The St George Hospital Renal Department initiated a virtual medical consulting (VMC) service in 2013, and due to its positive outcomes continues to remain an active component of our service. Aspects which made VMC attractive included:

- High level of satisfaction within the GP community
- Issues with software integration (time consuming)
- Patients happy with 'virtual' model of care
- Improved time to specialist review.

As the outcomes were positive, and at very least no different to 'standard' face to face clinic care, it was adopted as a model of care in our department.

Patients who are referred to this form of consultation are those deemed by their nephrologist to be stable CKD patients whose blood pressure is controlled and simply require more 'active' tracking.

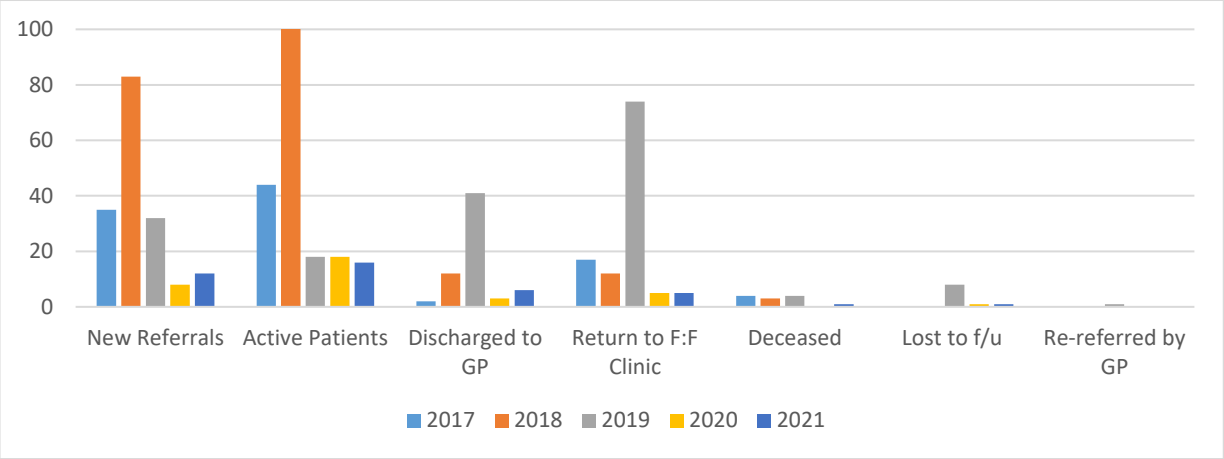


Figure 13. Virtual Medical Clinic 2017-2021.

In May 2019 we reviewed all active patients in the VMC and following this review streamlined it to only active patients who did not require face to face follow up. This resulted in those needing a review less than annually to be discharged from the program. The results of this overview reflects in the numbers in the above graph. Two of the new referrals for 2021 were patients who had been previously returned to face to face follow-up. There is avenue for this program to grow and for more nephrologists to utilise this service. It is valued by patients and the aim will be to extract the best value.

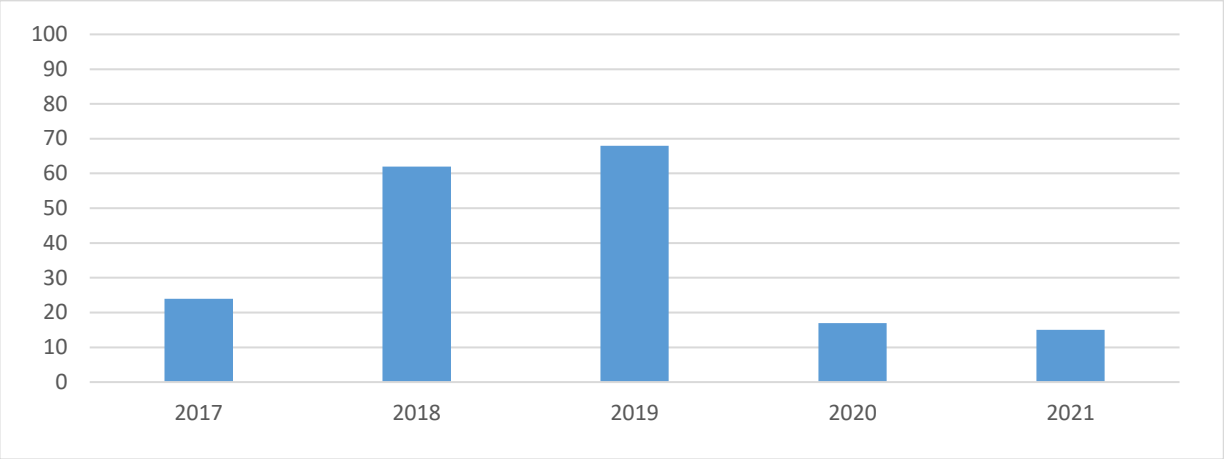


Figure 14. Follow-up appointments 2017-2021

Table 3. *Active VMC patients as at 31st Dec 2021*

	Active Patients 2019 (n = 16)	Active Patients 2020 (n = 17)	Active Patients 2021 (n = 16)
Age (Average)	74yrs	77yrs	72yrs
Female	31%	50%	56%
Male	69%	50%	44%
eGFR (Average)	45mL/min/1.73m^2	45mL/min/1.73m^2	52mL/min/1.73m^2
ACR (Average)	8.4mg/mmol	14.7mg/mmol	16.04mg/mmol
KFRE (Average)	0.41% 2yr / 1.54% 5yr	0.38% 2yr / 1.46% 5yr	0.24% 2yr / 0.98% 5yr

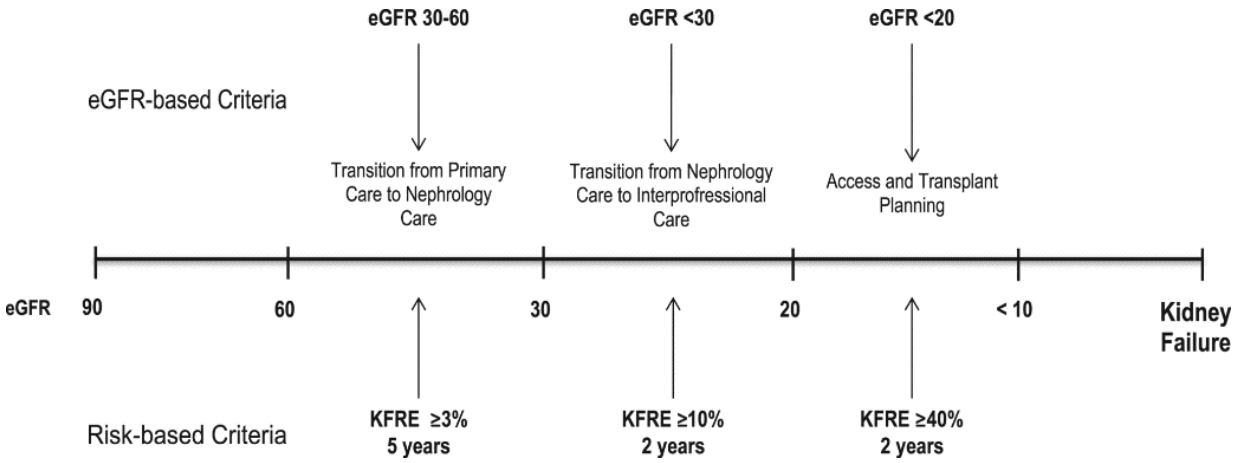
KPIs for Virtual Medical Clinic (VMC)

Two benchmarks for the virtual medical clinic have been established

1. **Patients referral in line with clinic criteria 5yr risk <3%**

In 2021 out of the 12 patients who were referred to the VMC 100% met the clinic criteria of a KFRE 5yr risk of less than 3% this is the same as 2020. Out of those 12 patients all were referred with an ACR result which is an improvement from 2019 and all had an eGFR on referral.

2. **Patients meeting criteria for decision making as per guidelines outlined in the Kidney Failure Risk Equation Score**
    a. Evaluate a risk-based versus eGFR-based approach to clinical decision-making in patients with CKD.



Summary and Recommendations

- Yearly review of tracking spreadsheet to ensure active patients currently meet the criteria to remain active in the virtual medical clinic
- Continue to ensure patients are having ACR collected and provided at the time of referral to the VMC.
- Increase the uptake of patients being referred to the program by promoting further in the SGH Renal Department.
- Currently we are reviewing the impact of the KFRE score in assisting us with predicting decline in renal function and when transition points in service are needed e.g. pre-dialysis care and vascular access.

8. RENAL VASCULAR ACCESS

Yanella Martinez-Smith, Jayson Catiwa

Background and Performance Indicators

Native arteriovenous (AV) fistula remains the preferred vascular access for haemodialysis due to prolonged patency, minimum risk of infection, and maintenance.
The Renal Vascular Access Clinical Nurse Consultants aim to monitor all fistulae from creation until the commencement of dialysis to ensure maturity, perform access surveillance before and after dialysis has commenced, and ensure a low level of access-related complications are maintained.

Data Benchmark

Data is benchmarked against ANZDATA 44th Annual Report 2021, KDOQI 2019, and KHA-CARI 2013 guidelines.
The key performance measures for vascular access are:
> 41% of patients commencing haemodialysis have functioning access [1].
> 83% of prevalent patients dialysing through a native fistula [1].
<1.5 episodes/1000 catheter days of tunnelled or non-tunnelled catheter infection rate [2].

Executive Summary

Almost all vascular access performance measures are within the national and international benchmark; primary AVF & AVG rates are above the national average. Infectious complications across all access types (fistula, graft, and catheter) remain below the benchmark, and access survival remains excellent.

Incident vascular access

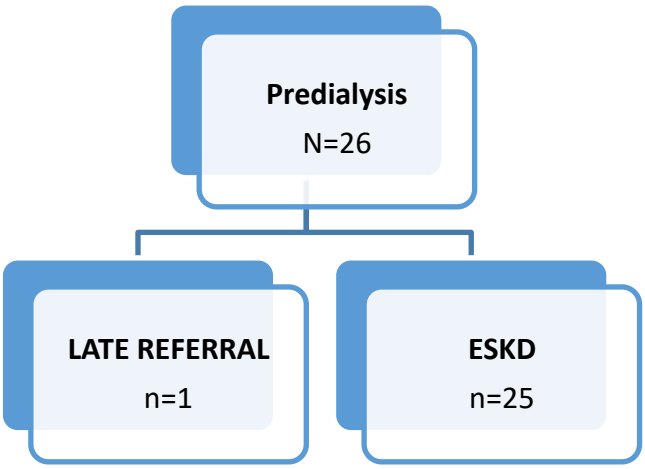


Figure 15. New patients commencing haemodialysis

Arteriovenous Access at Commencement of Haemodialysis

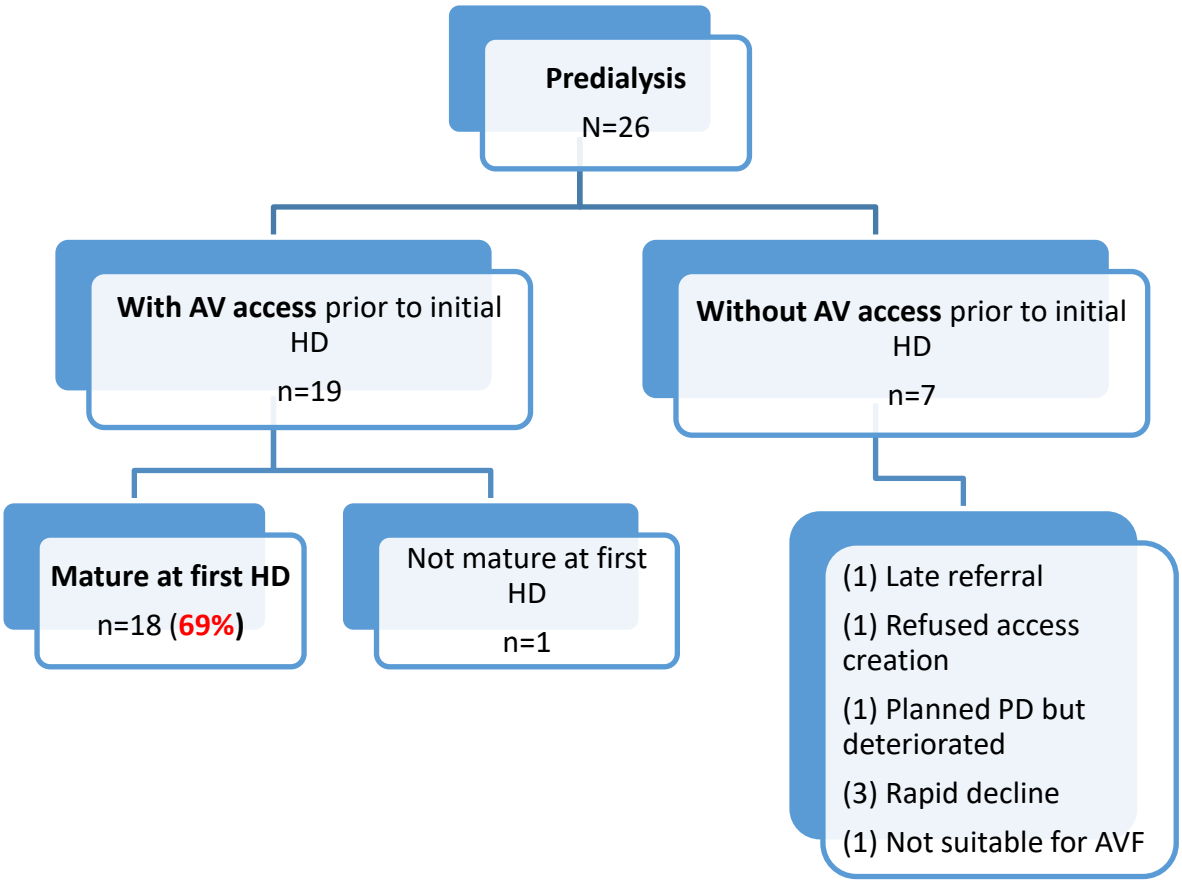


Figure 16. Access placement prior to the first haemodialysis

Comments

- 69% of incident patients (n=18) with AV access created at St George Hospital Renal Department had reached maturity at the first haemodialysis.
- Late referrals at St George Hospital Renal Department have significantly dropped to 3% in 2021 from 8% in 2020. This remains below the 21% and 16% of late referrals nationwide for Indigenous and Non-Indigenous cohorts, respectively, according to the 2021 ANZDATA Registry.
- The aim is to have AV access created within 30 days from the initial referral to the vascular surgeon.
- At St George Renal Department, the average time from initial nephrologist referral to vascular access creation was 57 days compared to 54 days in 2020.
- The average time from AV access creation to the first cannulation in 2021 is 2.2 months, which is shorter than 4.2 months in 2020. While face-to-face consultation is impacted during the pandemic with the lockdown rules, patients still present to the renal VA clinic for fistula surveillance, albeit infrequent.

Incident Vascular Access

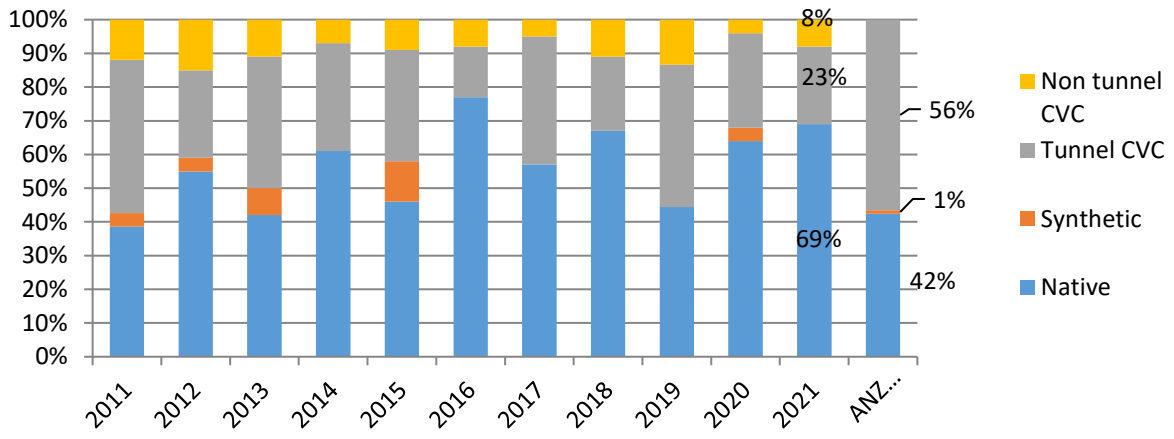


Figure 17. Incident vascular access.

Comments

- In the 2021 ANZDATA Report, 42% of patients commenced with a native arteriovenous fistula (AVF) and 1% with an arteriovenous graft (AVG) nationwide, equating to 43%. In contrast, more than half of incident patients across Australia and New Zealand start haemodialysis treatment with central venous catheters.
- 69% of new patients commencing haemodialysis at St George Hospital Renal Department were using native AVF as the first access for haemodialysis, which exceeds the national benchmark.
- 23% of the incident patients at St George Renal Department commenced initial haemodialysis via tunnelled CVC, mainly due to patients had a rapid decline in kidney function. The numbers remain below the national benchmark of 56%.

Functional Arteriovenous Access at Entry to Haemodialysis

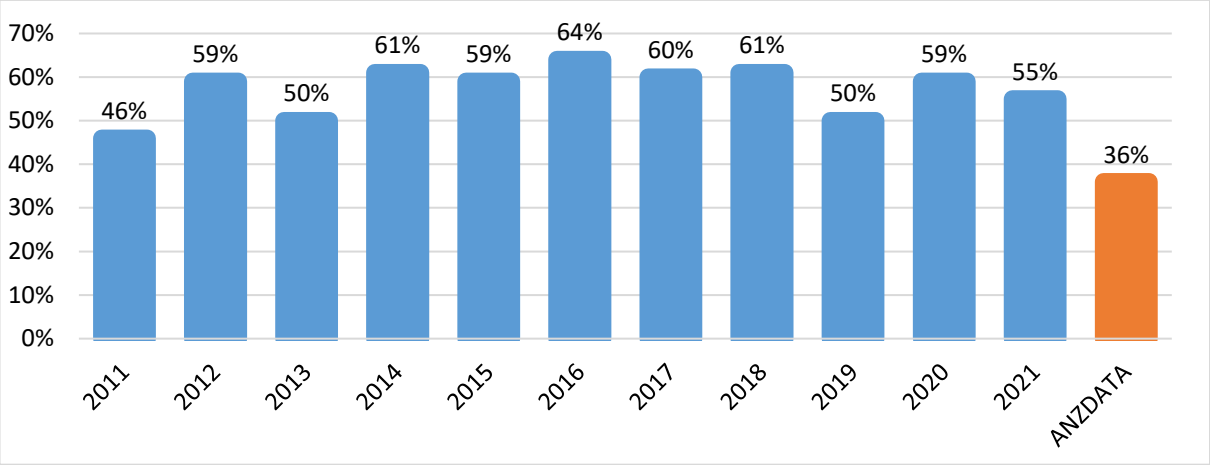


Figure 18. Mature arteriovenous access on the first haemodialysis.

Comments

- In 2021, the national average of functioning arteriovenous access at first dialysis was 36%.
- In comparison, 55% of all new haemodialysis patients (including transitioning from PD or failed transplants) at St George Hospital Renal Department had functioning access at first haemodialysis.
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Prevalent Haemodialysis Patients

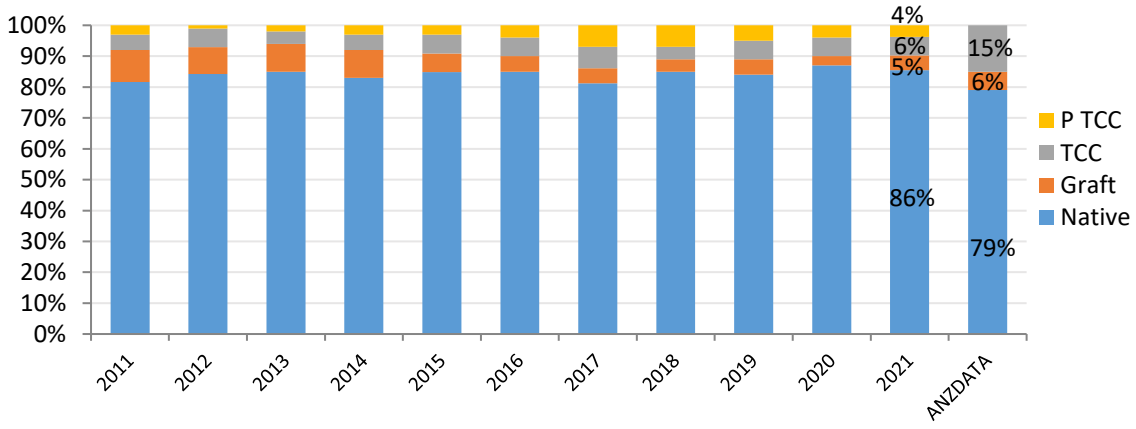

Figure 19. Prevalent vascular access. P TCC = permanent tunnelled cuffed catheter; TCC = tunnelled cuffed catheter.

Comments

- There were 214 prevalent patients on haemodialysis at St George Renal Department as of 31st December 2021.
- 91% of St George Hospital Renal Department patients were using AVF/AVG for haemodialysis, which exceeds the 2021 ANZDATA benchmark of 79%.

- 4% of patients at St George Hospital Renal Department were using a permanent catheter, which is similar to the previous year and has met the 2006 KDOQI benchmark of <10% for catheter use in haemodialysis patients.

Av Access Infectious complications

There was no episode of bloodstream infection for both the native fistula and grafts in St George Hospital Renal Department. This data does not include home haemodialysis patients.

Table 4. *Bloodstream infection.*

Year	Native		Graft	
	Episode	Rate BSI/100 patient-months	Episode	Rate BSI/100 patient-months
2021	0	0	0	0
2020	1	0.7	0	0
2019	2	0.69	0	0
2018	0	0	0	0
2017	3	0.27	0	0
2016	1	0.08	0	0
2015	2	0.15	0	0
2014	0	0	0	0
2013	1	0.15	2	2.3
2012	1	0.07	1	5.9
2011	2	0.53	4	4.5

Note BSI = bloodstream infection

Av Access Thrombotic Complications

The average thrombosis events across arteriovenous access types are 1.1 episodes per month due to lost follow-up with a vascular surgeon, delayed vascular intervention, known vessel disease, and post-procedural complications.
Additional point-of-care surveillance through the Transonic machine for detecting signs of failing vascular access remains an enabler to the department's low monthly average thrombosis rate.

Table 5. *Thrombosis events.*

Year	Native		Grafts		Monthly average
	Episode	No of patients	Episode	No of patients	
2021	11	11	2	1	1.1
2020	9	9	3	3	1.0
2019	10	10	5	3	1.25
2018	7	7	2	1	0.75
2017	9	9	6	5	1.25
2016	15	14	3	3	1.5
2015	20	17	16	5	2.5
2014	14	13	13	8	2.3
2013	8	8	12	7	1.7
2012	9	9	11	9	1.7
2011	6	4	16	10	1.8

Access Survival

- KDOQI (2006) recommends AVF patency > 3.0 years and AVG patency > 2.0 years by life-table analysis.
- Cumulative assisted patency is defined as the number of accesses that remain patent regardless of the number of interventions during a time period.
- Data includes current and deceased patients since 2004 and excludes primary failure. The endpoint was access lost. Data were censored for deaths, current functioning access, transplantation, or transfer to another unit.
- Cumulative proportion surviving at the end of the below intervals: AVF at 5 years (80%), at 10 years (69%); AVG at 1 year (61%), 2 years (53%), 3 years (46%); Flixine grafts at 1 year (77%), 3 years (54%).
- Access survival continues to be relatively similar to the previous year's results.

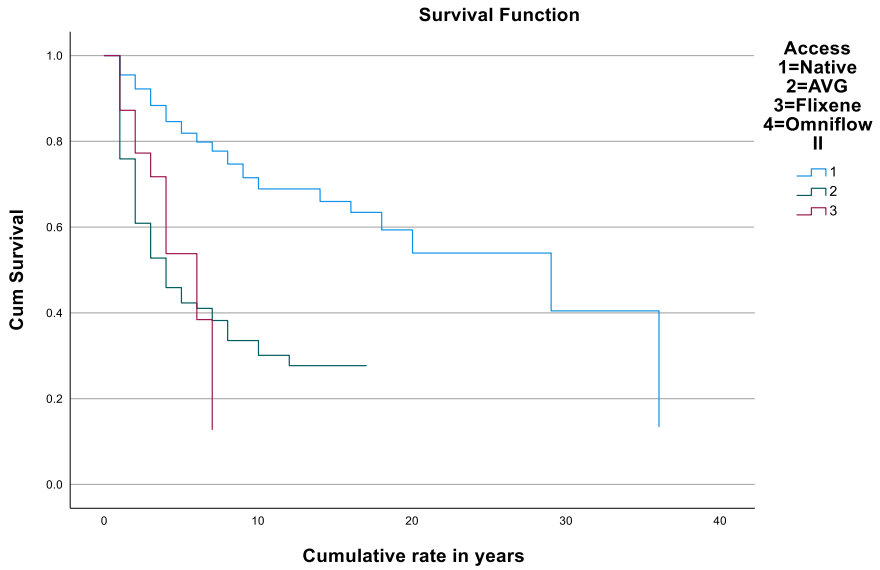

Figure 20. Survival of AV access.

Central Venous Catheters (CVC) Activity Level

Tunnelled cuffed catheters provide temporary access for acute and chronic haemodialysis (HD) patients, including those with a primary AVF still to mature [2]. In addition, where the creation of arteriovenous access is not feasible, HD can commence with the use of CVC [3].

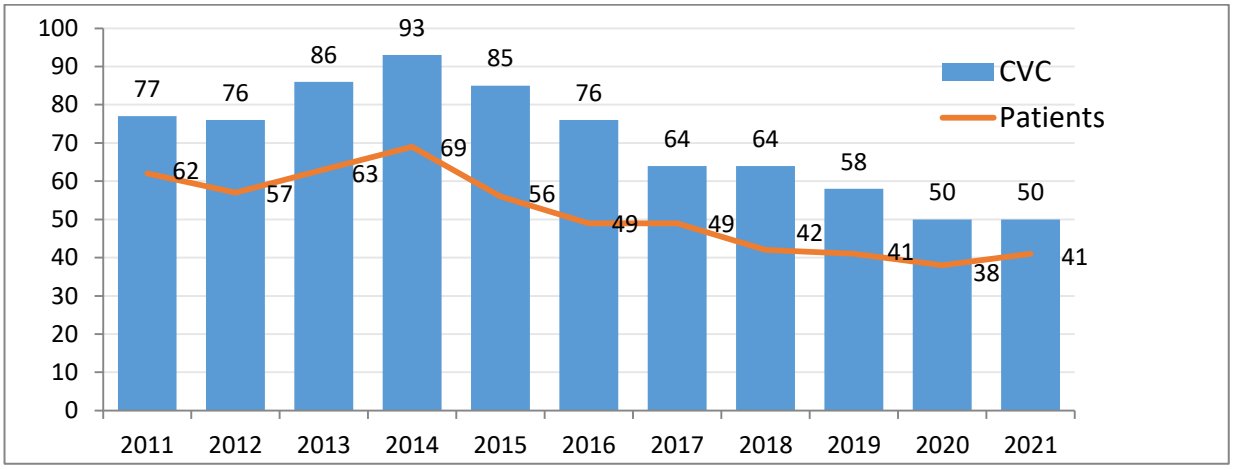

Figure 21. Catheter insertions.

Comments

- The number of CVCs inserted for AKI & CKD is the same as the previous year.
- The total number of catheter exposure has reduced from 6655 in 2020 to 4494 days in 2021. This paralleled the decline in the average number of catheter days from 113 in 2020 to 56.5 days in 2021.

Catheter Insertion

The ICU Department continues to manage more patients with AKI, which has resulted in a steady decrease of catheters inserted for use in dialysis use over the years.

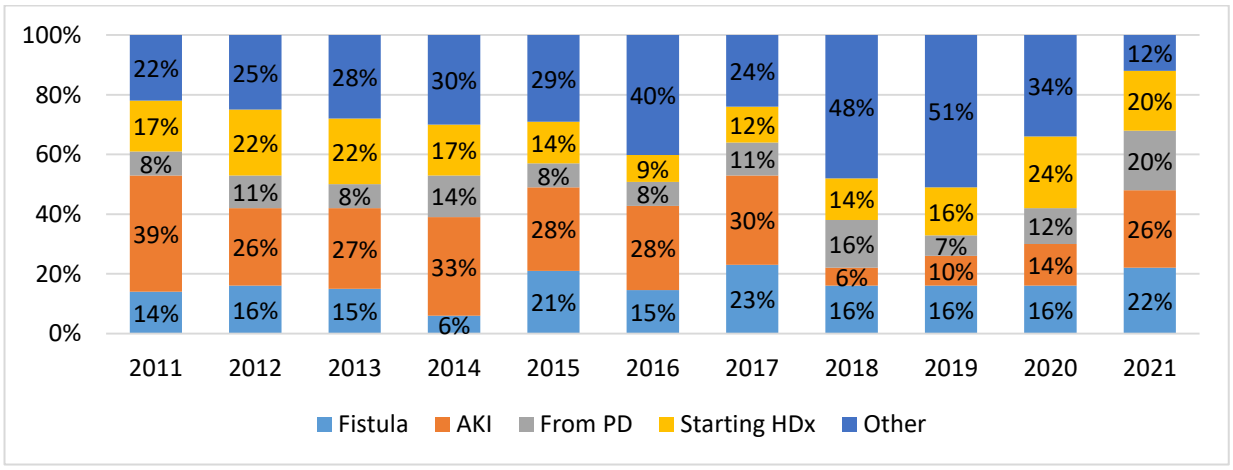

Figure 22. Reasons for catheter insertion.

Note: Fistula group includes immature, revision or thrombosed access. Other includes replacing a non-tunnelled with a tunnelled catheter, incorrect placement, malfunction, thrombotic and infectious complications.

Catheter-related Infectious Events

KDOQI 2006 recommends <1.5 episodes/1000 catheter days of tunnelled or non-tunnelled catheter infection rate [2].
Current literature suggests exit site catheter infection rate varies from 8.2 to 16.75 episodes/1000 catheter days for non-tunnelled catheters and 0.35 to 8.3 episodes/1000 catheter days for tunnelled catheters [4].

Table 6. *Catheter infectious event summary.*

Year	Exit site infection		Catheter-related bacteraemia	
	Freq (%)	Rate episodes/1000 catheter days	Freq (%)	Rate episodes/1000 catheter days
2021	**0**	**0**	**2**	**0.15**
2020	2	0.07	2	0.07
2019	5	0.43	2	0.14
2018	9	0.67	10	0.78
2017	7	0.44	7	0.35
2016	4	0.27	6	0.45
2015	5	0.41	1	0.1
2014	5	0.54	2	0.22
2013	2	0.31	1	0.15
2012	4	0.62	4	0.62
2011	6	0.43	1	0.09
2010	5	0.82	4	0.69

Comments

- For the 50 catheters inserted in 2021, one episode of catheter-related bacteraemia but 0 episode of exit-site infection has occurred.
- The gentamicin/heparin lock continues to be utilised in St George Renal Department as a recommended means to reduce CRB and exit site infection events [2](3). The KHA-CARI guideline suggests that antibiotic locks be considered to salvage catheters [5].
- The potential for the emergence of antimicrobial resistance remains a significant concern [5]; however, random gentamicin levels of <0.5 mg/L indicate toxicity is unlikely. Bi-annual audits of the gentamicin level are being held in the department.

Future Plans

- Nurse-led vascular access clinic continues twice weekly.
- The combined Nephrologist/Vascular Surgeon meeting will continue quarterly.
- The VA professional development group will continue monthly in St George Renal Department to keep staff involved in the collective decision-making in improving vascular access care of patients. Regular in-service education sessions will be provided to the staff.
- Vascular access workshops incorporating ultrasound for point-of-care access-guided cannulation will be carried out bi-annually.
- Vascular access monitoring through the revised Vascular Access Risk Assessment Tool will be performed on admission, each dialysis (when necessary), and monthly by the nursing staff.
- Vascular access surveillance through the nurse-led clinic and the Transonic machine in the dialysis unit will continue for timely detection of the dysfunctional signs of the AV access.

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2. KDOQI, Clinical Practice Guidelines for Vascular Access. American Journal of Kidney Diseases, 2006. 48: p. S248-S273.
3. Polkinghorne, K.R., et al., KHA-CARI Guideline: Vascular access - central venous catheters, arteriovenous fistulae and arteriovenous grafts. Nephrology, 2013. 18(11): p. 701-705.
4. McCann, M. and Z.E.H. Moore, Interventions for preventing infectious complications in haemodialysis patients with central venous catheters. Cochrane Database of Systematic Reviews, 2010(1).
5. Chin, G., Treatment of dialysis catheter infection. 2012.

9. HAEMODIALYSIS

A/Prof Ivor Katz, Evelyn Graf, Tracey Blow, Elizabeth Hogan, Louise Jordan, Dr. Brendan Smyth, Max Thomsett

Haemodialysis continues to be provided at 3 centres supported by the St George hospital and Sutherland hospital in the South Eastern Sydney Local Health District (SESLHD). An In-Centre dialysis unit at St George Hospital on the 4 West ward and two satellite dialysis units at Sutherland Hospital and at the Fresenius Medical Care (FMC) unit in Kogarah.

Activity

The **St George Hospital 4 West In-centre** unit operates a 17-chair haemodialysis service including two isolation rooms. The unit has a total of 23 dialysis machines. There are 4 portable reverse osmosis (RO) machines to provide acute haemodialysis in outlier areas as required. The unit provides high level care haemodialysis for inpatients and frail outpatients. On average in 2021, 52 patients were dialysed each month and a total of 9769 treatments were completed.

During the COVID-19 pandemic, to prevent spread through all units and for logistical reasons, the 4 West In-Centre dialysis unit was responsible for providing dialysis to the COVID-19 positive patients. The patients from the Sutherland Satellite Unit (TSH) and Fresenius Medical Care (FMC) were all referred to the St George Hospital In-Centre unit. Prior to January 2022, the COVID-19 positive patients were dialysed in the St George Hospital specialised COVID-19 precinct wards. In January 2022, the two isolation rooms in 4 West were fitted with HEPA filters. This enabled 4 West to perform haemodialysis on our own patients testing positive. From January 2022 – May 2022 approximately 65 patients with COVID-19 have had their haemodialysis in 4 West In-Centre unit.

The **Fresenius Medical Care (FMC) Satellite** Unit operates 17 chairs, with capacity to expand to 25 if required. On average in 2021, 70 patients were dialysed each month and a total of 11474 treatments were completed. Between the two St George unit's (In-Centre and Satellite) there were 21243 (FMC Satellite 11474 and SGH in-centre 9769) treatments completed. Comparing this to 2020 there were 20586 treatments, which was very similar.

At the FMC Satellite clinic an additional 2 chairs are utilised for home haemodialysis training with four (4) patients having successfully trained in 2021. This was significantly down from the previous year due to the COVID-19 pandemic. Two (2) patients were transferred to home supported dialysis under the Medibank Private program. Home suitability assessments were transferred from the Sydney Dialysis Centre to the FMC home training service to limit patient movement in the community and thus the potential exposure to COVID-19. Training time increased due to age and comorbidities.

Training ranged from 42 days to a maximum of 56 days. Respite dialysis is also offered at the FMC unit. This was well utilised throughout the year with multiple sessions being provided for 21 patients. There were also several patients required multiple visits for support or retraining.

Reasons for respite included, assistance with cannulation (7 patients), support following hospital admission (6 patients), partner unwell (1), dialysis issues in the home (1). Respite stays ranged from as little as two days and up to three months.
The FMC Satellite clinic also operates a nocturnal dialysis program. These dialysis shifts occur overnight and throughout 2021 eleven patients (12%) were dialysing on this overnight (nocturnal) dialysis program. This service has the capacity for 12 patients.

The Sutherland Hospital satellite unit operates twelve chairs for Satellite care patients. In 2021, 6460 treatments were performed, and on average, 45 patients dialysed each month.

Growth rates of haemodialysis in the St George Hospital dialysis units/centres

The graphs below shows growth patterns from 2012 with year-on-year change as a percentage across the different dialysis units and all the units together. Figure 21 demonstrates the changes occurring before and after the transition of the establishment of a second satellite dialysis unit. The Fresenius Medical Care (FMC) Kogarah Satellite unit. This FMC satellite chronic haemodialysis unit was established in late 2018 and the transition was only completed in early 2019. Figure 22 shows the growth changes in all three units. The growth rates includes haemodialysis for acute kidney injury and for those patients with end stage kidney disease (ESKD) who will require dialysis. Figure 3 shows the total number of dialysis sessions per year by each unit.

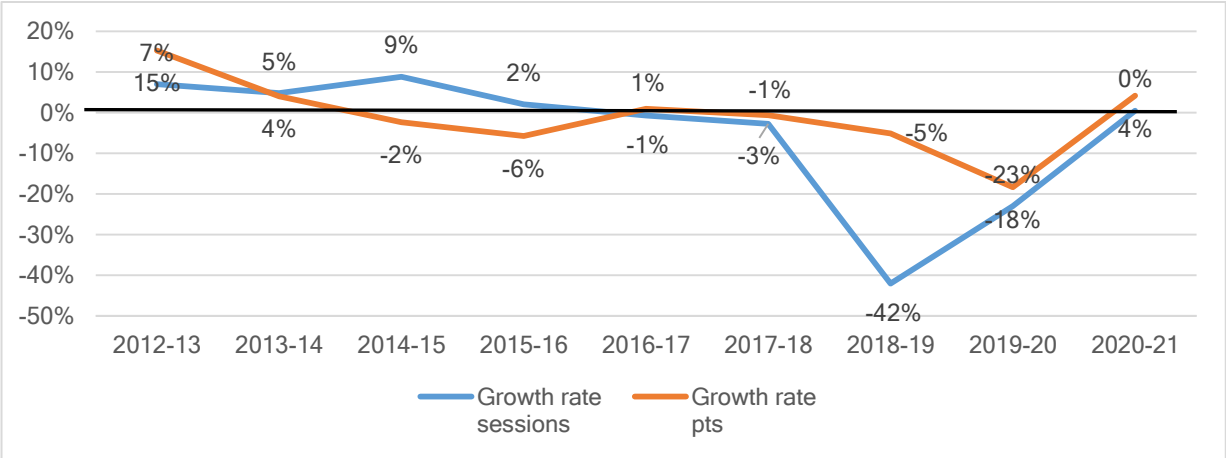


Figure 23. Haemodialysis growth rates by session and patients from 2012 to 2021 at St George Hospital and the Sutherland Satellite unit (Note: Fresenius Satellite unit began in 2019).

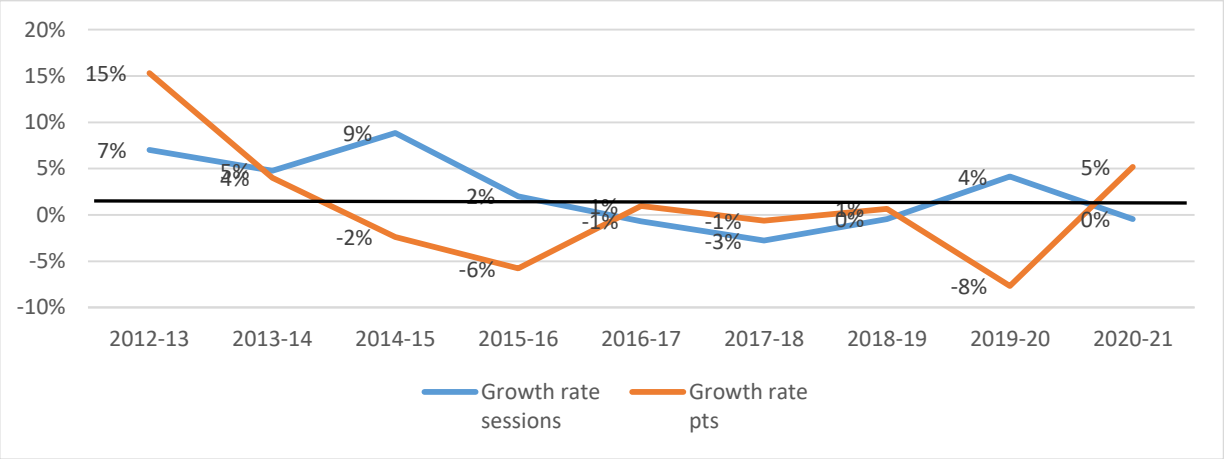


Figure 24. Growth Rates in Haemodialysis at St George (In-Centre and Satellite) and Sutherland Dialysis Units.

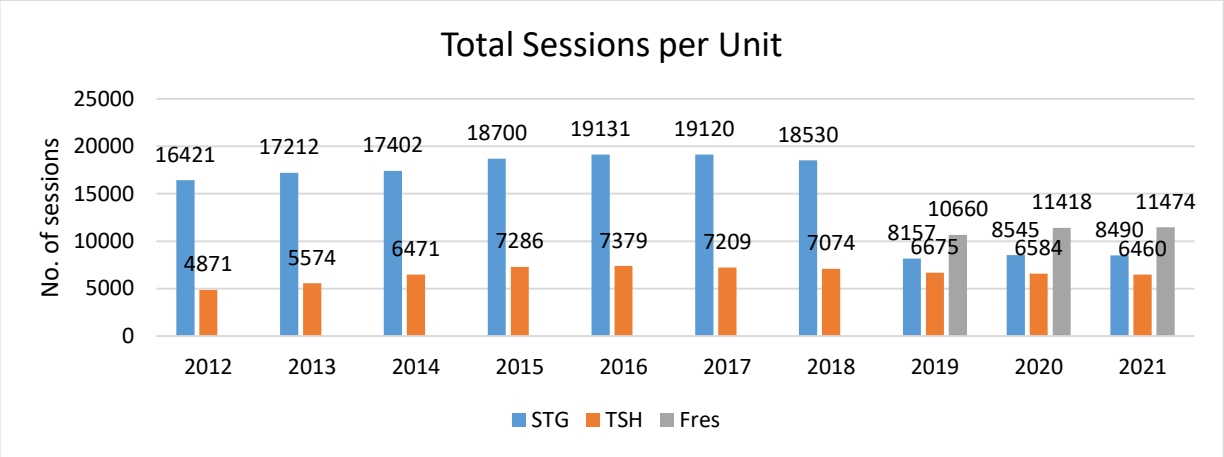


Figure 25. Haemodialysis growth rates by session and patients from 2012 to 2021 at St George Hospital and the Sutherland and Fresenius Satellite units (Note: Fresenius Satellite in Unit opened in 2018-2019).

Activity by Dialysis Centre

Table 7. *Movement in and out of Ward 4 West In-Centre haemodialysis unit from 2016 to 2021.*

4 West In-Centre Haemodialysis	2016	2017	2018	2019 4W	2019 FMC	2020 4W	2021 4W
In-centre haemodialysis patients at beginning of year.	123	135	133	130*			
Remained in 4W / Transferred to FMC				61	69	*61	66
IN							
1. New Patients	29	24	20	19	7	15	15
2. Transfers from other units	2	11	18	8	5	20	0
3. Transfers from PD[#]	10	13	6	7	4	3	0
4. Failed transplants	1	2	3	3	1	0	0
5. Transfers from Home HD[$]/Satellite/In-Centre	5	8	4	5	14	6	14
6. Acute Kidney Injury	24	22	11	2	1	0	0
7. Other	5		1	1	0	0	0
Subtotal	**76**	**80**	**63**	**45**	**28**	**44**	**29**
OUT							
8. Transplants	4	6	2	0	5	0	0
9. Transfers to other units/overseas	5	3	6	6	2	17	2
10. Transfers to Home HD[$]	3	2		0	6	4	1
11. Transfers to PD[#]	2	5	1	0	0	0	2
12. Transfers to Satellite/In-Centre	6	14	7	6	8	0	8
13. Regain Function	13	16	8	0	1	0	2
14. Deaths (medical)	11	21	17	14	1	8	11
15. Deaths (withdrawal)	20	15	15	7	1	10	17
Subtotal	**64**	**82**	**56**	**33**	**24**	**39**	**43**
Net Gain/ Loss	12	-2	-14	+12	+4	+5	-14
In-centre haemodialysis patients at end of year.	135	133	119	73	73	66	52
Sum of FMC and In-Centre				146			

* In 2019 the 4 west dialysis unit split into a satellite dialysis unit and those patients unable to move to a satellite unit remained on 4 west as 'In centre dialysis' patients.

[@] FMC – Fresenius Medical Centre (Kogarah Satellite dialysis unit);

[#]PD – peritoneal dialysis;

[$]HD- haemodialysis.

Table 8. *Movement in and out of the Sutherland Satellite haemodialysis unit from 2016 to 2021.*

Sutherland Satellite HD Unit	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Satellite haemodialysis patients at beginning of year.	47	48	48	48	48	45	45
IN							
1. New Patients	2	0	0	0	0	4	2
2. Transfers from other units	1	1	0	2	2	1	2
3. Transfer from PD[#]	0	0	1	4	1	0	1
4. Transfer from In-Centre	12	7	14	11	11	6	6
5. Transfer from home/training				6	1	1	1
Subtotal	15	8	15	23	15	12	12
OUT							
6. Transplants	2	1	0	4	3	1	1
7. Transfers to Home HD[$]	1	1	2	1	3	1	1
8. Transfers to PD[#]	0	1	1	1	0	0	1
9. Transfers to In-Centre	5	3	8	11	3	7	2
10. Transfer to other units	1	1	1	0	2	1	3
11. Deaths (medical)	5	1	3	5	2	1	2
12. Deaths (withdrawal)	0	0	0	1	3	1	4
13. Regain Function	0	0	0	0	2	0	0
Subtotal	14	8	15	23	18	12	14
Net Gain/ Loss	1	0	0	0	-3	0	-2
Satellite haemodialysis patients at end of year.	48	48	48	48	45	45	43

Table 9. *Movement in and out of the Fresenius Medical Care haemodialysis unit from 2016 to 2021.*

Fresenius Medical Care Satellite HD Unit	**2019**	**2020**	**2021**
Satellite haemodialysis patients at beginning of year.	69	73	71
IN			
1. New Patients	7	15	12
2. Transfers from other units	5	2	2
3. Transfers from PD# or home	4	3	1
4. Failed transplants	1	0	0
5. Permanent transfers from In-centre or TSH Satellite	14	6	7
6. Acute Kidney Injury	1	1	0
7. In-Centre/TSH** backfill		11	19
8. Respite			21
9. Holiday patients	0		8
Subtotal	28		22
OUT			
10. Transplants	5		1
11. Transfers to other units/overseas	2		0
12. Transfers to Home HD$/MBP	6		1
13. Transfers to PD#	0		0
14. Transfer to In- centre/Satellite	8		14
15. Regain Function	1		0
16. Deaths (medical)	1		3
17. Deaths (withdrawal)	1	0	0
18. Others out - Return to Inc /TSH**/home or parent hospital		24	40
Subtotal	24	53	18
Net Gain/ Loss	4	-2	5
Satellite haemodialysis patients at end of year.	73	71	75

**Inc – In-Centre, TSH – The Sutherland Hospital.

Table 10. *Movement in and out of the Home training haemodialysis unit from 2016 to 2021.*

Home Haemodialysis	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Home haemodialysis patients at beginning	43	38	38	32	29	34	36
IN							
1. New Patients	2	6	5		3	0	4
2. Transfer from PD#	2	2	3	0	0	0	0
3. Transfers from other units	0	0	0	0	0	2	0
4. Transfer from Satellite	1	0	2		6	7	1
5. Failed transplants	0	0	2		0	0	0
6. Transfer from In Centre HD$	0	2	2	0	0	0	0
Subtotal	5	10	14		9	9	5
OUT							
7. Transplants	7	5	4		2	3	3
8. Transfers to MPB	1	0	0	0	0	1	1

Home Haemodialysis	2015	2016	2017	2018	2019	2020	2021
9. Transfers to In Centre HD[$]	2	3	0	0	0	1	1
10. Transfers to Satellite	0	0	3		1	1	1
11. Deaths	0	2	2		2	0	2
Subtotal	10	10	9		5	6	8
Net Gain/ Loss	-5	0	-5	-3	5	3	-3
Home haemodialysis patients at end of year	38	38	33	29	34	36	33

Note the home haemodialysis training unit moved from the St George Hospital 4 west In-Centre unit to be run by Fresenius Medical Care satellite haemodialysis unit in 2018/19.

Anaemia, biochemistry and adequacy

Key biochemical, haematopoietic and dialysis adequacy values are recorded on all in-centre haemodialysis patients in April and October. The data is pooled to derive mean or median values. Where confidence intervals are reported, these have been adjusted for intra-patient correlation. Where possible, local results have been compared to the most recently available ANZDATA report. For the last year due to COVID-19 pandemic only October adequacy values, biochemical and haematopoietic values were recorded for this report.

Anaemia management

The median haemoglobin was 116/L (STD 12.7) and the proportion of patients with haemoglobin between 110 and 129 was 58.5% (Last year it was 56.7%). At the time of data collection, on average, 74 % of patients were on erythropoietin stimulating agents (ESA), 2% currently had ESA withheld and 8% were not on ESA. Data for the remaining 16% was not known.

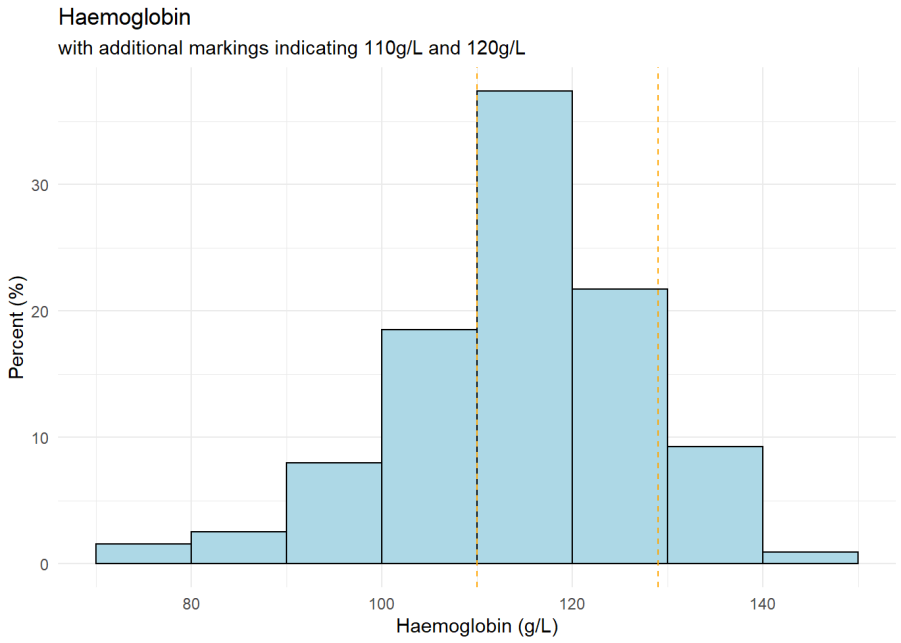
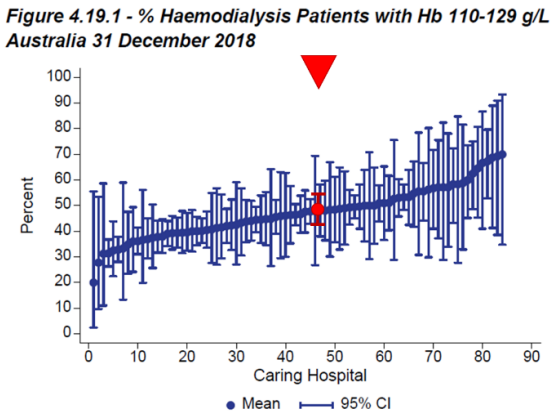


Figure 26. Haemoglobin values in g/L of all dialysis patients (median 116; mean 115; STD 12.7)



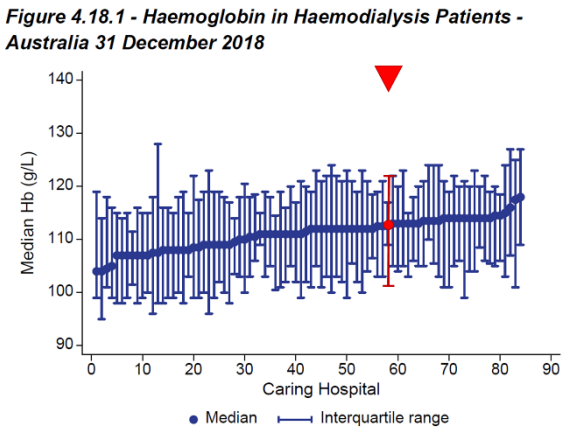


Figure 27. St George/Sutherland (red) and National Anaemia parameters (ANZDATA, 2018 Report)

The mean ferritin value was 470ng/L (STD, 316) and median value was 408ng/L. Thirty five percent (35%) of patients had a ferritin between 200 and 500ng/L. The mean transferrin saturation was 25% (STD, 13.8) and 63.5% (last year it was 84%) had a transferrin saturation between 20 and 50%. Fifty six percent (56%) tests revealed ferritin between 200 and 800, and 63.6% had a transferrin saturation between 20 and 50%. Nineteen percent (18.6%) of tests revealed a ferritin level <200 and for transferrin saturation below 20%, this was only 33.5%.

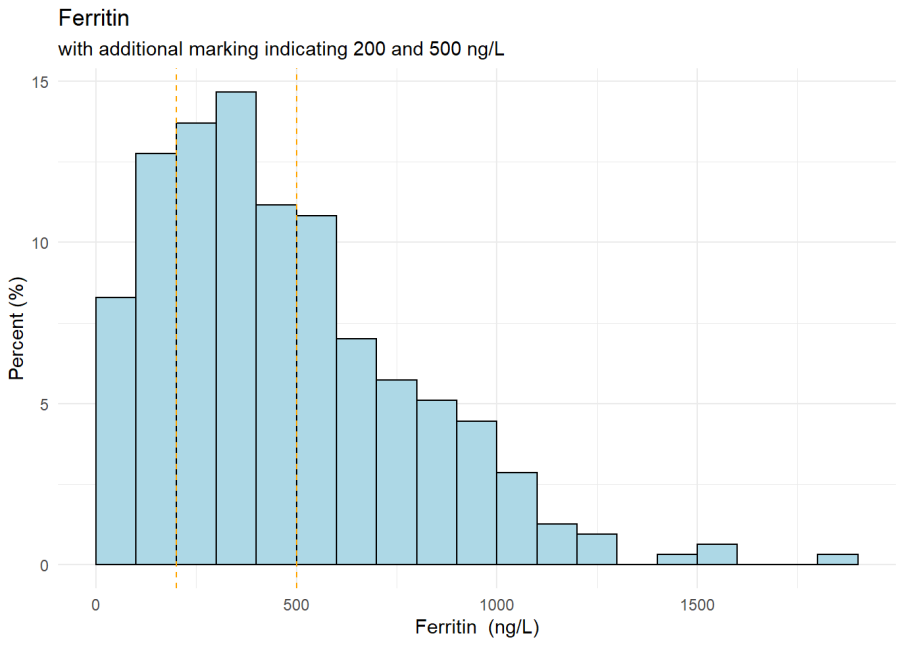


Figure 28. Ferritin values ng/L.

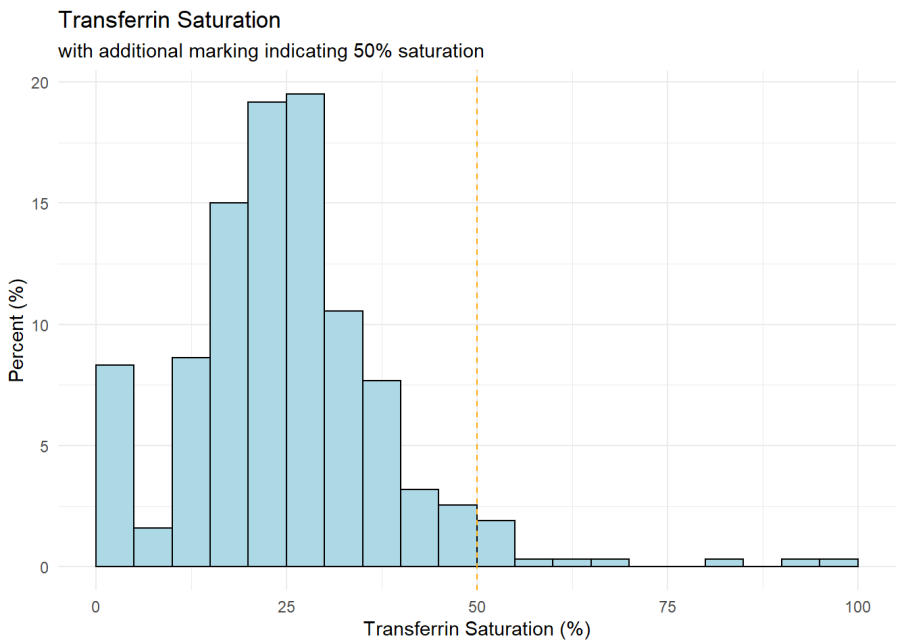


Figure 29. Transferrin Saturation values (%).

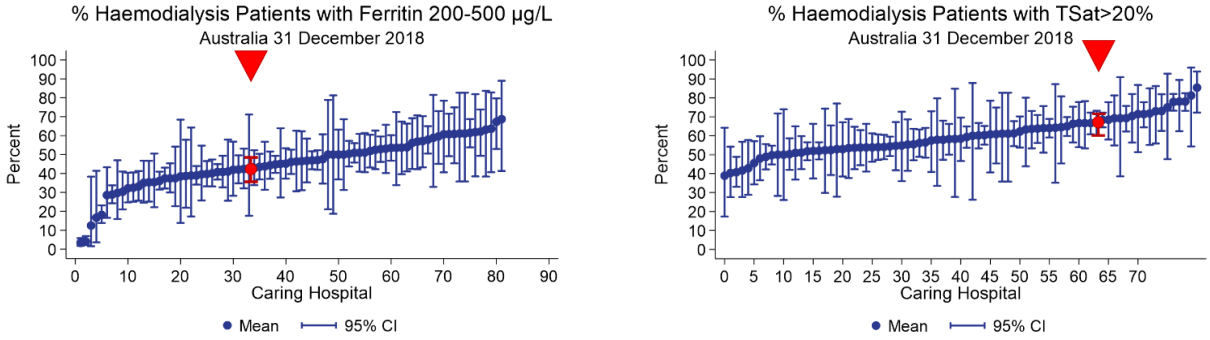


Figure 30. St George/Sutherland (red) and National iron parameters (ANZDATA, 2018 Report).

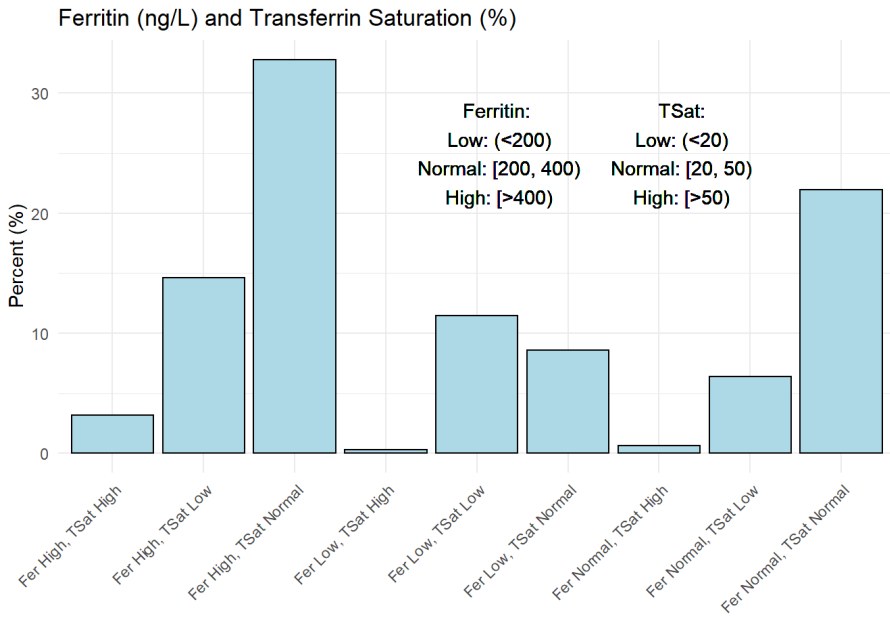


Figure 31. Ferritin and Transferrin saturation patterns.

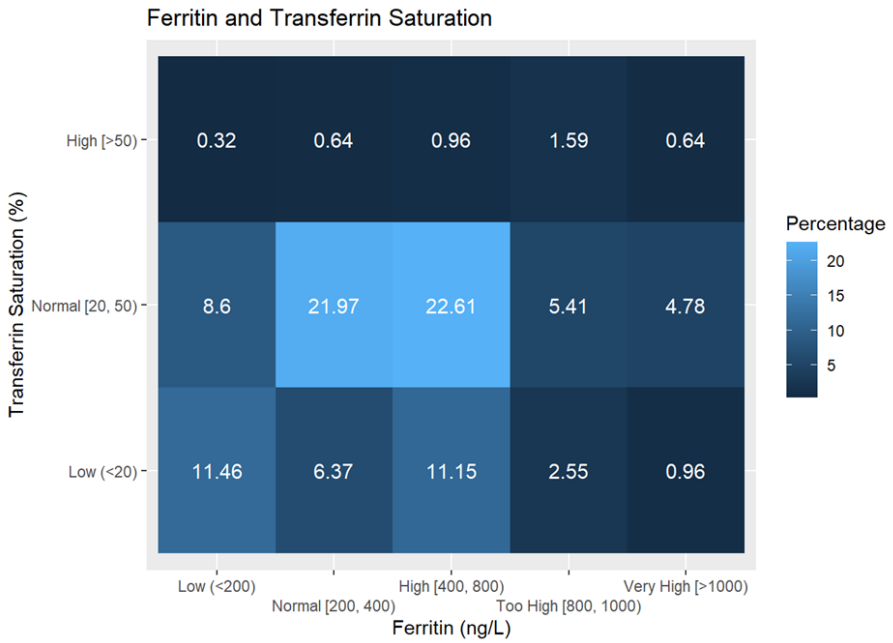


Figure 32. Ferritin and Transferrin Saturation heat map indicating percentages achieving targets.

Calcium, Phosphate and Parathyroid Hormone (PTH)

The mean calcium was 2.31mmol/L (STD 0.17), with 63.6% of tests in the target range of 2.1 to 2.4mmol/L. The mean phosphate was 1.66mmol/L (SD 0.55) and 41.1% had phosphate in the range of 0.8 to 1.60mmol/L. The median PTH was 25.4mmol/L (STD 43.9) and 40.5% of test were in the range of 2 to 9 times the upper limit of normal. There were 9.8% with a Parathyroid hormone level less than 95mmol/L.

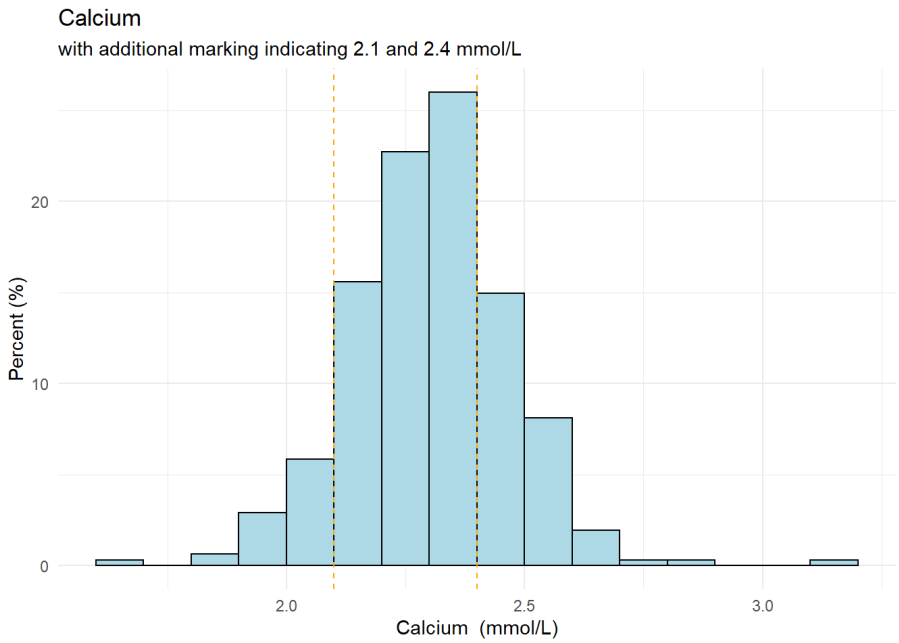


Figure 33. Calcium levels for all patients on dialysis.

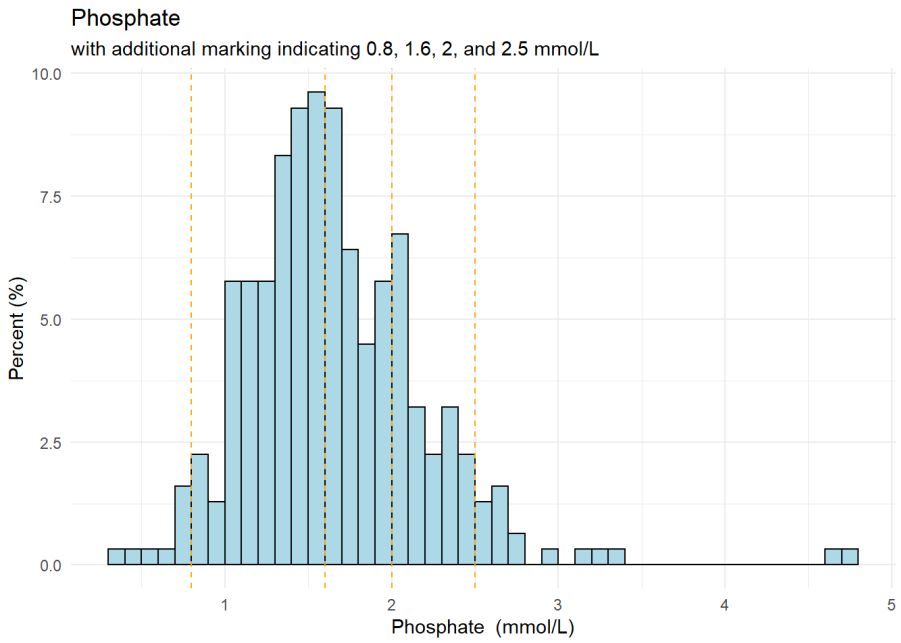
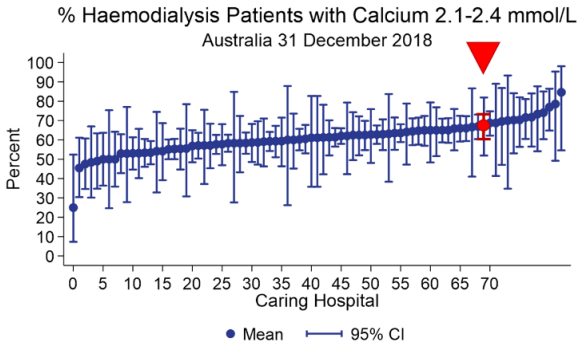


Figure 34. Serum Phosphate levels for all patients on dialysis.



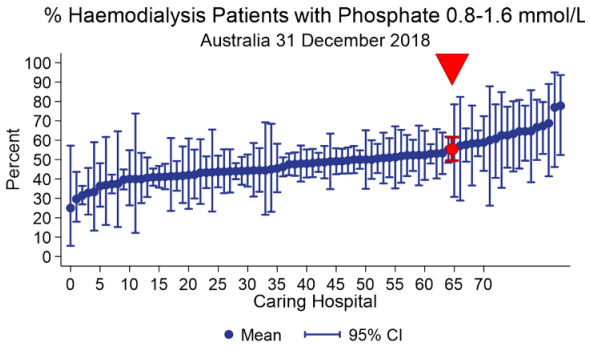


Figure 35. St George/Sutherland (red) and National calcium and phosphate parameters (ANZDATA, 2018 Report).

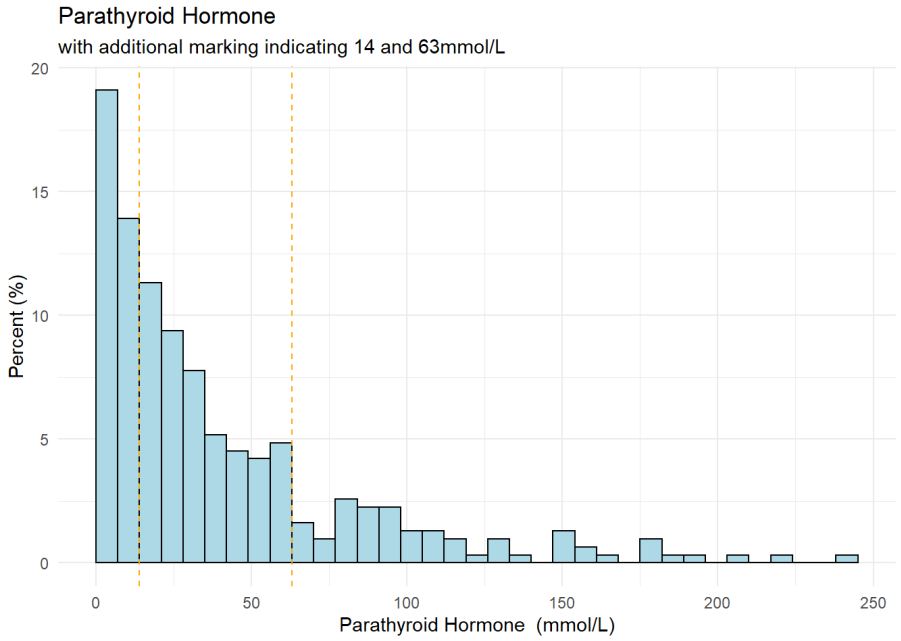


Figure 36. Serum Parathyroid levels for all patients on dialysis.

Dialysis adequacy

The mean urea reduction ratio was 76.5% (STD 6.4) and 85.6% of tests were 70% or greater. Mean Kt/V was 1.7 (STD 0.3476). These results excludes 1 outlier result with a value of 24.5Kt/V. 93.75% of Kt/V results have a value > 1.2.

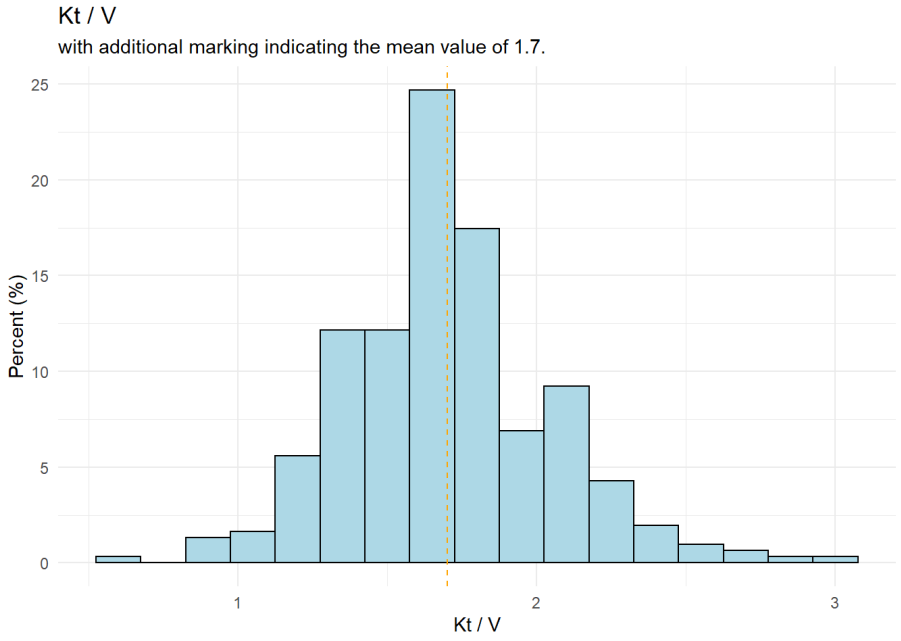


Figure 37. The Kt/v measure of adequacy for all dialysis – Mean of 1.7 (see yellow line) (Target >1.2).

%

1.6

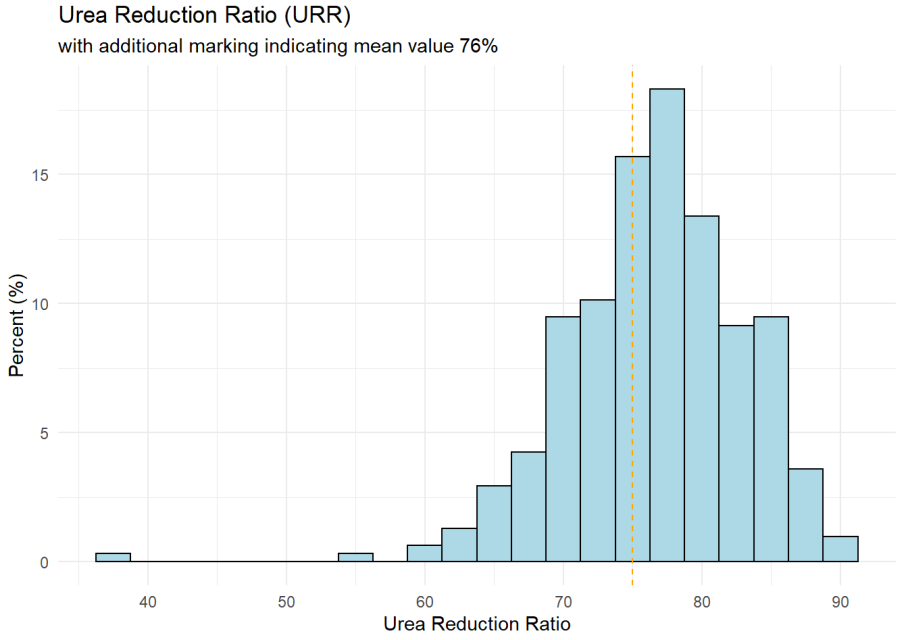


Figure 38. Urea Reduction Rate (URR) as a measure of dialysis adequacy – Mean 76% (Target >70%).

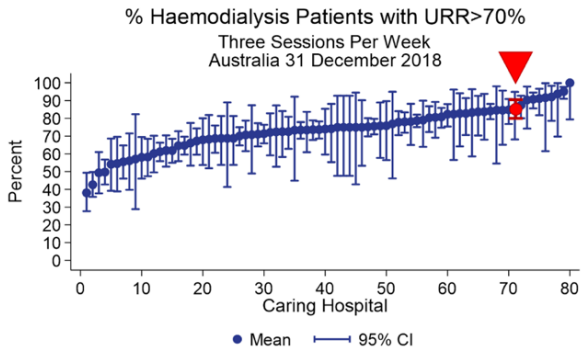


Figure 39. St George/Sutherland (red) and National URR (ANZDATA, 2018 Report

Table 11. *Dialysis duration per individual dialysis session at St George and Sutherland Hospitals.*

Duration (hours)	St George Hospital In-Centre HD (%)	Sutherland Hospital Satellite HD (%)	Fresenius Medical Centre Satellite HD (%)
< 4	0	0	1
4	35	31	31
4.5 – 4.75	35	37	21
5-6.5	30	32	43
7-7.5	0	0	2
8	0	0	1

- Almost 100% of in centre or satellite haemodialysis achieved the KPI of >15 hours on dialysis per week i.e. In-Centre 97%, Sutherland 100% and FMC 98% respectively.

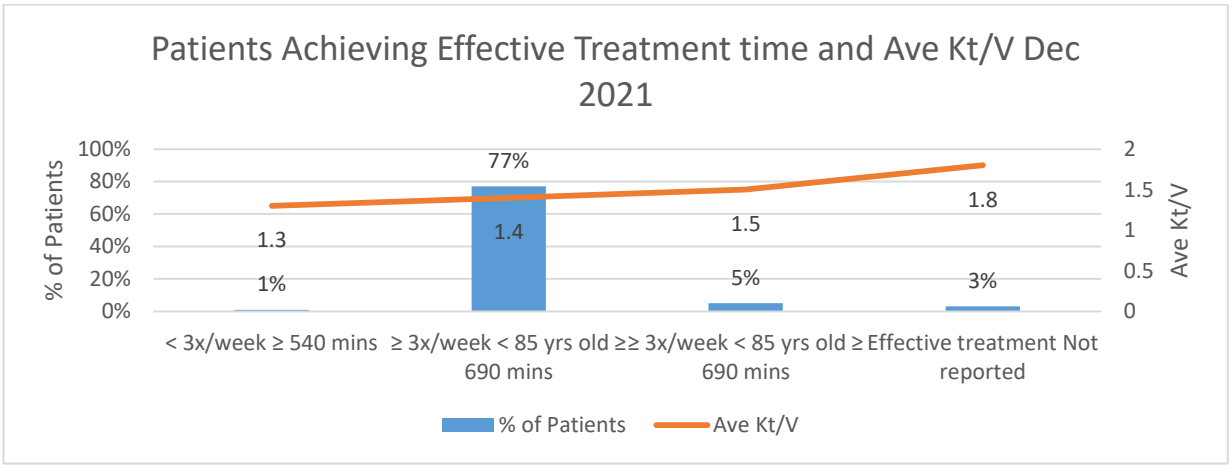


Figure 40. Fresenius Medical Care Satellite Unit – Dialysis adequacy and Treatment Time.

Home Haemodialysis 2021

Table 12. *Home haemodialysis dose (hours on dialysis)*

Duration (hours per week)	Home haemodialysis (n)	Frequency of dialysis
8 hrs	1	
12 -14 hrs	5	3 x week = 26
15-17 hrs	0	Alternate days = 8
17.5-20 hrs	19	2 x week = 1
21-24 hrs	3	Nocturnal = 2
24-26 hrs	2	Total no. 35

- Twenty six patients (74%) are dialysing >15 hours week
- Two patients are performing overnight (nocturnal) dialysis
- Eight patients (23%) are dialysing on alternate days or more

Summary

- The number of delivered treatments continues to increase, albeit at a slower rate than previously. This last year's increase was minimal and may be impacted by COVID-19.
- Our haemodialysis units were able to continue to offer the full gambit of options including in-centre, satellite, nocturnal and home haemodialysis
- With the addition of the Fresenius Medical Centre we have been able to ensure a smaller in-centre dialysis population in keeping with other large city centres around the country
- Patient survival, biochemical and dialysis adequacy parameters remain consistent with or above the national averages.
- This year many patients were dialysed with COVID-19, we were very fortunate not to suffer any deaths of patients on dialysis and our COVID-19 vaccination rates were >80%.

10. PERITONEAL DIALYSIS

Claire Cuesta, Dr. Franziska Pettit

Activity

Peritoneal dialysis was used to treat 16.6% of all dialysis patients in St George compared to 17% reported in the 44th Annual ANZDATA report (2021).

A total of 60 patients were on PD in 2021 compared to 62 in 2020. In December 2021, the proportion of patients receiving automated peritoneal dialysis (APD) was 76% and 24% for continuous ambulatory peritoneal dialysis (CAPD). Our CAPD population is gradually increasing in the past 3 years, from 9% in 2018 to 22% last year. Our APD population continues to be above the proportion reported by ANZDATA (2021) of 69%.

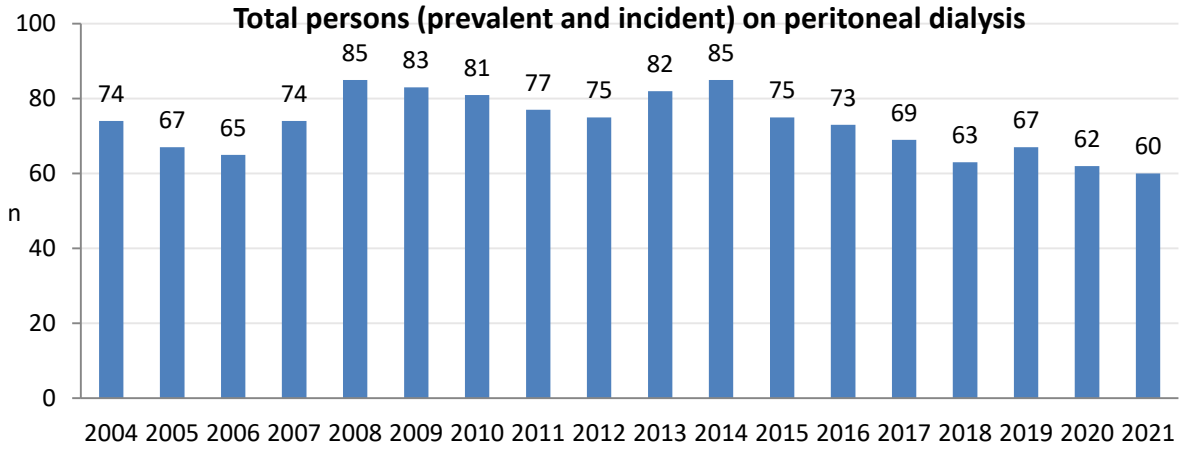


Figure 41. Total persons (prevalent and incident) on peritoneal dialysis.

Table 13. *Automated peritoneal dialysis (APD) and continuous ambulatory peritoneal dialysis (CAPD) proportions compared to ANZDATA.*

APD	ANZDATA 69% (1755/2544)	St George 76% (32/42)
CAPD	ANZDATA 31% (789/2544)	St George 24% (10/42)

PD patient flow

Table 14. *PD Patient Flow.*

	PD patients December 31st 2020		41
In	New Patients	15	
	Failed kidney transplant	2	
	Transfer from HD	2	
	In Subtotal		19
Out	Transplants	0	
	Planned transfer to Haemodialysis	2	
	Permanent Transfers to Haemodialysis	7	
	Temporary transfer to Haemodialysis	1	
	Withdrawal from dialysis	5	
	Deaths on PD	3	
	Out Subtotal		18
	Net gain	1	
	PD patients December 31st 2021		42

KPIs

The benchmarks for peritoneal dialysis were mostly set or established by ANZDATA, CARI, KDOQI and ISPD. For outcomes without set benchmark, results were compared to previous year's audits.

1. Biochemical targets

Table 15. *Biochemical targets.*

Parameter	Target	2017 (%)		2018 (%)		2019 (%)		2020 (%)		2021 (%)		2021 (%) ANZDATA
		Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	
Corr Ca	2.1-2.4 mmol/L	29	42	59	57	53	67	50	59	58	59	-
PO_4	0.8-1.6 mmol/L	53	46	47	48	46	36	54	39	49	54	37
$CaPO_4$	<4.0 mmol/L	42	44	41	44	44	40	38	30	42	45	-
Uncorrected $CaPO_4$	<4.0 mmol/L	60	52	55	61	55	50	44	39	47	55	54
Albumin	33-48 g/L	31	24	34	26	28	32	46	44	36	45	-
PTH	7-45 mmol/L	63	61	59	59	54	61	60	52	61	57	-

- **Serum Calcium**
  - 59% of patients achieved the target for corrected calcium in October 2021. The ANZDATA benchmark was for uncorrected calcium only. 67% patients were within the target for uncorrected serum Ca 2.1-2.4 mmol/L in October 2021.
  - 57% of patients have serum Ca level 2.2-2.4 in October 2021. The mean calcium result was 2.27 (SD 0.24).

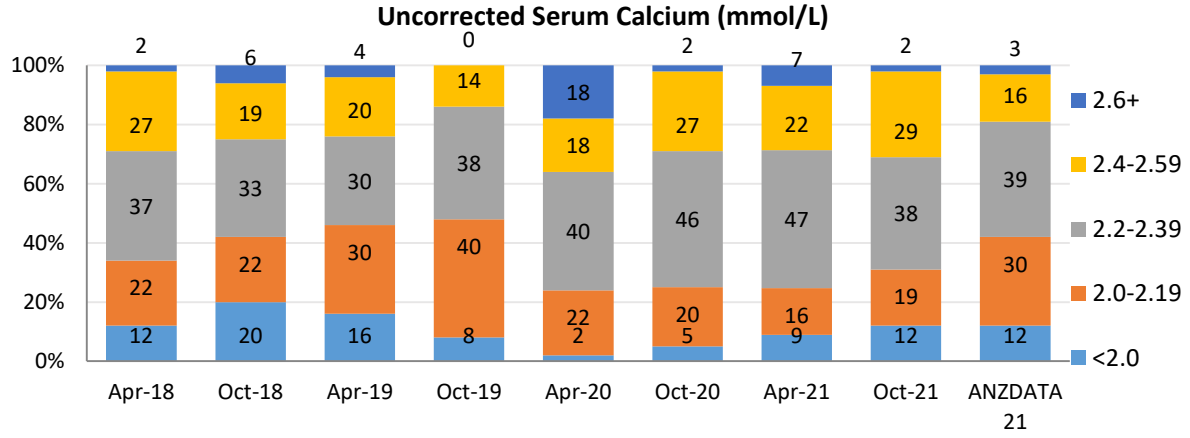


Figure 42. Uncorrected Serum Calcium (mmol/L).

- **Phosphate**
  - In October 2021, 54% of patients were within the target for serum phosphate of 0.8-1.6 mmol/L, slightly better than ANZDATA 2021 at 37%. The mean phosphate result was 1.79 mmol/L (SD 0.46). Our serum phosphate profile for October 2021 is better than last year and better than ANZDATA 2021.

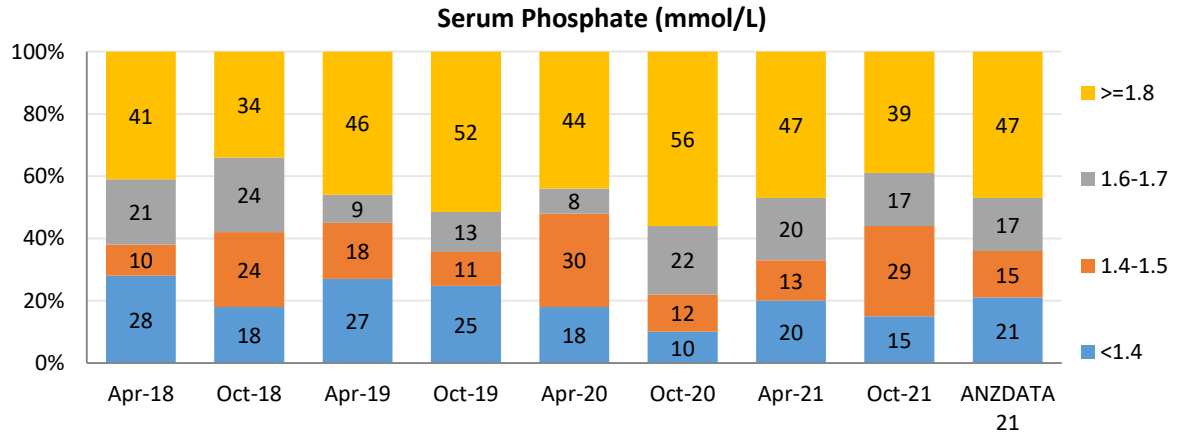


Figure 43. Serum Phosphate (mmol/L).

- **Calcium Phosphate Product**
  - ANZDATA calculated the calcium phosphate product with uncorrected calcium. Our uncorrected calcium x phosphate profile improved in 2021 and is similar to ANZDATA 2021. The mean uncorrected calcium x phosphate product was 4.12 (SD 1.14)
  - We also calculate calcium x phosphate product with corrected calcium. 45% of patients had calcium x phosphate product <4.0 mmol/L in October 2021, a big improvement from last year at 29%. The mean for our corrected calcium x phosphate product in 2021 was 4.4 (SD 1.17)

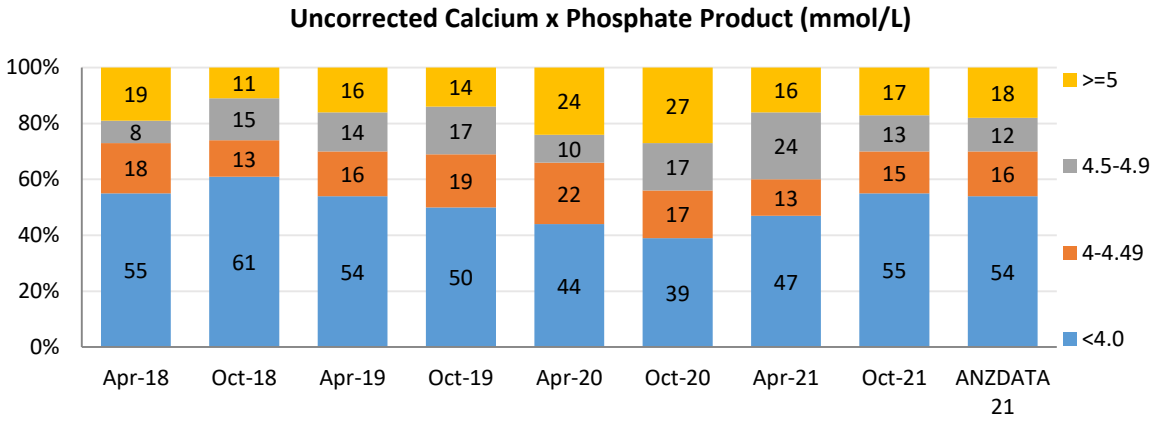


Figure 44. Uncorrected Calcium x Phosphate Product.

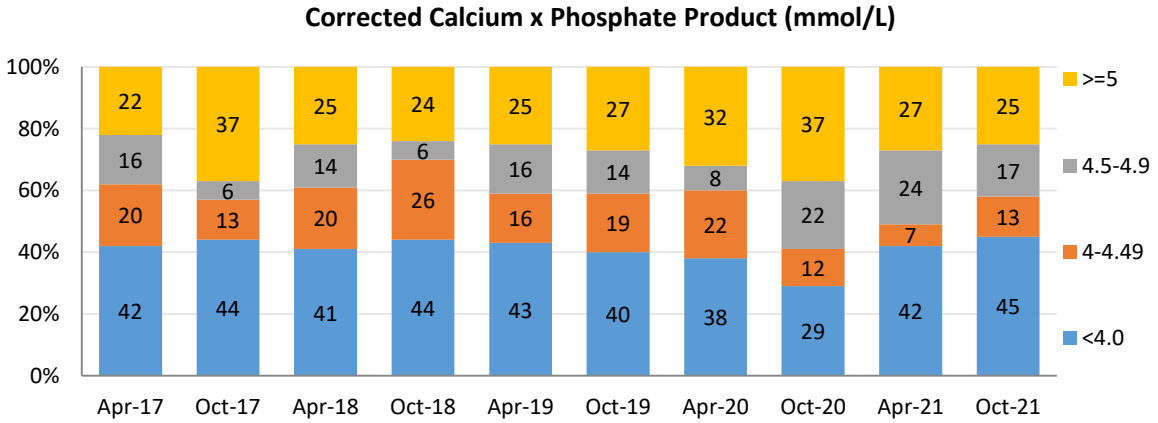


Figure 45. Corrected Calcium x Phosphate Product.

- **Albumin**
  - 45% of PD patients had albumin level within 33-48 g/L in October 2021, slightly better than last year at 44%. 22% of PD patients had albumin level 30-32 g/L and median albumin level was 32g/L (CI 29.84, 32.87).
- **PTH**
  - In October 2021, 57% of PD patients had PTH 7-45 mmol/L, better than last year at 52%. The median PTH result in 2021 was 27.2 mmol/L (CI 25.4, 41.6).

2. Haematological targets

- **Haemoglobin**

  - 48% achieved our target of 100 – 120 g/L in October 2021, compared to 56% in ANZDATA 2021. Our mean Hb was 106 g/L (SD 16.53, min 67, max 142).
  - In October 2021, all PD patients with Hb <100 were receiving erythropoiesis stimulating agents (ESA). 56% of PD patients with high Hb (>120) were also receiving ESA. These patients had either stopped or reduced ESA dosing frequency. 23% of patients who had Hb below 100 g/L had iron studies below the target range (ferritin 200-800 µg/L and transferrin 20-50%) in October 2021. These patients received iron infusion.

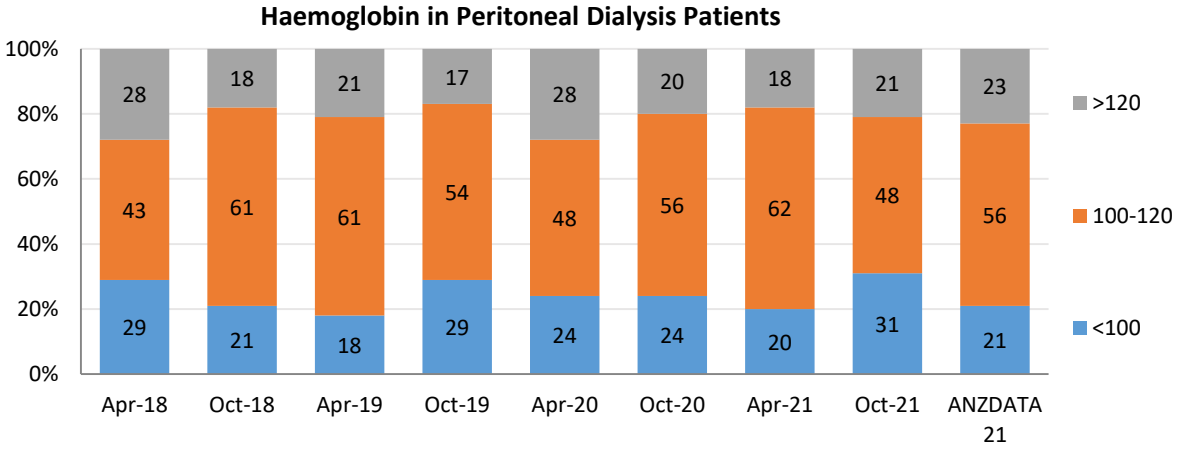


Figure 46. Haemoglobin in Peritoneal Dialysis patients.

  - HbA1c (Glycosylated Haemoglobin)
  - 48% of peritoneal dialysis patients in 2021 has diabetes.
  - 95% patients with diabetes were screened for HbA1C in October 2021. The mean HbA1C result was 6.8% (SD 1.08, min 5.6%, max 10.2%). 69% of screened diabetic patients had results below 7%, big improvement from last year at 46%.
  - Adjusting the HbA1c target to the International Society of Peritoneal Dialysis (ISPD) recommendation of: ≤7% for diabetic PD patients and up to <8.5% for our older PD patients with diabetes (presumably >70 years as age group for elderly was not defined by ISPD).

    89% of screened diabetic patients were within ISPD target in 2021, better than last year at 73%.

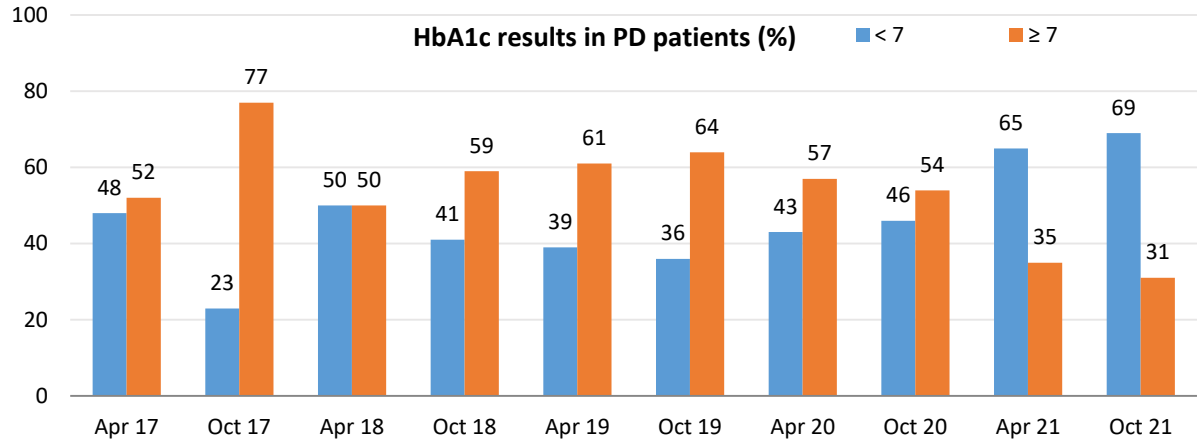


Figure 47. HbA1c (Glycosylated Haemoglobin) results in PD patients

- **Lipids**
  - 69% of PD patients in October 2021 were considered high-risk, these included patients having or suspected of having diabetes, coronary artery disease, cerebrovascular disease and peripheral vascular disease. Lipid studies were collected for 89% of high-risk PD patients. 2021 results were better than last year.

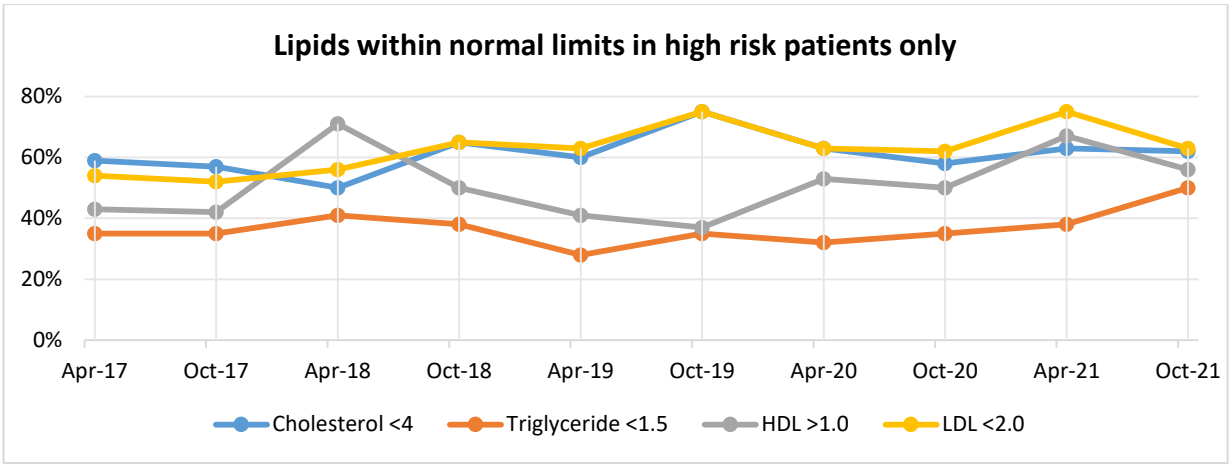


Figure 48. Lipids within normal limits in high risk patients only.

- **Iron**
  - Iron replete refers to ferritin levels between 200-800ng/mL as well as iron saturation between 20-50%. 36% of PD patients were iron replete in October 2021. Median ferritin was 238 µg/L (CI 230, 424, min 17, max 1269), mean transferrin was 23.4% (SD 9.37, min 10%, max 50.6%). Our iron profile for October 2021 was similar to ANZDATA 2021.

Table 16. *Iron profiles compared to ANZDATA.*

Parameter	Target	2017 (%)		2018 (%)		2019 (%)		2020 (%)		2021 (%)		2021 (%) ANZDATA
		Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	
Ferritin	200-800 µg/L	53	57	68	62	70	66	49	48	53	57	61
Transferrin	20-50%	47	57	68	58	80	73	75	57	47	57	63

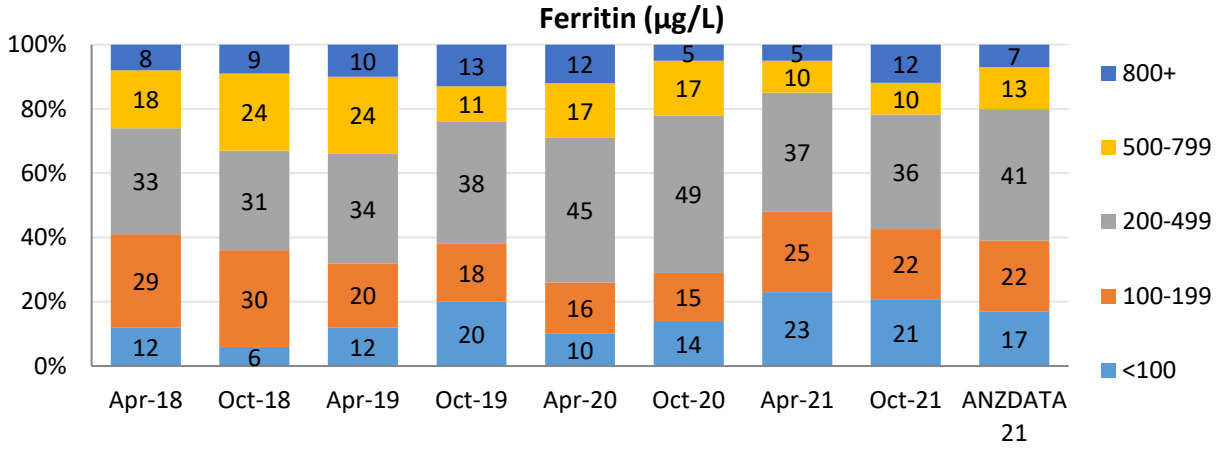


Figure 49. Ferritin (µg/L).

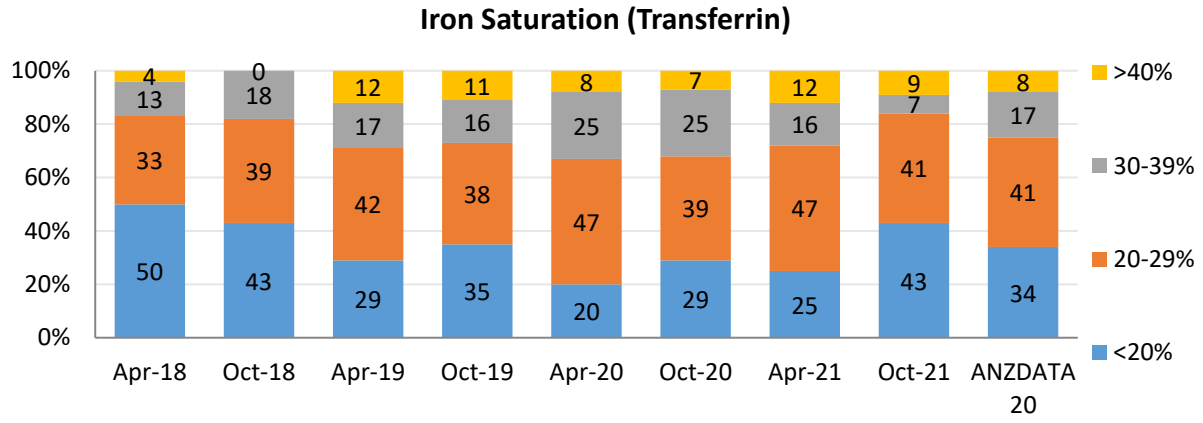


Figure 50. Iron Saturation (Transferrin)

3. Dialysis Adequacy

- Peritoneal dialysis adequacy is determined using solute clearance measurements:
  - Kt/V – Benchmarked against the KDOQI and ISPD target of at least 1.7 per week. In October 2021, 84% of tested patients had Kt/V ≥ 1.7 per week, an improvement from last year at 77%. The median Kt/V was 2.19 (CI 2.13, 2.80, min 0.86, max 5.55)
  - Creatinine clearance – Benchmarked against the CARI target of 60 L/week/1.73 m2 in high and high-average peritoneal transporters and 50 L/week/1.73 m2 in low-average and low peritoneal transporters. In October 2021, 66% of tested patients achieved this target. ISPD set a different creatinine clearance target of >45 L/week/1.73m2 for patients on APD, 79% of tested APD patients achieved this target in 2021. Mean creatinine clearance was 81.23 L/week/1. 73 m2 (SD 36.59, min 25.6, max 159.49).

Table 17. *Dialysis adequacy.*

Parameter	Target	2017 (%)		2018 (%)		2019 (%)		2020 (%)		2021 (%)		2021 (%) ANZDATA
		Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct	
KT/V	≥ 1.7	77	80	72	73	67	79	71	77	88	84	77
CCL	>50L / >60L *	72	75	69	73	67	77	67	75	75	66	72
CCL (ISPD[%])	>45L [#]	84	84	92	95	73	89	73	82	80	79	84

** Low and Low Average / High and High Average respectively for Creatinine Clearance (CCL)*

[#] (for APD patients)

[%] International Society of Peritoneal Dialysis

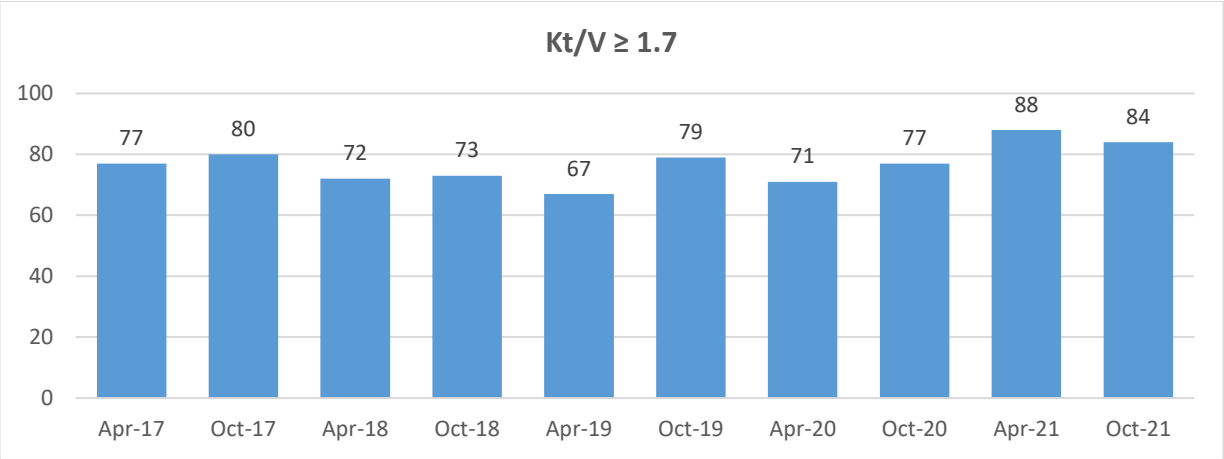


Figure 51. Kt/V ≥1.7.

4. Patient and Technique Survival

Survival is analysed from the 90th day of treatment until death. Censoring occurs at first transplant, loss to follow-up or recovery of renal function lasting >30 days. Graphs and tables are from ANZDATA Individual Hospital Report 2015-2020. The 5-year patient survival rate is better than the national rates for Australia and New Zealand.

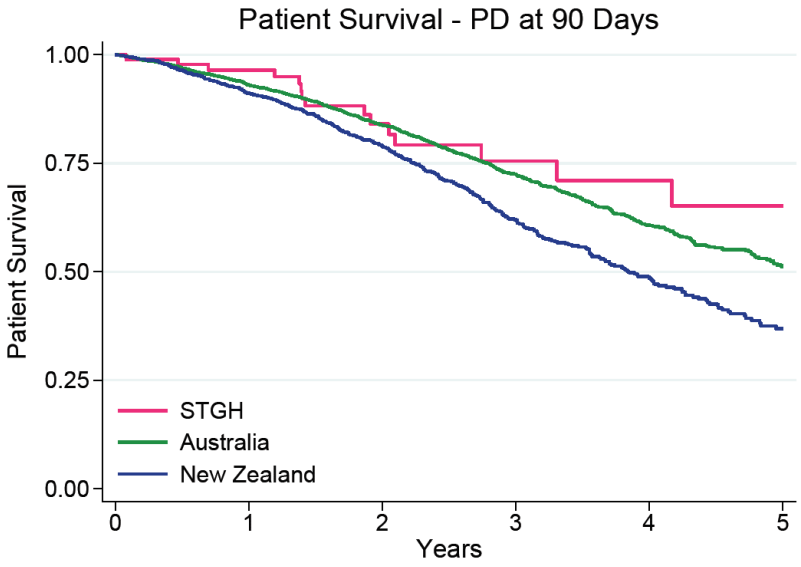


Figure 52. Patient survival – PD at 90 days

Table 18. *PD Patient survival – PD at 90 days. ANZDATA individual hospital report 2015-2020.*

Table 23: PD patient survival

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	96	100.0	4658	100.0	1416	100.0
3 months	89	98.9 (92.6-99.8)	4259	98.6 (98.2-98.9)	1303	98.8 (98.0-99.2)
6 months	83	97.8 (91.3-99.4)	3829	97.0 (96.4-97.5)	1165	96.4 (95.3-97.3)
1 year	66	96.5 (89.5-98.9)	3057	93.0 (92.2-93.8)	955	91.1 (89.3-92.6)
2 years	38	84.1 (72.0-91.2)	1917	83.7 (82.4-85.0)	595	78.8 (76.1-81.3)
3 years	19	75.5 (60.0-85.6)	1048	72.5 (70.6-74.3)	324	62.0 (58.3-65.4)
4 years	14	71.0 (53.6-82.9)	469	60.7 (58.3-63.1)	143	48.5 (44.2-52.7)
5 years	3	65.1 (45.0-79.4)	152	51.2 (47.8-54.4)	52	36.9 (31.8-42.0)

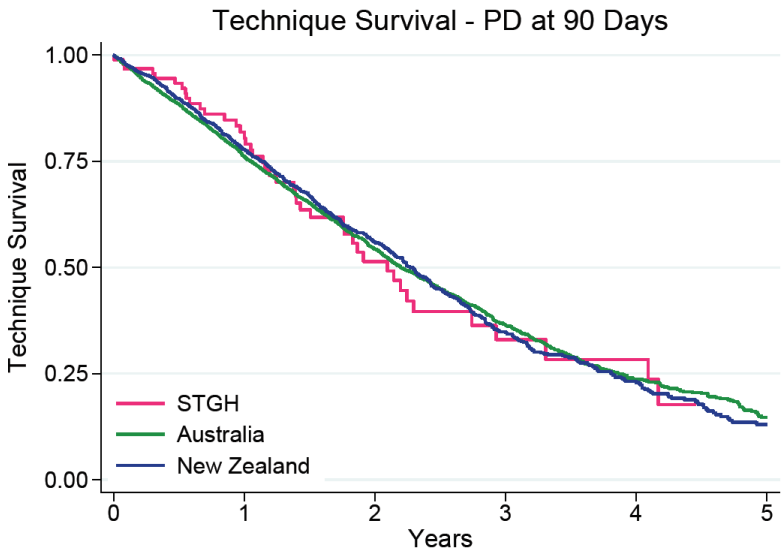


Figure 53. Technique survival – PD at 90 days.

Table 19. *PD Technique Survival – PD at 90 days. ANZDATA individual hospital report 2015-2020.*

Table 19: PD technique survival

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	96	100.0	4658	100.0	1416	100.0
3 months	87	96.8 (90.4-99.0)	4040	93.6 (92.8-94.3)	1257	95.3 (94.1-96.3)
6 months	79	93.4 (85.8-97.0)	3492	88.5 (87.5-89.4)	1084	89.8 (88.0-91.3)
1 year	56	80.5 (70.0-87.6)	2482	76.1 (74.7-77.4)	813	77.8 (75.3-80.0)
2 years	23	51.4 (38.2-63.2)	1230	54.3 (52.5-56.1)	428	55.9 (52.7-59.0)
3 years	9	33.0 (19.8-46.9)	521	36.4 (34.4-38.4)	185	34.9 (31.4-38.3)
4 years	6	28.3 (14.9-43.3)	183	23.7 (21.6-25.9)	73	22.9 (19.5-26.5)
5 years			52	14.7 (12.2-17.4)	21	13.0 (9.7-16.8)

5. Technique Failure

- ANZDATA 2021 reported the commonest cause of technique failure (ceasing peritoneal dialysis apart from deaths and transplant) was “total dialysis/technical failure” at 43%, followed by infection at 32%. At St George Hospital, the primary cause of technique failure in 2021 was similar to ANZDATA with “total dialysis/technical failure” being the main cause at 60%. These were due to catheter blockage, pleuroperitoneal leak, scrotal leak and inadequate solute clearance or ultrafiltration due to peritoneal membrane failure.
- Nine patients were transferred to haemodialysis permanently in 2021. Average age of patients at time of transfer to haemodialysis was 64 years (min 34, max 83) and average time on PD at time of transfer to haemodialysis was 18.3 months (min 2, max 65).

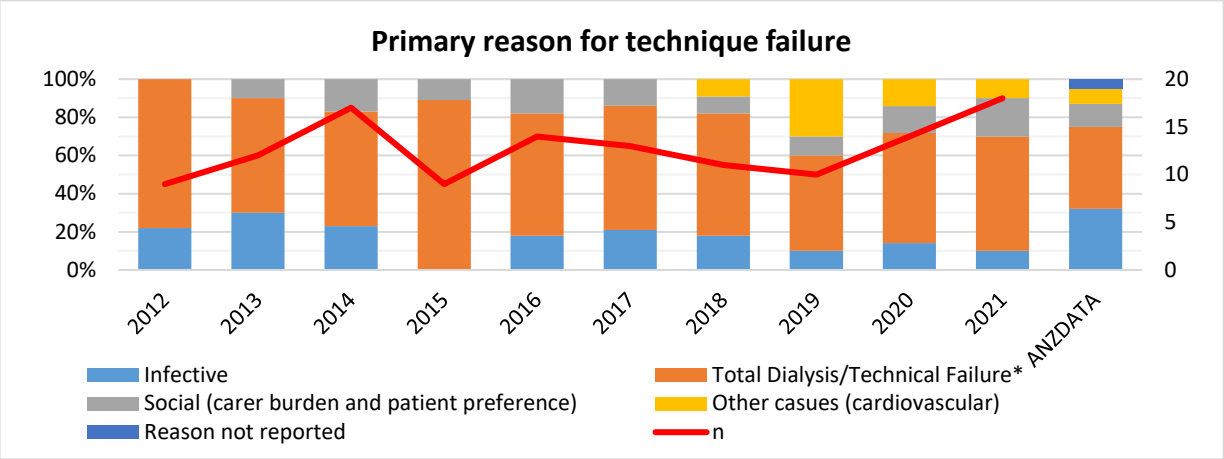


Figure 54. Primary reason for technique failure. leaks and inadequate dialysis.*

6. PD-related Infection rates

- Peritonitis episodes and rates
  - 2021 peritonitis rate results continue to surpass the national benchmark. The St George peritonitis rate is 81.65 patient months compared to ANZDATA at 49.24 patient months.
  - 79% (33/42) of patients on peritoneal dialysis in 2021 were peritonitis-free.
  - The average time on dialysis for current patients who have had peritonitis was 38 months and for all patients who have had peritonitis in 2021 was 36.9 months. The average time on dialysis for current patients who are peritonitis free was 21.7 months and for all peritoneal dialysis patients who were peritonitis free in 2021 was 22.4 months. Both data suggests the longer patients stay on PD, the higher the risk of developing peritonitis.
  - In 2021, 8% (5/60) of our patients could expect peritonitis in any one year, in comparison to 46% 15 years ago and better than ANZDATA 2021 at 20%
  - The proportion of peritoneal dialysis patients who were 3 years peritonitis-free in 2021 was 71%, better than ANZDATA 2021 at 54%.
  - 93% patients were peritonitis-free on their first year of peritoneal dialysis.

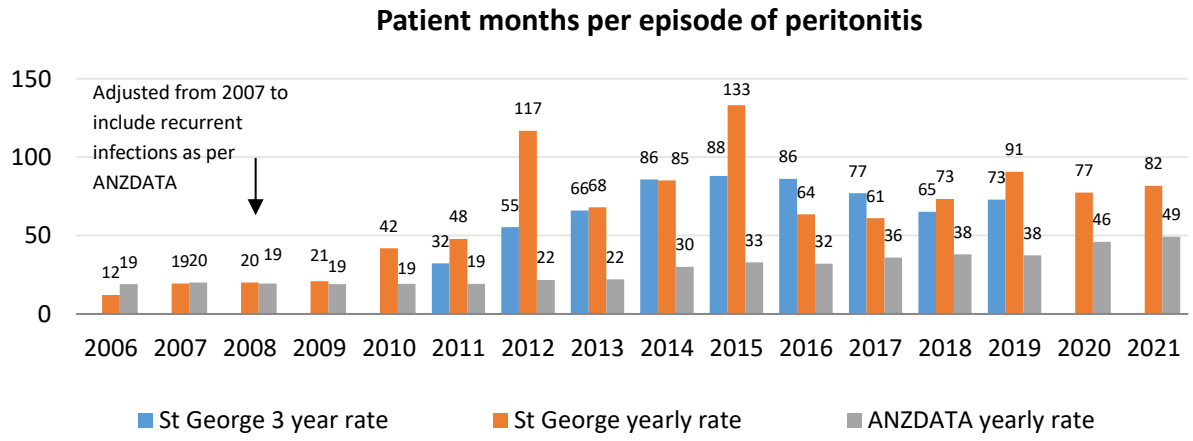


Figure 55. Patient months per episode of peritonitis.

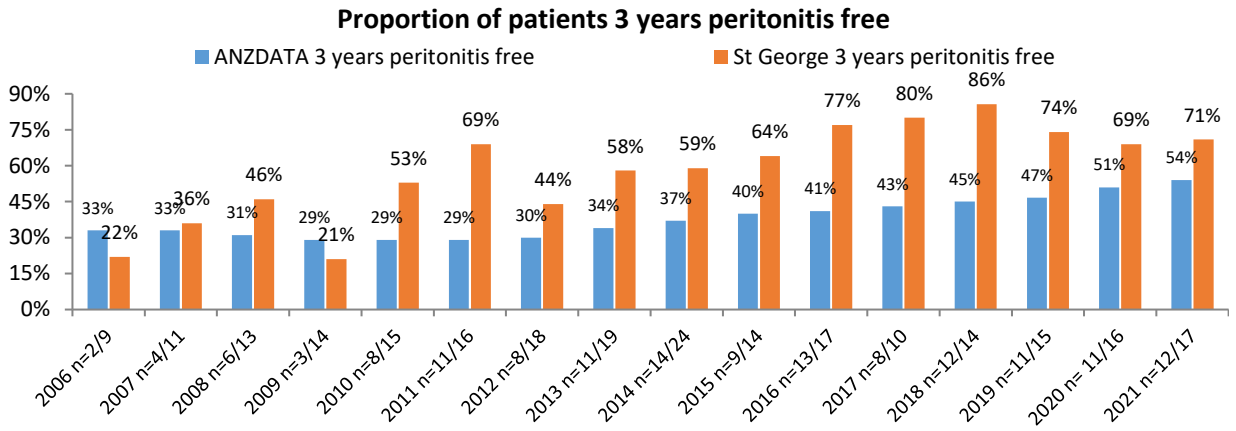


Figure 56. Proportion of patients 3 years peritonitis free

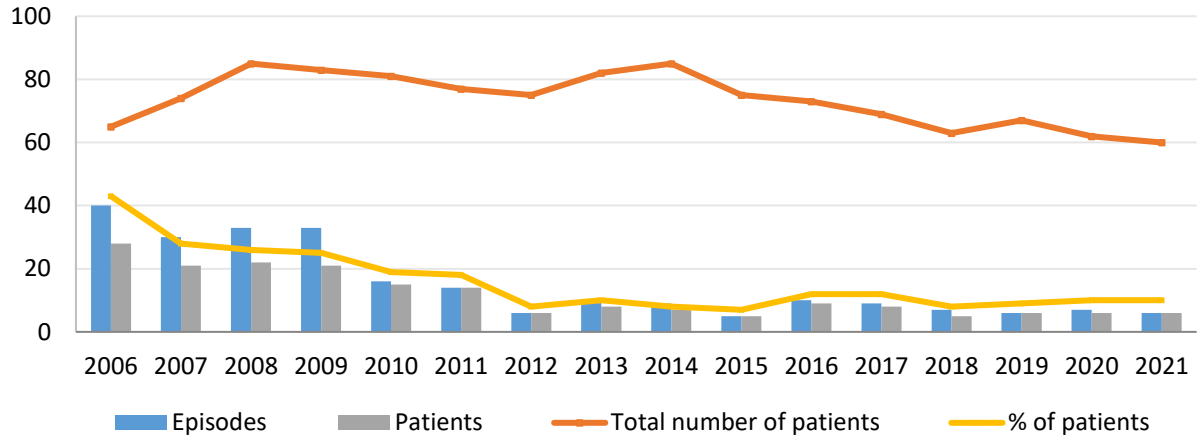


Figure 57. Peritonitis Episodes.

Table 20. *Peritonitis episodes.*

	09	10	11	12	13	14	15	16	17	18	19	20	21
Total patients	83	81	77	75	82	85	75	73	69	63	67	62	60
Peritonitis episodes	33	16	14	6	10	9	5	10	9	7	6	7	6
Patients with at least 1 episode of peritonitis % (n)	25 (12)	19 (15)	18 (14)	8 (6)	10 (8)	8 (7)	7 (5)	12 (9)	12 (8)	8 (5)	9 (6)	10 (6)	10 (6)
Patients with at least 1 episode of Exit site infection % (n)	16 (13)	20 (16)	21 (16)	15 (11)	4 (3)	9 (8)	5 (4)	5 (4)	7 (5)	6 (4)	7 (5)	10 (6)	5 (3)

Change of treatment as a result of peritonitis:

The peritonitis data was measured to determine the rate of transfer to haemodialysis as a direct result of peritonitis. One patient was transferred permanently to haemodialysis as a result of peritonitis in 2021.

Table 21. *Change of treatment as a result of peritonitis.*

Change in treatment as a direct result of peritonitis (%)	09*	10*	11*	12*	13*	14*	15	16	17	18	19	20	21
Interim Haemodialysis	0	6	0	0	0	0	0	0	0	0	0	0	0
Permanent Haemodialysis	15 (5/33)	24 (4/17)	14 (2/14)	16 (1/6)	30 (3/10)	33 (3/9)	0	10 (1/10)	44 (4/9)	28 (2/7)	17 (1/6)	14 (1/7)	17 (1/6)
Catheter removed	15 (5/33)	41 (7/17)	14 (2/14)	16 (1/6)	30 (3/10)	33 (3/9)	0	10 (1/10)	44 (4/9)	28 (2/7)	17 (1/6)	14 (1/7)	17 (1/6)

- Most of the peritonitis episodes in 2021 for SGH were from gram positive organisms.
- There were no MRSA peritonitis infections since 2011 and no fungal peritonitis in 2021.

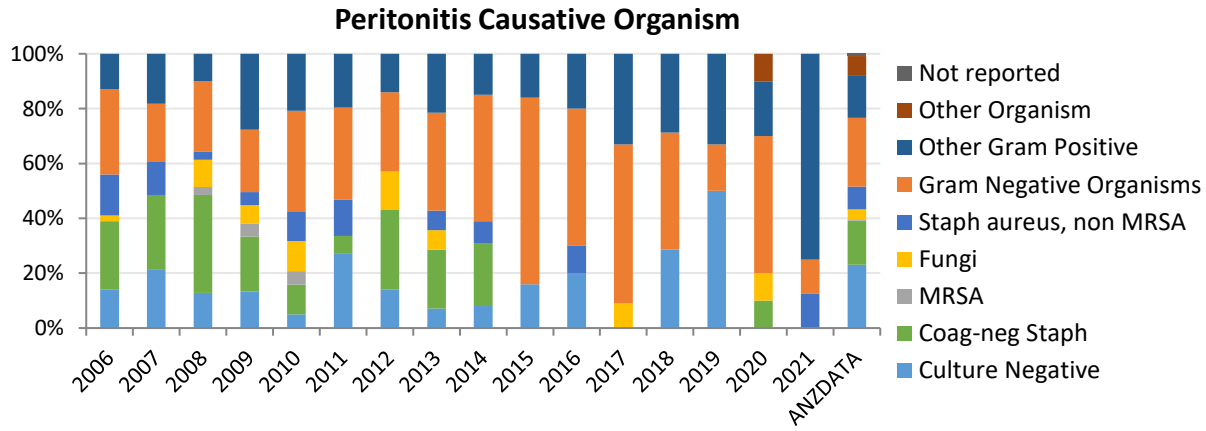


Figure 58. Peritonitis Causative Organism at St George Hospital compared to ANZDATA 2021.

- Exit Site Infections (ESI)

  - ANZDATA does not collect data on exit site infections, we can only compare to previous year's result.
  - 2021 exit site infection rate was 1/81.65 months.
  - Similar to the past 5 years, gram negative (pseudomonas aeruginosa) organism was the commonest organism of exit site infection in 2021. No fungal ESI in 2021.
  - 5% of PD patients had exit site infection in 2021.

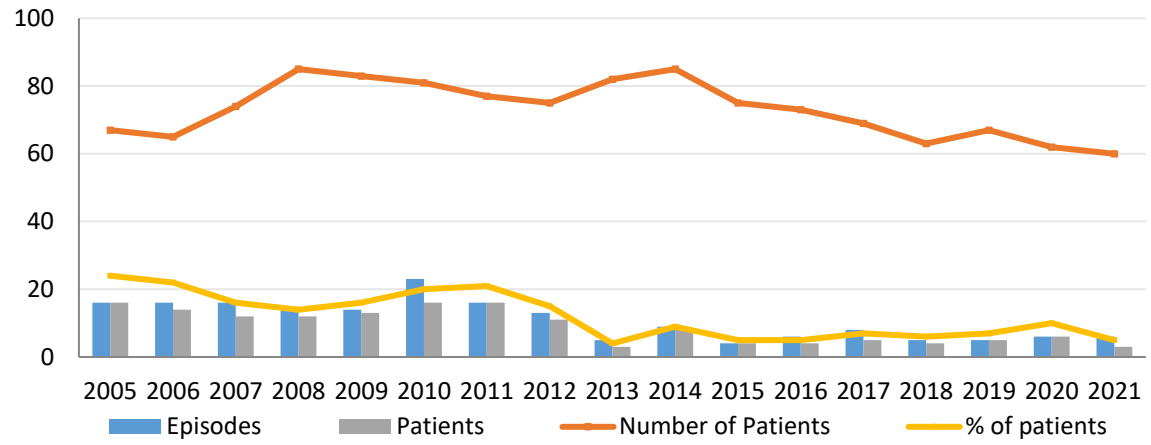


Figure 59. Exit Site Infection Episodes.

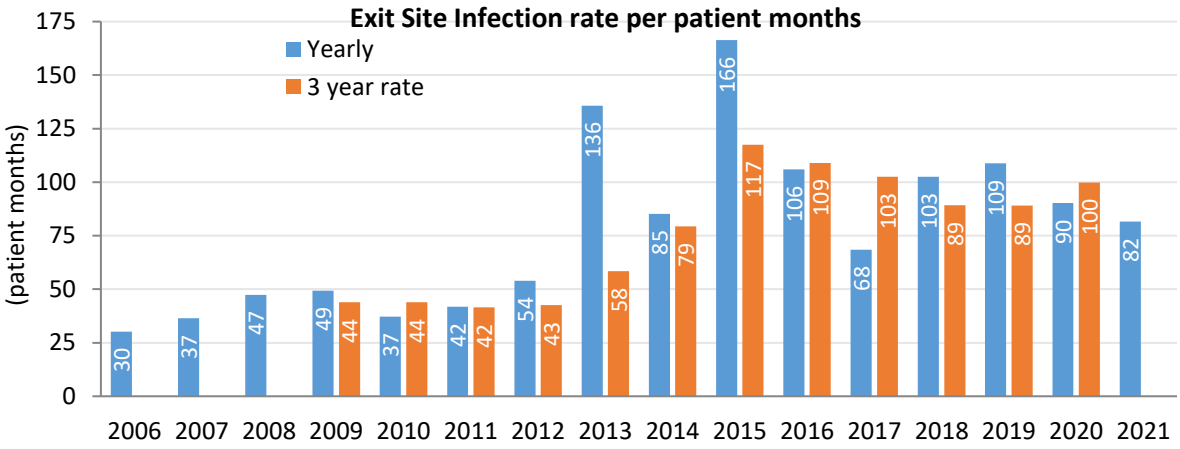


Figure 60. Exit site infection rate per patient months.

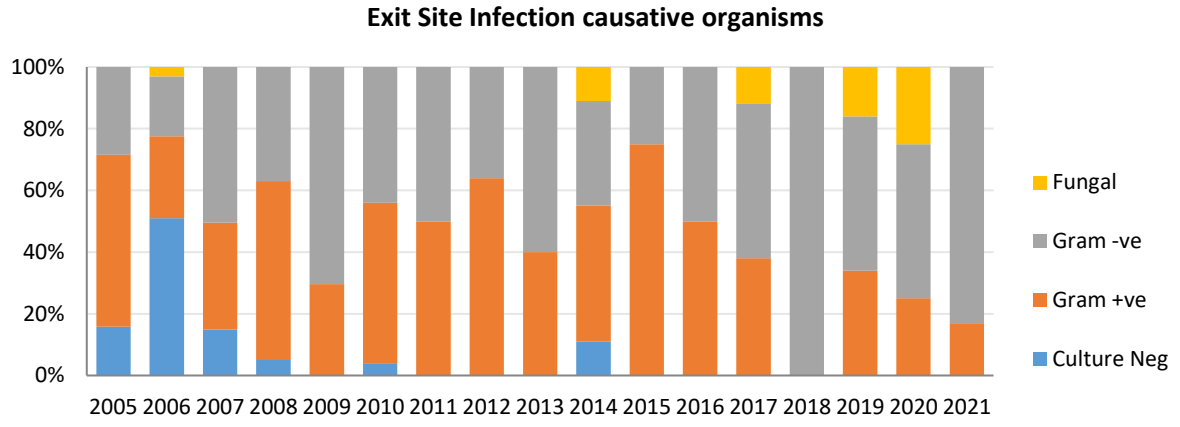


Figure 61. Exit site infection causative organisms.

7. Change of Modality and Deaths

- We have no kidney transplants and we have more transfers to haemodialysis and deaths than the national average in 2021.
- Average age of our patients at time of death was 73 years (min 61, max 86) and average time on PD at time of death was 36 months (min 0.1, max 94.2).

	SGH 12 (%)	SGH 13 (%)	SGH 14 (%)	SGH 15 (%)	SGH 16 (%)	SGH 17 (%)	SGH 18 (%)	SGH 19 (%)	SGH 20 (%)	SGH 21 (%)	ANZDATA 2021 (%)
Transplants	5	4	11	17	4	10	14	5	2	0	9
Changed to haemodialysis	16	15	26	17	19	40	23	16	17	24	21
Deaths	9	8	5	4	12	25	7	20	17	19	11

Table 22. *Change of Modality and deaths comparing St George Hospital to ANZDATA.*

Note: The rates were calculated using the total number of patients on peritoneal dialysis at 31.12.2021 (n=42), the method used by ANZDATA to calculate their rates.

Summary

1. ANZDATA results are the benchmark used for comparison with St George results.
2. APD remains the preferred PD therapy.
3. There's an increasing preference to CAPD in the past 3 years.
4. Improvements with calcium, phosphate, PTH, diabetes, lipid and nutrition management in 2021.
5. Patient survival is better than the national rates.
6. St George continue to have very low rates of peritonitis and exit site infections:
   a. Peritonitis rates continue to be better than the national data.
   b. The percentage of patients who were peritonitis-free at 3 years remains higher than ANZDATA.
   c. 93% patients were peritonitis-free on their first year of peritoneal dialysis.
   d. 79% patients on peritoneal dialysis at the end of 2021 were peritonitis – free.
7. Mixed results with dialysis adequacy testing, Kt/V is better and creatinine clearance needs improvement.
8. Consistently similar to the national data and the previous years was "total dialysis and technical failure" as the primary reason for PD technique failure.
9. No kidney transplants and more transfers to haemodialysis and deaths than that of the national rate. The commonest cause of death was non-PD related infection or sepsis.

Research activities

- St George PD unit will participate in the TEACH – PD trial (Targeted Education ApproaCH to improve Peritoneal Dialysis outcomes). This is a pragmatic phase 4, multi-centre, multinational, cluster-randomised trial (CRCT), randomising PD units to implement TEACH-PD training modules targeted at PD trainers and incident PD patients versus standard existing practices. It aims to determine whether implementation of standardised training modules based on the ISPD guidelines, targeting both PD trainers and patients, results in a longer time to the composite end-point of exit site infections, tunnel infections, and peritonitis in incident PD patients compared with existing training practices. Approved by NHMRC for $2.38M from MRSS fund. Site ethics (HREC & SSA) approval received in 2020. Recruitment commenced in April 2021. 8 patients were recruited by end of 2021. Recruitment will continue until end of 2022.

Management: Clinical and QA activities

- Patient Satisfaction survey was completed for all PD patients in early 2021. 62% responded. Survey questions and responses were divided into 4 sections:
  - Overall management of care – All responders were satisfied with the service, support and clinical advice provided by the PD nurses.
  - Educational needs – All responders were satisfied with the PD training/retraining and periodic education (PD newsletter) they received from the PD nurses. Less than half of them believed they will benefit from more education sessions and very few would be interested to attend retraining sessions or to meet other PD patients for group education sessions. Most patients are able to use and have access to technical devices i.e. smartphones, notebooks, laptops or computers.
  - APD machine (Claria) & Remote Patient Management/Monitoring (Sharesource) – 70% of the responders confirmed they use Claria machine, all have found it easy to use & believed they received enough training for it. Most are not interested to attend retraining sessions on Claria machine. Less than half of the responders have trouble sleeping whilst connected to Claria machine mostly due to machine alarms from PDC flow issues. All responders on Claria machine are aware and satisfied that their APD results are monitored regularly by the PD nurses, however, very few are interested in seeing their own APD results on the internet.
  - Open questions to encourage feedback and suggestions - majority of the feedback received were praises for the 'great' PD service and the PD nurses for being "excellent, lovely, kind and respectful" and for "always being there".
  - Recommendations that came out from the survey are:
    - Continue the 6 monthly PD newsletter
    - Continue daily APD outcome monitoring & review in Sharesource
    - Continue to provide support for bowel management and other causes of PDC flow issues
    - Continue ad hoc PD retraining
    - Repeat survey in 2022

- HbA1c screening for patients with diabetes and lipid screening for high risk patients will need to improve. Mailing of pre-filled blood request forms to patients with SMS reminders to increase patient compliance for blood testing will continue in 2022. Home collection service for frail patients and/or patients with poor mobility will also continue to be utilised in 2022.

- Continue to flag patients with poor biochemistry, haematology and dialysis clearance results through renal clinic, monthly and 2-monthly multi-disciplinary team (MDT) patient review meetings and electronic communication to nephrologists to improve dialysis clearance, anaemia and iron management in 2022.

- Pre PD assessment and education program for predialysis patients choosing PD was offered through telehealth or face to face sessions in 2021. Telehealth prePD sessions were not popular and less effective, hence, will be discontinued in 2022. Face to face sessions will continue in 2022 in accordance with most recent COVID-19 guidelines.

- The additional PD services established for COVID-19 guidelines i.e. PD follow – up sessions through telehealth, daily APD remote monitoring & management and drive through pick – up of PD supplies from the PD unit were continued in 2021 and will be continued in 2022 as required and in accordance with most recent COVID-19 guidelines.

- All effective initiatives and projects will continue i.e. clinic review checklist project, nurse-facilitated iron management, bi-annual patient newsletters, monthly to 2-monthly MDT patient review, PD retraining program and outpatient follow-up and support.

- St George PD training curriculum was converted to the TEACH – PD curriculum in 2021 and for the duration of the study as St George has been randomised to the intervention group.

- All education programs for nursing staff aimed to improve peritoneal dialysis care in the acute or inpatient setting were resumed in 2021 and will continue in 2022 through face to face or virtual sessions in consideration of SGH COVID-19 guidelines:
  - Progressive competency – based training program for renal ward nurses in:
    - CAPD and APD including Sharesource remote patient monitoring
    - Back to basic PD knowledge and skills
    - 5 – yearly PD competency re – assessment and re – training
  - Mentorship program to advance the PD knowledge and skills of identified PD champions in the renal ward and emergency department
  - Education and mentorship program to advance the renal knowledge & skills of identified renal champions from the renal ward and dialysis unit, in collaboration with other renal CNCs and renal CNEs, with full support from the nurse manager and nurse unit managers.

- The structured PD support and training program tailored to nursing home nurses to streamline the uptake of PD patients into aged care facilities was resumed in 2021 and will continue in 2022 as required. In compliance with the nursing home and SGH's COVID-19 guidelines, 2 new nursing homes were virtually trained on PD in 2021. A total of 11 nursing homes within the SGH catchment area were trained on PD.

- Continue the 3-yearly review of PD policies to keep in line with national (CARI) and international (ISPD) clinical practice guidelines and in preparation for the National Safety and Quality Health Service Standards Accreditation in 2022.

11. TRANSPLANTATION

Tania Burns

The aim of this report is to provide data about patients who have had a renal transplant and are under the care of a St George Hospital (SGH) nephrologist. It will also provide data about patients who are potential renal transplant recipients currently listed on the transplant waiting list and about living renal donors under the care of a SGH nephrologist.

Highlights

- A total of 248 kidney transplant recipients and 74 living kidney donors were under the care of the SGH team during 2021
- Six people received a kidney transplant during 2021: two from living donors and four from deceased donors. One of the living donor transplants was pre-emptive
- One person donated a kidney.
- Fifty people waiting for a transplant were reviewed at the SGH transplant assessment clinic by a nephrologist from the transplanting unit.
- At 31/12/21 43 SGH dialysis patients were active on the transplant waiting list and 10 were interim.

Transplant patient flow

Table 23. *Transplant flow.*

1/1/20 SGH transplant patients registered with ANZDATA	**238**
In	
Transplanted	6
Transferred care in	3
In Subtotal	9
Out	
Transferred care out	1
Died	6
Graft failure transferred back to dialysis	3
Out Subtotal	-10
Net Gain	-1
31/12/21 SGH transplant patients	**237**

Post-transplant follow up

Of the 248 kidney transplant recipients cared for at SGH in 2021:

- 229 were primary grafts, 14 are second grafts and 3 are third grafts.
- 82 of these patients received grafts from live donors.
- 31 were pre-emptive transplants.

Graft and Patient Survival ANZDATA report for transplants 2015-2020; n=98

Benchmarks are against the national average

1. **Deceased Donors**
   - Compared with national data:
   - Recipients of deceased donor grafts from SGH hospital spend a longer time on dialysis than the national average (89% vs. 66% >2yrs dialysis).
   - SGH recipients of deceased donor organs have better than national patient and graft survival.

Table 24. *Patient survival for primary deceased donor grafts (ANZDATA Individual Hospital Report 2014-2020 Table 11).*

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	61	100.0	3753	100.0	514	100.0
3 months	58	100.0	3545	99.0 (98.7-99.3)	483	98.2 (96.7-99.1)
6 months	58	100.0	3373	98.4 (98.0-98.8)	440	97.4 (95.6-98.5)
1 year	53	98.2 (88.2-99.8)	3109	97.7 (97.1-98.1)	416	97.0 (95.0-98.2)
2 years	47	98.2 (88.2-99.8)	2371	95.5 (94.7-96.2)	312	96.2 (94.0-97.6)
3 years	31	96.1 (85.2-99.0)	1649	93.7 (92.7-94.5)	229	94.1 (91.1-96.0)
4 years	22	96.1 (85.2-99.0)	1048	92.1 (90.9-93.1)	125	91.6 (87.8-94.3)
5 years	16	96.1 (85.2-99.0)	464	88.8 (87.0-90.4)	55	90.5 (85.8-93.6)

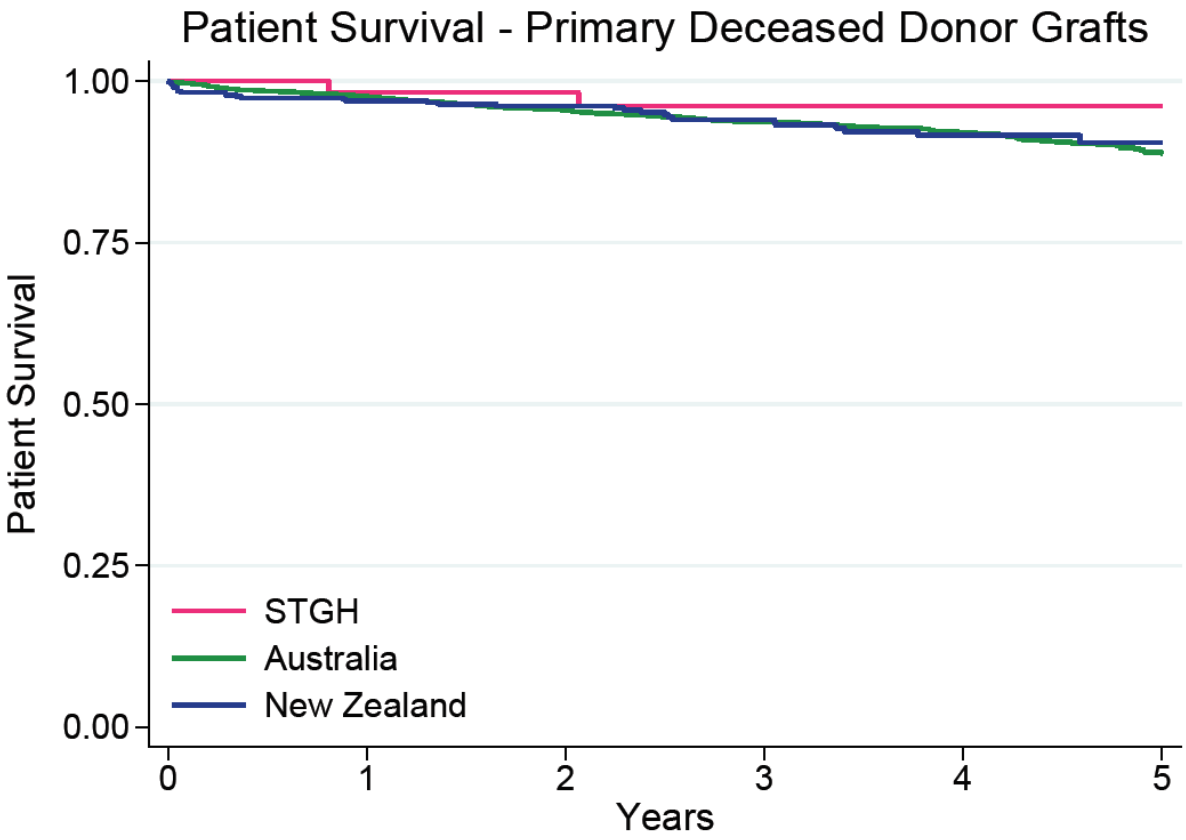


Figure 62. Patient survival – Primary deceased donor grafts (ANZDATA Individual Hospital Report 2014-2020).

Table 25. *Graft survival for deceased donor grafts (ANZDATA Individual Hospital Report 2014-2020 Table 16).*

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	67	100.0	4327	100.0	569	100.0
3 months	64	100.0	4031	97.5 (97.0-97.9)	527	96.8 (95.0-98.0)
6 months	63	100.0	3813	96.3 (95.6-96.8)	481	95.9 (93.9-97.3)
1 year	58	98.4 (89.1-99.8)	3495	94.6 (93.9-95.3)	450	94.9 (92.7-96.4)
2 years	49	96.6 (86.9-99.1)	2666	91.8 (90.9-92.7)	326	92.0 (89.2-94.1)
3 years	33	96.6 (86.9-99.1)	1857	89.4 (88.3-90.4)	235	89.1 (85.6-91.7)
4 years	23	96.6 (86.9-99.1)	1151	86.4 (85.1-87.7)	130	87.2 (83.3-90.3)
5 years	16	96.6 (86.9-99.1)	486	82.2 (80.3-83.9)	55	85.4 (80.6-89.1)

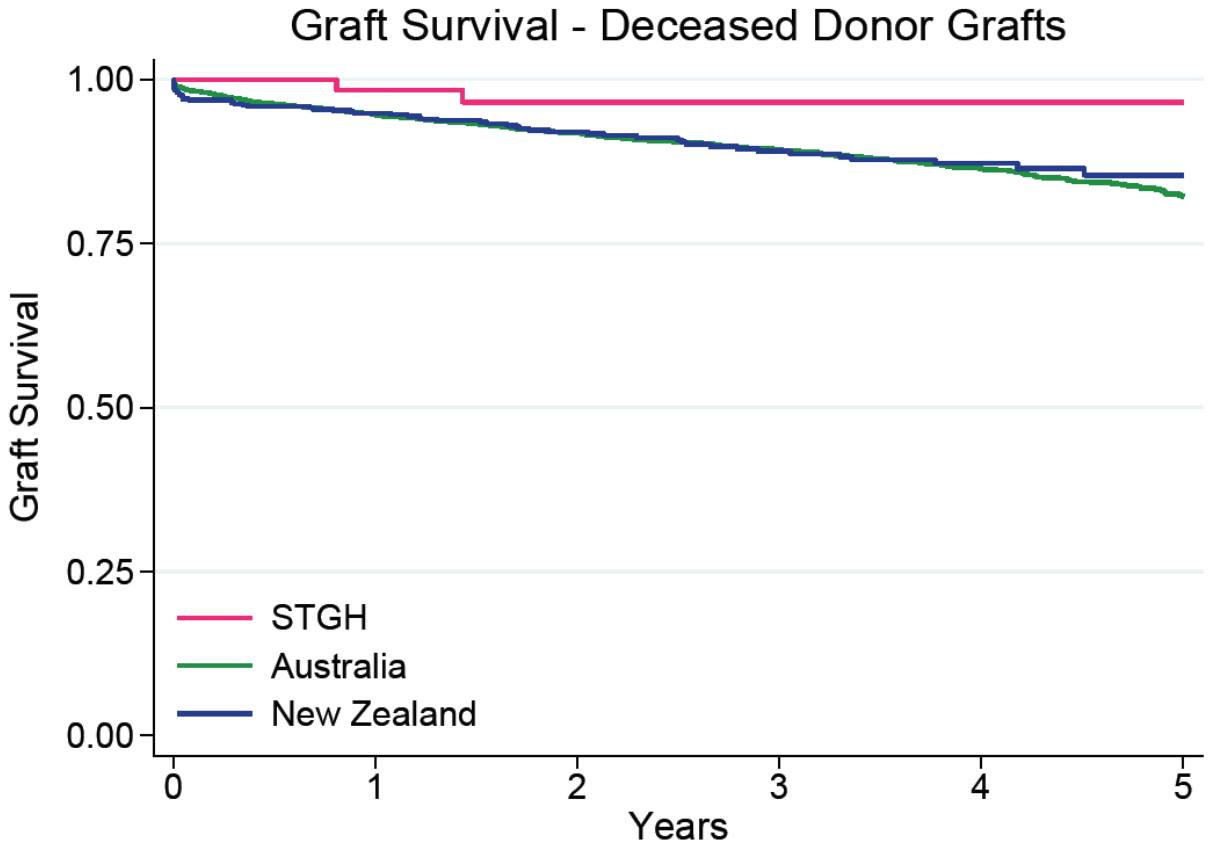


Figure 63. Graft survival –Primary deceased donor grafts (ANZDATA Individual Hospital Report 2014-2020).

2. Live Donors

- Compared with national data:
- Recipients of living donor grafts from SGH hospital are slightly older (74% vs. 56% >45years)
- 48% SGH living donor transplant recipients received their transplant pre-emptively compared to 39% in Australia as a whole.
- SGH recipients of living donor organs have better than national patient and graft survival.
-

Table 26. *Patient survival for primary living donor grafts (ANZDATA Individual Hospital Report 2014-2020 (Table 12)).*

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	28	100.0	1159	100.0	413	100.0
3 months	27	100.0	1107	100.0	386	99.0 (97.4-99.6)
6 months	27	100.0	1058	99.8 (99.3-100.0)	359	98.8 (97.0-99.5)
1 year	24	100.0	1001	99.5 (98.9-99.8)	331	98.5 (96.6-99.3)
2 years	19	100.0	796	98.5 (97.5-99.1)	256	97.8 (95.7-98.9)
3 years	17	100.0	594	97.7 (96.4-98.5)	183	97.8 (95.7-98.9)
4 years	6	100.0	384	96.2 (94.4-97.4)	124	95.4 (91.6-97.5)
5 years	3	100.0	167	94.6 (92.0-96.4)	54	94.6 (90.4-97.0)

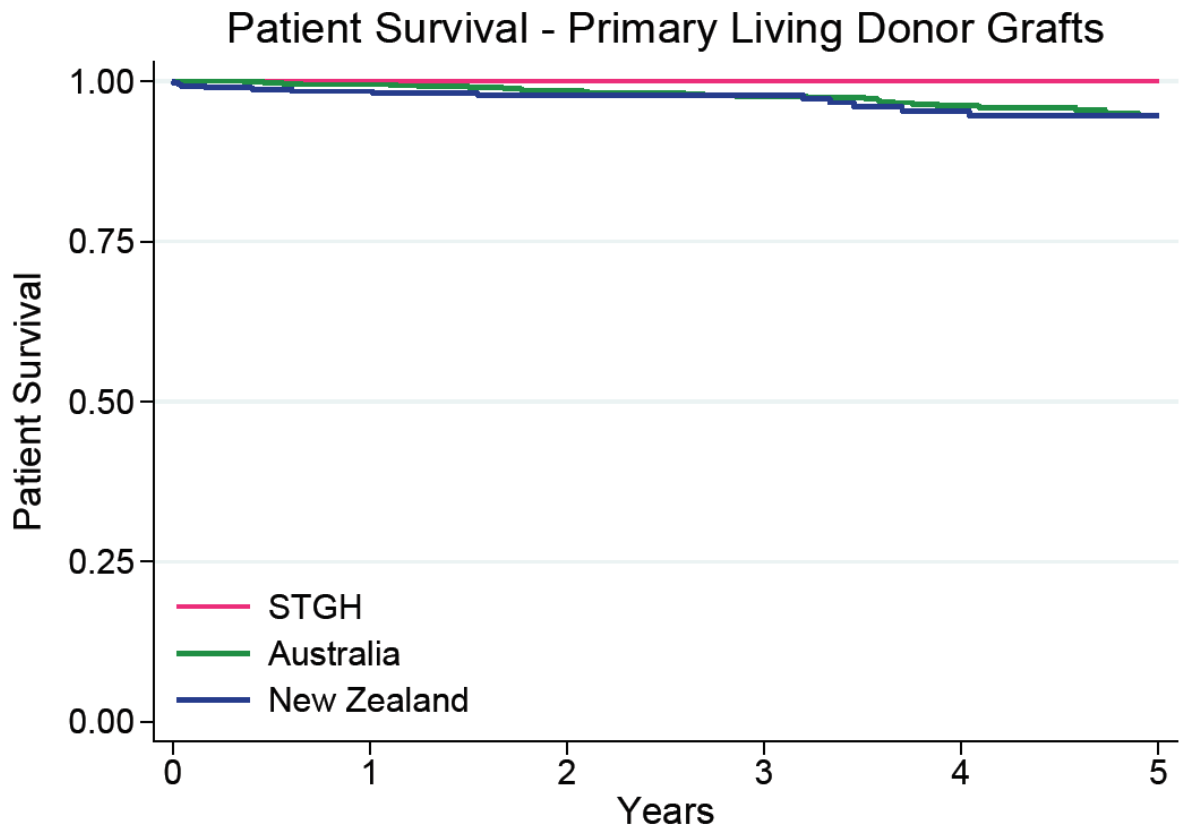


Figure 64. Patient survival - primary living donor grafts (ANZDATA Individual Hospital Report 2014-2020).

Table 27. *Graft survival for living donor grafts (ANZDATA Individual Hospital Report 2014-2020 (Table 17)).*

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	31	100.0	1298	100.0	453	100.0
3 months	30	100.0	1227	99.0 (98.3-99.4)	421	98.0 (96.2-99.0)
6 months	30	100.0	1175	98.8 (98.1-99.3)	393	97.8 (95.9-98.8)
1 year	27	100.0	1111	98.2 (97.3-98.8)	360	97.0 (94.9-98.2)
2 years	21	100.0	881	97.0 (95.8-97.9)	276	96.4 (94.1-97.8)
3 years	19	100.0	660	95.4 (93.9-96.5)	199	95.6 (93.0-97.3)
4 years	7	90.9 (50.8-98.7)	424	93.8 (91.9-95.3)	133	93.3 (89.5-95.8)
5 years	2	90.9 (50.8-98.7)	189	91.4 (88.7-93.5)	57	90.2 (85.1-93.7)

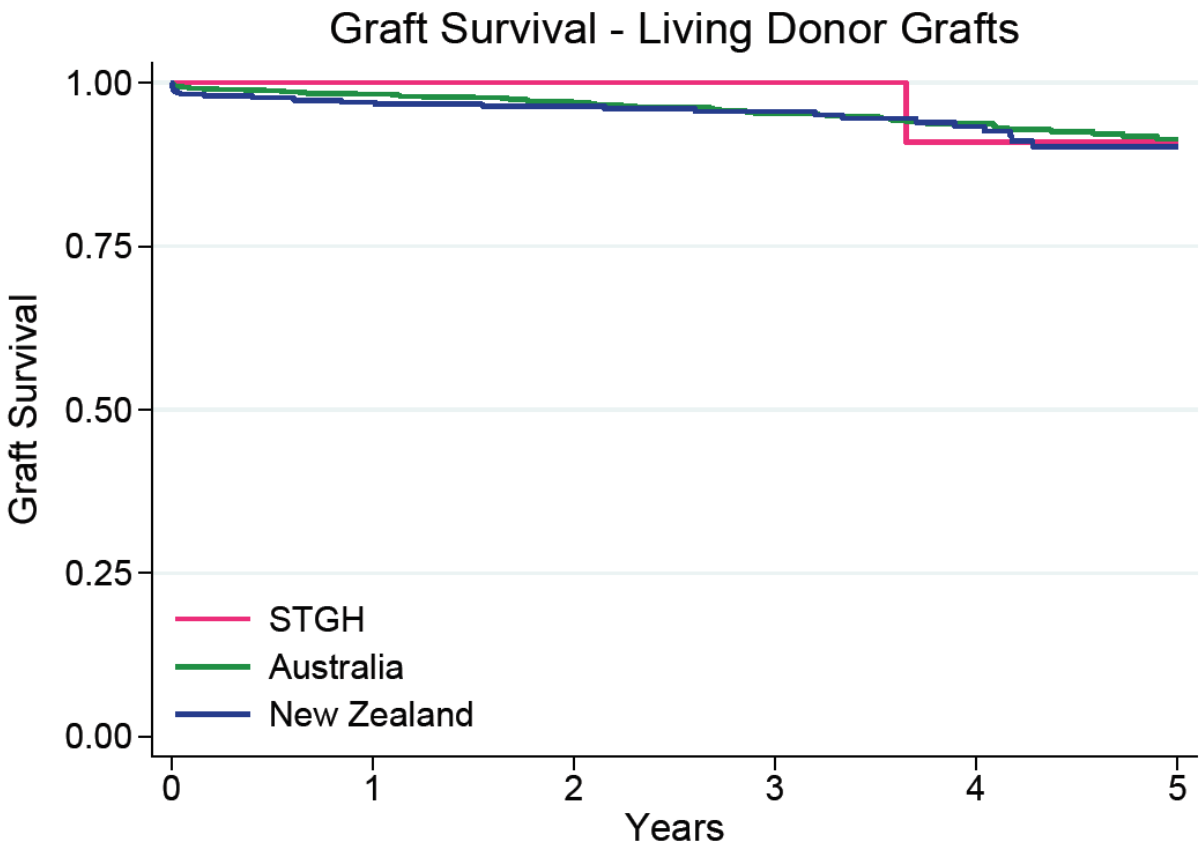


Figure 65. Graft survival for living donor grafts (ANZDATA Individual Hospital Report 2014-2020).

3. Waiting list data

KPI:

- All dialysis patients under 75years to have their suitability for transplant assessment reviewed.

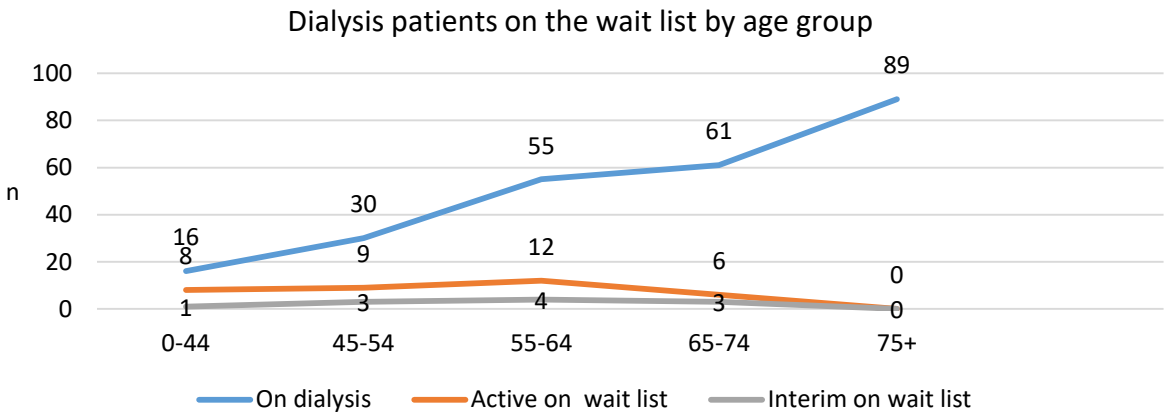


Figure 66. Number of people on dialysis and on the transplant waiting list May 2021.

Although the numbers are small, the percentage of SGH dialysis patients listed for transplant in each age group continues to exceed the national figures reported in ANZDATA. Reasons for dialysis patients not being listed include comorbidities such as coronary artery disease, peripheral vascular disease, chronic infection or malignancy. Some patients have also expressed their preference to remain on dialysis and not pursue a transplant.

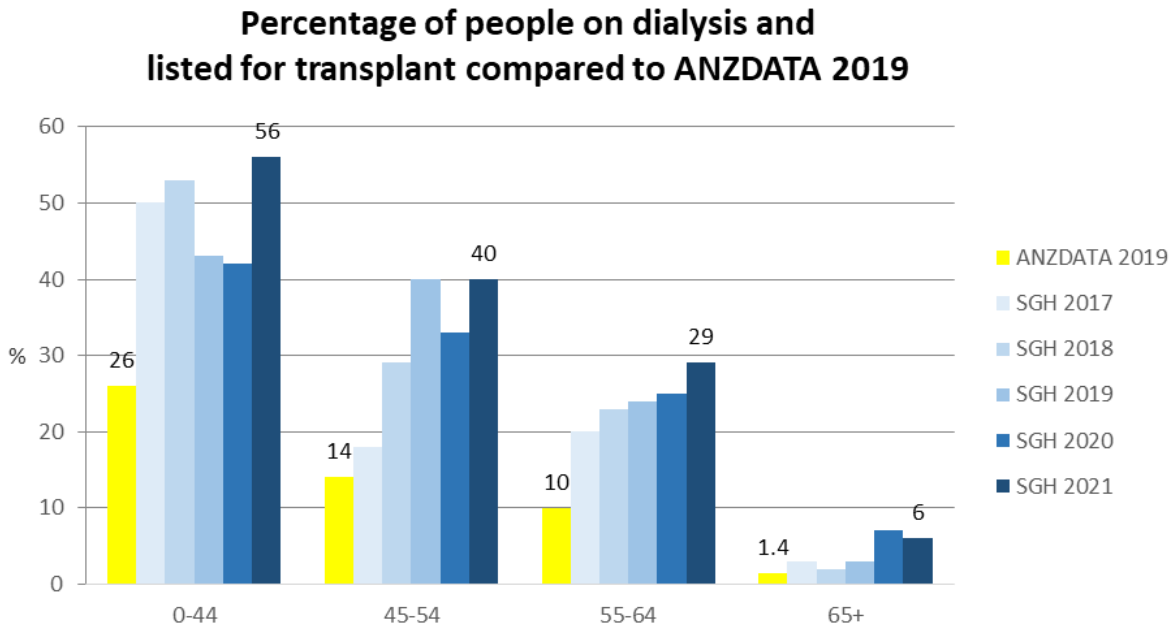


Figure 67. Percentage of SGH dialysis patients listed for transplant compared to ANZDATA 2019.

4. Donor Data

KPIs:

- All living kidney donors to be reviewed annually.
- Living donor assessment to be completed in <12months.
- At 31/12/21 there were 74 living kidney donors under the care of SGH nephrologists.
- During 2021 65 donors (86%) attended for review.
- Of the 9 who did not attend for review in 2021, 1 was an overseas donor who returned home and 5 had their 2021 appointment delayed by the COVID-19 lockdown and were seen in early 2022. The remaining 4 were followed up by letter or phone.
- Among the donors there were no deaths and no one on dialysis.
- Creatinine ranged from 60-159umol/L, eGFR from 39->90mL/min/1.73m2 and albumin creatinine ratio from 0–13.7mg/mmol.
- Nineteen SGH renal donors reviewed in 2021 have CKD stage 3A (GFR 45-59) and 5 have CKD stage 3B (GFR 30-44).
- Thirteen donors had hypertension requiring treatment, with 8 requiring one agent and 5 requiring two.

Table 28. *Renal Donor patient flow.*

1/1/2021 SGH renal donors registered with ANZDATA	**73**
In	
Donated	1
Transferred care in	0
In Subtotal	1
Out	
Transferred care out	1
Died	0
Out Subtotal	-1
Net Gain	0
31/12/2021 SGH renal donors	**73**

One person under the care of SGH proceeded to donate a kidney during 2021 for a recipient at Westmead Hospital. The process of donor assessment from referral to the coordinator to kidney donation took 41 weeks.

Twenty three people presented to SGH for donor assessment during 2021. Seven were unsuitable to proceed to donation due to medical reasons and one did not continue with assessment after the first clinic appointment. Nine potential donors did not make any progress after the initial phone call. At 31/12/20 a total of 6 people remain in the donor assessment process at SGH.

Plans for the next 12 months

- Pre-transplant education 31/3/22, 7/6/22, 9/11/22.

12. RENAL SUPPORTIVE CARE SERVICE

Dr. Frank Brennan, Dr. Kelly Li, Elizabeth Josland, Alison Smyth, Jessica Dawson, Caoimhe Fitzmaurice, Danielle Horne, Anna Hoffman, Max Thomsett

Overview

- Details of current research, guidelines, patient information, education and presentations can all be found on the Renal Supportive Care section of the Renal Department website: https://stgrenal.org.au/
- Due to COVID-19 restrictions the Sutherland Hospital Clinic ceased mid-year and all patients were consulted via telehealth or seen at St George Hospital

RSC Service Activity

- There is an average of 4 new inpatient referrals per month.

Table 29. *RSC Activity 2009-2021*

Year	STG Clinic Visits	% New Referrals	TSH Clinic Total	% New Referrals	CNC OOS	Dietitian OOS	SW OOS
2009	115	33%			115		
2010	224	19%			258		
2011	409	13%			746		
2012	482	10%			988		
2013	383	12%			1173		
2014	300	9%	99	12%	1090		
2015	268	10%	81	9%	1505	24	6
2016	305	6%	137	12%	1728	92	77
2017	281	14%	141	15%	1722	78	50
2018	366	11%	133	12%	2222	179	128
2019	349	10%	136	8%	1957	238	255
2020	499	7%	92	4%	1828	352	231
2021	588	5%	108	9%	1136	339	404
TOTAL	4569	10%	927	115	16468	1302	1151

Patient Demographics and Outcomes

Demographics of patients seen by the renal supportive care service (at their first visit/ consult) are tabled below.

Table 30. *Patient demographics on first visit/ consult 2009-2021.*

	Conservative	Dialysis	Transplant	Pre-Dialysis/ undecided	Total
No. of patients (count)	722	471	41	100	1334
Age (average, years)	82	71	62	74	77
Age (range, years)	(29, 99)	(23, 94)	(33, 80)	(28, 91)	(23, 99)
eGFR (average)	16		35	28	16
Diabetes (%)	2%	2%	2%	2%	1%
IHD (%)	52%	57%	27%	46%	53%
Dementia (%)	10%	5%	0%	3%	7%
2 or more co-morbidities* (%)	76%	79%	63%	76%	77%
Current or former smokers (%)	15%	30%	20%	13%	20%

Inpatient services

- Inpatients are predominantly seen by the CNCs. The majority of new inpatient referrals continue to be for pain and symptom management.

Outpatient services

- There were a higher number of Telehealth consults due to COVID-19 restrictions. These consults assist patients who are too frail to physically attend the clinic and to manage patients who require frequent follow up.

Palliative Care Outcome Scale Clinic outcome

- Symptom surveys are conducted at each RSC Clinic visit. The most prevalent symptoms reported as severe/ overwhelming were lack of energy, poor mobility, pain, difficulty sleeping and itch.
- Of all patients that have been seen in the RSC Clinic since 2009, 60% had a reduction in their total symptom score by the 3rd clinic visit.
- 29% of patients with at least 3 visits reported severe/ overwhelming pain at their first visit, 74% had a reduction in their scores by visit 3.

Advance Care Plans

Advance care plans are standard practice within the clinic, this includes yearly reviews. The table below shows figures for patients as of Jan 2021.

- 71% of non-dialysis patients attending the RSC clinic that are competent had an advance care plan. This is an improvement from the previous years (66%) but still lower than 2019 (79%) from an increase in telehealth consults due to COVID-19.

Table 31. *Advanced Care Plan completion summary.*

NFD - RSC clinic	86
With ACP	50
Without ACP - Suitable	20
Discussed	12
ACPs to do	8
Without ACP- not suitable	16
Unable due to Dementia/ Incompetent/ Social	4
Nursing home patients	3
Less than 3 Clinic appointments	9
Lost to follow-up -Not seen >2yrs	6
% Completed	71% (50/70)

Research, Publications, Teaching and Presentations

Research

- Incidence of frailty and malnutrition in advanced chronic kidney disease: a comparison of conservatively-managed and dialysis-dependent patients
- Quality of Life: To determine the QOL of RRT patients and to determine if there is a relationship between QOL, specific biochemical markers, dialysis adequacy, age and diabetic status.
- CKD managed without dialysis: survival symptoms and QOL. Presented at finals of RACP Advanced Trainee Presentations, and won.
- RAPID: To prospectively collect information on the harms, benefits, and interactions of medicines and interventions commonly used in palliative and supportive care.

Education Days and Teaching

- 275 participants attended the Kidney Supportive Care Symposium and Master Class held virtually and internationally on 17 and 18 September 2021.

COVID-19 Deployment

- Caoimhe, one of the RSC dietitians was deployed for 30 x 8 hour shifts (240 hours) as a COVID Marshall. This was part of the COVID-19 response between September 20th and November 14th 2021.

Performance indicators and outcomes for 2021

1. **Symptom and functional state assessment in clinic**
    - 100% of patients had an IPOS (renal) symptom survey and Karnofsky performance scale measured in the RSC clinic on each visit. These assessments are used to identify individual issues and monitor change.
    - 66% of patients (conservative and dialysis) had an improvement or maintained their total symptom score between first and third visit to the RSC clinic.
    - 83% of patients (conservative and dialysis) had an improvement or maintained their functional status between first and most recent visit to the RSC clinic.
    -
2. **Symptom assessment in dialysis.**
    - All dialysis patients have an IPOS (renal) symptom survey and Karnofsky performance scale measured every 6 months. These clinical tools are used twice a year for each patient to monitor progress and identify issues.

Patients with severe or overwhelming symptoms have automatic referral to the renal supportive care service. Patients can be seen on dialysis or are called to arrange an appointment.

3. **Advance Care Plans: 100% of competent and consenting ESKD patients who are not for dialysis and are seen in the RSC clinic, or those who are currently on dialysis but their treating physician has identified that they would "not be surprised if they died in the next 12 months", should have an advance care plan completed and reviewed every year.**
    - 71% of competent NFD patients who are seen in the RSC clinic have an ACP.
    - Of the 78 dialysis patients identified as requiring an ACP in 2021, 55% (n=38) had an ACP completed. Each year nephrologists are sent a list of their current dialysis patients to identify those requiring an ACP (identified using the "Surprise Question").
4. **Nutritional assessment**
    - 76% of RSC dietetic consultations were for patients attending for conservative management, with 100% of conservative patients being reviewed one or more times in clinic.
    - 23% of RSC dietetic consultations were for patients attending for symptoms support (e.g. pre-dialysis, dialysis-dependent, transplant), with 99% of symptom support patients being reviewed one or more times in clinic.

13. HYPERTENSION

Dr. George Mangos, Jennifer Beddoe

Twenty four hour ABPM monitoring

2021 was a challenging year, due to COVID-19 for the 24hr ABPM service. Despite the challenges two hundred and eighty five ABPM's were conducted, with only fourteen of these were for research, eleven were for pregnant women and the remaining two hundred and sixty were for clinical purposes.

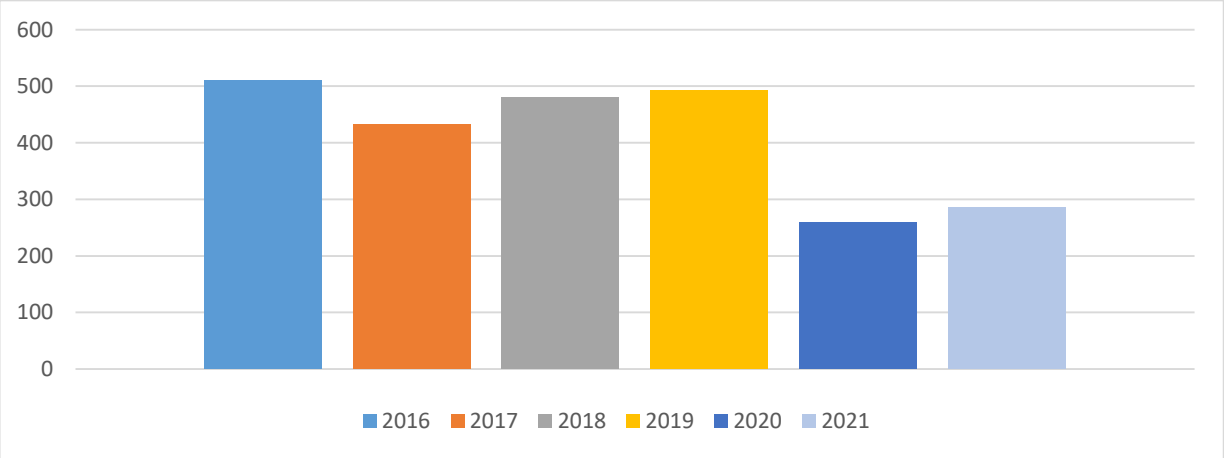


Figure 68. Total number of ABPMS 2015-2021.

Home monitor checks

During 2021 thirty four home monitor checks were performed. Activity was also affected by COVID-19.

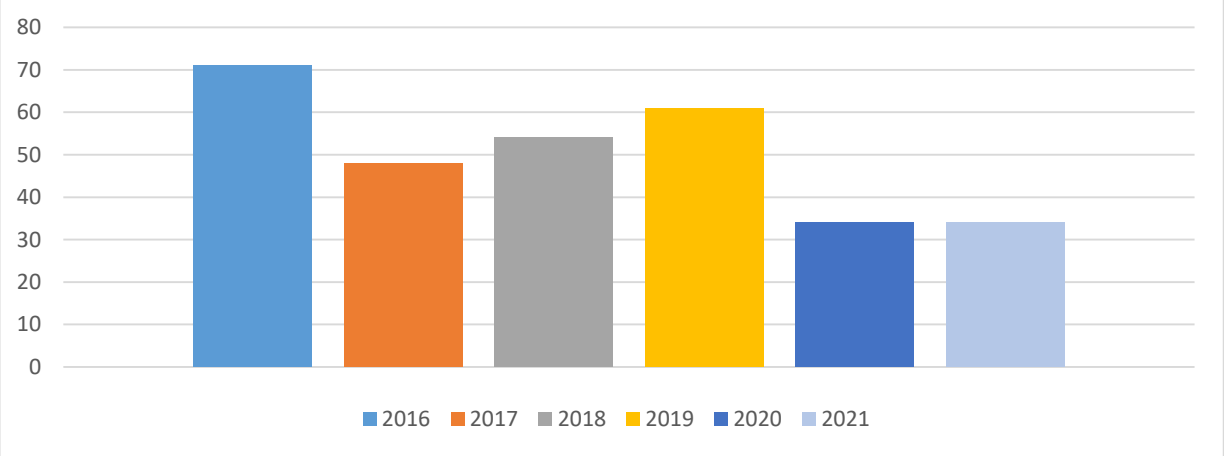


Figure 69. Home Monitors 2015- 2021 Activity.

Hypertension studies

Our unit is participating in two hypertension based research projects at the moment. Both of these were put on hold for most of the year due to COVID-19. The end of the year saw these studies been re commenced and hopefully 2022 will be a better year.

14. HYPERTENSION IN PREGNANCY

Dr. Franziska Pettit, Jennifer Beddoe

The aim of this report is to review the maternal and fetal outcomes of women presenting with a hypertensive disorder of pregnancy.

Activity

- In 2021 there were 2532 births at St George Hospital, up from 2206 in 2020. 196 (8%) of these were complicated by a hypertensive disorder. 5 were twin pregnancies and were excluded from this analysis. In 2021 the Australian Mothers and Babies report the overall rate of hypertension in pregnancy was 5%.
- Of the 191 singleton pregnancies in 2021 157(82%) were consulted to the renal team. The remaining 34(18%) were managed by the obstetric team.
- There was 1 reported case of Pulmonary Oedema in a woman with pre-eclampsia (PE) at 31/40. She was transferred to the Royal Hospital for Women (RHW) & delivered there at 31/40.
- There were no episodes of dialysis or maternal deaths during here at St George.
- There were no fetal or neonatal deaths reported.

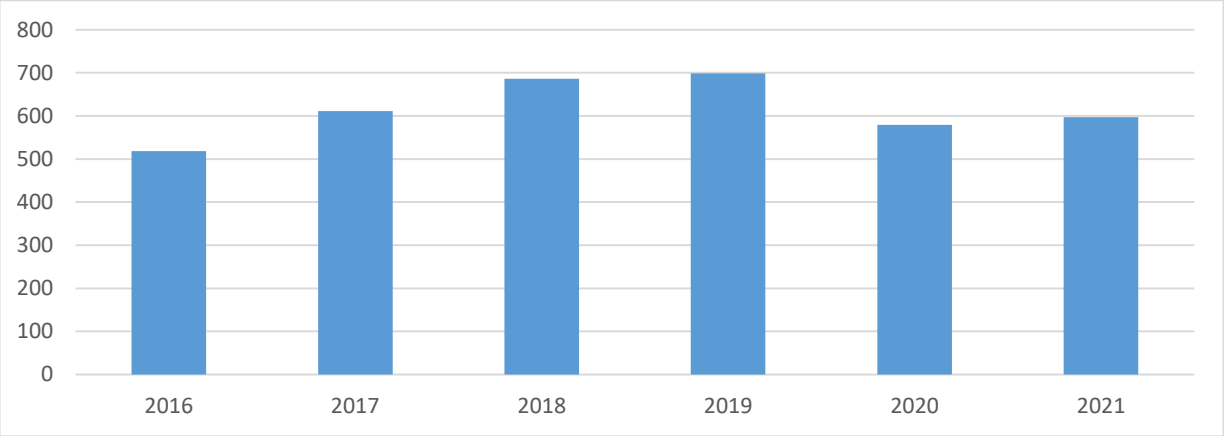


Figure 70. OMC occasions of service 2016-2021.

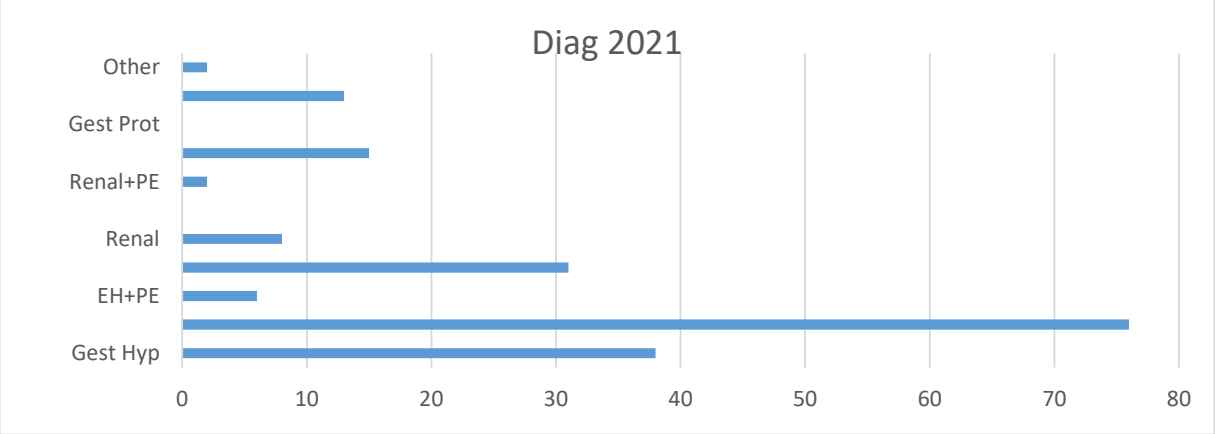


Figure 71. Diagnosis 2021 breakdown.

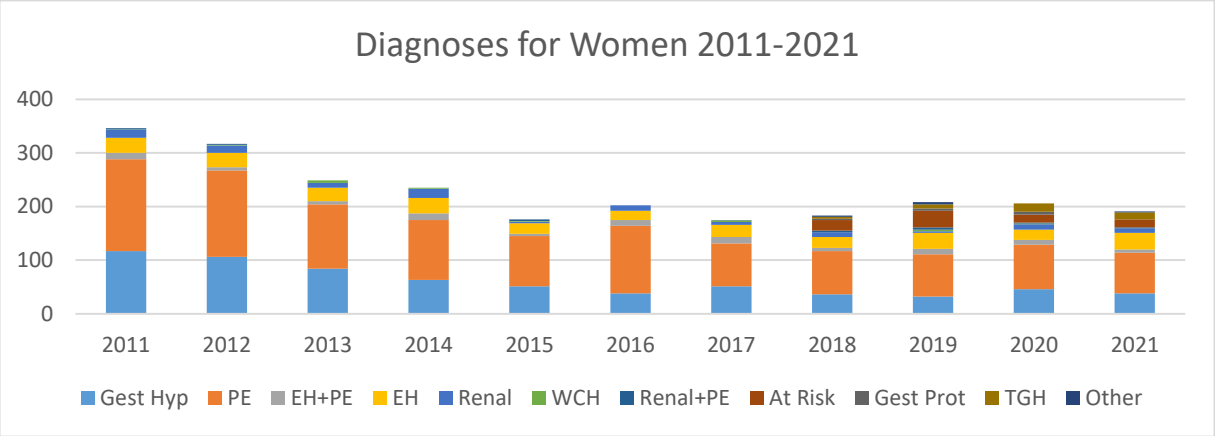


Figure 72. Diagnosis comparison 2016-2021.
Gest Hyp: Gestational Hypertension, PE: Pre-eclampsia, EH:, WCH: White coat hypertension, Gest Prot: Gestational proteinuria, TGH: Transient gestational hypertension

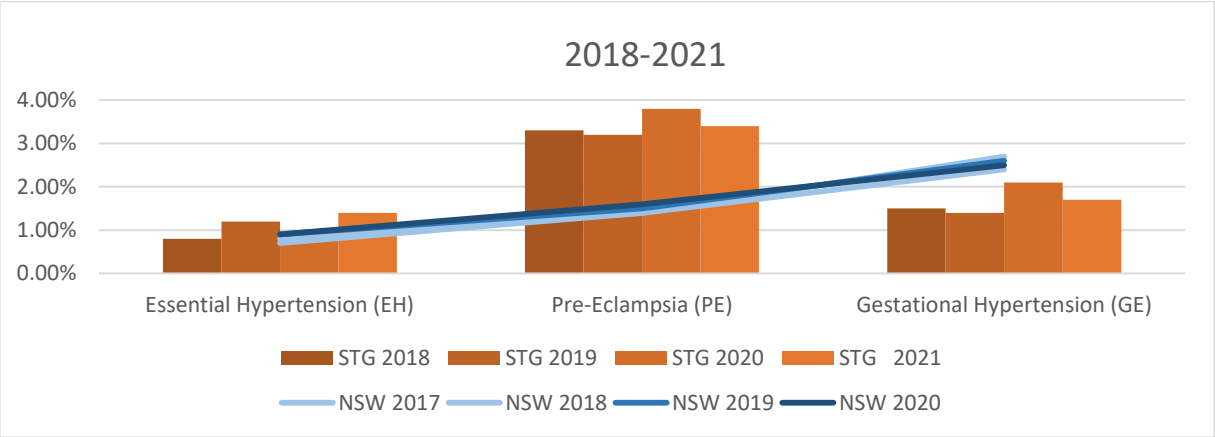


Figure 73. Diagnosis comparison NSW to STG taken from Mothers and Babies NSW.

Conclusion

The renal obstetric medicine team have remained extremely busy this year. Although the number of births have increased from 2206 in 2020 to 2532 in 2021, the number of women with a hypertensive disorder of pregnancy diagnosis has decreased from 10% to 8%. However the rate of consults to the renal obstetric medicine team rose slightly from 81% to 82%.
OMC was slightly busier with 597 occasions of service compared to 579 in 2020.

15. RENAL BIOPSY REVIEW – AUDIT OF COMPLICATIONS

Dr. Partha Shanmugasundaram

	Total	Transplant biopsies
Number	94	20
Total complications	7 (7.4%)	1 (5%)
Macroscopic haematuria	4 (4.3%)	0 (0%)
Symptomatic Perinephric haematoma	4 (4.3%)	1 (5%)
Required blood transfusion	2 (2.1%)	None

Comparison of total complication rates from previous years

	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Number	118	123	98	134	126	127	125	115	94
Complication rate (%)	5.1	6.5	12.2	5.2	7.1	3.9	6.4	7.8	7.4

Comparison of specific complication rates expressed as percentage (number)

Year	2017 n=126	2018 n=127	2019 n=125	2020 n=115	2021 n=94	Last 5 years n=587
Total complications	7.1 (9)	3.9 (5)	6.4 (8)	7.8 (9)	7.4 (7)	6.5 (38)
Macroscopic Haematuria, % (n)	2.3 (3)	3.1 (4)	3.2 (4)	4.3 (5)	4.3 (4)	3.4 (20)
Perinephric Haematoma, % (n)	3.2 (4)	0.8 (1)	3.2 (4)	4.3 (5)	4.3 (4)	3 (18)
Perinephric bleed – angioebolisation, % (n)	0 (0)	0 (0)	0 (0)	0.9 (1)	0 (0)	0.2 (1)
Required blood transfusion	0 (0)	0 (0)	1.6 (2)	1.7 (2)	2.1 (2)	1 (6)

Our benchmarks [1] **are:**

- Macroscopic haematuria 3.5% - unmet
- Blood transfusion 1%- met
- Angio-embolisation 0.6%- unmet

The rate of all complications over the last 5 years was 6.4%. This seems to be stable and in keeping with the rates noted in the international literature and in standard practice.

The average rate of macroscopic haematuria following a renal biopsy was acceptable within the benchmark rate. The complications related to individual patients were discussed in the departmental annual audit meetings to identify issues which can be optimised to reduce complication rates.

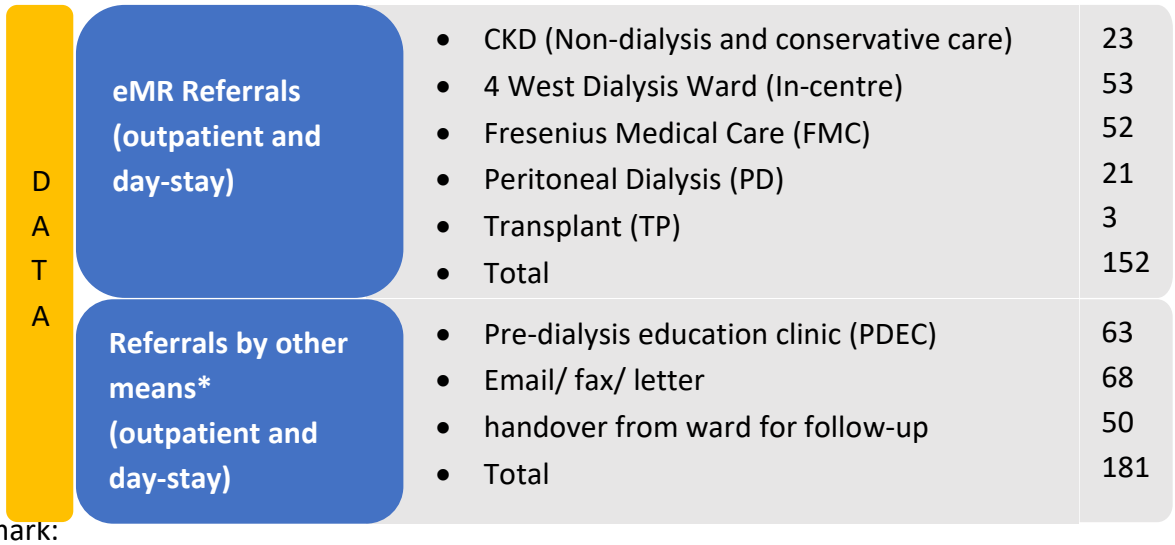
Bibliography

1. Corapi, K. M., Chen, J. L., Balk, E. M., & Gordon, C. E. (2012). Bleeding complications of native kidney biopsy: a systematic review and meta-analysis. *American journal of kidney diseases : the official journal of the National Kidney Foundation*, *60*(1), 62–73. https://doi.org/10.1053/j.ajkd.2012.02.330

16. NUTRITION SERVICES

Maria Chan, and Samantha Furka (SGH campus). Please refer to RSC for Jessica Dawson

Figure 74. Referrals to dietetics in 2021.



Remark:

- 118/333 referrals and/or alerts for follow-up didn't appear in eMR booking or Census Task List (CTL) in eMR. Improvement is required.
- Inpatient data not extracted for current report due to time constraints.

Table 32. *Service type, referrals and dietitian staffing level for 2021.*

	Outpatient/day-stay patient			Inpatient (as per eMR referrals)
Non-dialysis dependent CKD (Pre-dialysis and conservative care)	New For dialysis-including modality changes and transfers	**Total** at any time point*	Short term & ad hoc intervention	
	83 (63 from PDEC + 20 direct referral from Medical Officer)	130 (110 from PDEC + 20 from conservative care)	10	
Home Haemodialysis	6	37		
In-centre	29	60		
FMC	10	80		
PD	19	40		
TP	6	220		
Total	**153**	**587**	**10**	Not extracted

	Outpatient/day-stay patient	Inpatient
FTE required as per workforce recommendations	3.6 FTE	
Current staffing	1.0 FTE	0.6 FTE

*this denotes the total number of patients who should be reviewed regularly and for long term follow-up as per best practice guidelines.

- Current dietitian staffing for non-admitted (outpatient) + day stay haemodialysis, dietitian: patient ratio – 1:600 (MC) or 1.0 FTE at St George Hospital for the estimated clinical load of 3.6 FTE dietitian OR 1.6FTE dietitian for 4.2 FTE's total workload according to the Dietitians Association Renal Dietitians Workforce Recommendation:

Workforce recommendations for renal dietitians in Australia and New Zealand,
The Australian and New Zealand Renal Dietitians Workforce Planning Group 2012

- This data suggested minimal contact time, not including re-referrals for new issues.

Remarks: Dietitian staffing level continues to be inadequate to implement best practice to ensure patient safety and quality care.

Key Achievements

IDPN CBR
Clinical Business Rules completed and is available on the SGH intranet
http://seslhdweb.seslhd.health.nsw.gov.au/SGSHHS/Business_Rules/haemodialysis/documents/CLIN675_SGH_IDPN.pdf

Research
DAMPER study: Dietary Approaches to Manage Progress and End Stage Renal Disease study. Ethics application submitted.

Teaching
Collaborated with NKF, USA to commission Global Renal Internet course for Dietitians (GRID) to train specialist dietitians in renal Care, Module II was launched at the end of 2021.
https://cme.kidney.org/spa/courses/resource/global-renal-nutrition-course-for-dietitians-module-2/mooc/home/default

Quality Improvement
Usage of haemodialysis and peritoneal dialysis diet codes (for inpatient meal ordering) reviewed to improve oral intake and patient experience on the 4 South ward.

Work in Progress

- Establishing pre-and post-transplantation assessment and follow-up.
- To pilot Dietitian Assistant services in in-centre haemodialysis for nutrition screening and ongoing nutrition support.

Future Directions

- To pilot virtual group education sessions or virtual class room (to complement individualised advice)
- To further develop and evaluate structured nutritional care incorporating precision medicine and tele-health.
- Screening and ongoing nutrition

17. SUSTAINABILITY INITIATIVES

Dr. Brendan Smyth, Dr. Franziska Pettit, Dr Alexandra Gallagher

Staff at St George Hospital have been investigating ways to reduce water consumption at the dialysis unit. Fresenius and hospital engineering and plumbing staff have been consulted and a working group established. A grant from Baxter healthcare for $5,000 has been secured to support the implementation of a water recycling program. Hospital plumbing and engineering teams have been consulted and a plan to divert RO reject water from the drain to a productive use (flushing toilets) has been agreed. Cost estimates are being sought with a view to commencing work early 2023.