Department of Renal Medicine
St George & Sutherland Hospitals

2019

Annual Report

and

Quality Indicators

Health
South Eastern Sydney
Local Health District

Introduction

It gives me great pleasure to present the 2019 Annual Report of the Department of Renal Medicine.

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 and transplant patients, and have been able to control or improve symptoms well for patients on a non-dialysis pathway.

Preparation for dialysis through our pre-dialysis education program is increasingly successful and the vascular access program has achieved primary access at a 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.

I wish to thank everyone in our Department for their contributions to this report and to the care of our patients.

I welcome any feedback.

A/ Prof. George Mangos

Head of Department

Renal Medicine. St. George Hospital.

George.mangos@health.nsw.gov.au

Table of Contents

Contents

1. ANZDATA Activity Overview

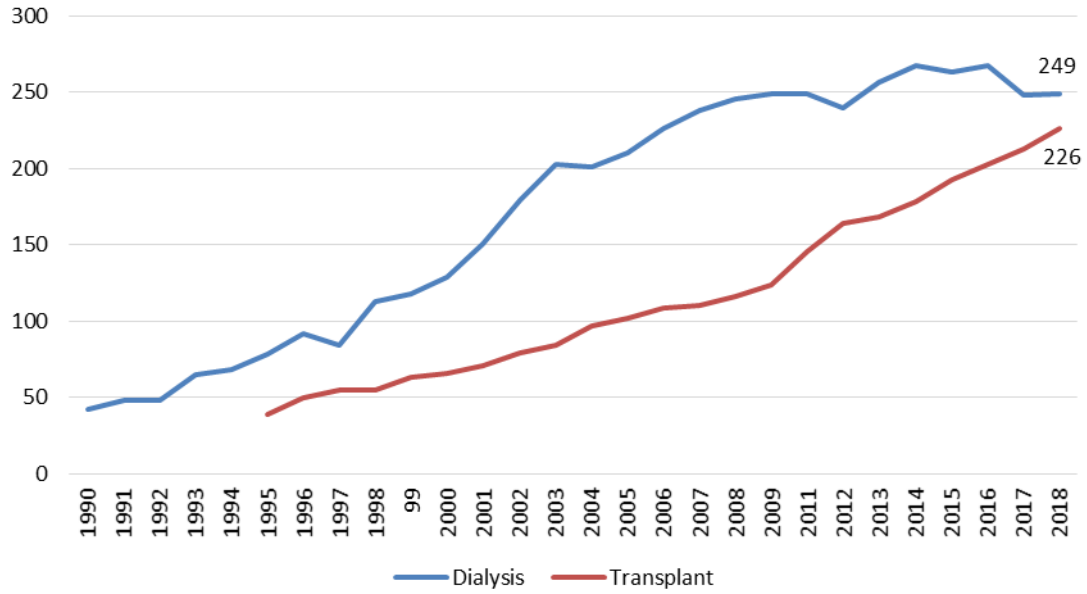


Figure 1. *All Dialysis & transplant patients St George hospital 1990-2018 (ANZDATA 31/12/18)*

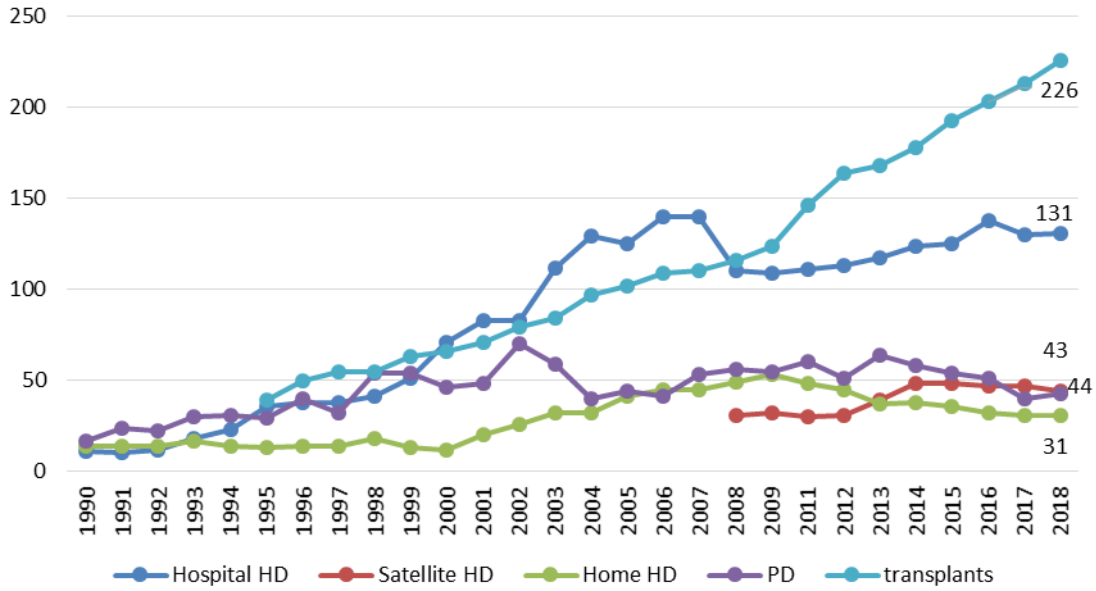


Figure 2. *Dialysis & transplant patients St George hospital 1990-2018 (ANZDATA 31/12/18)*
NB. Sutherland Satellite unit opened in 2008

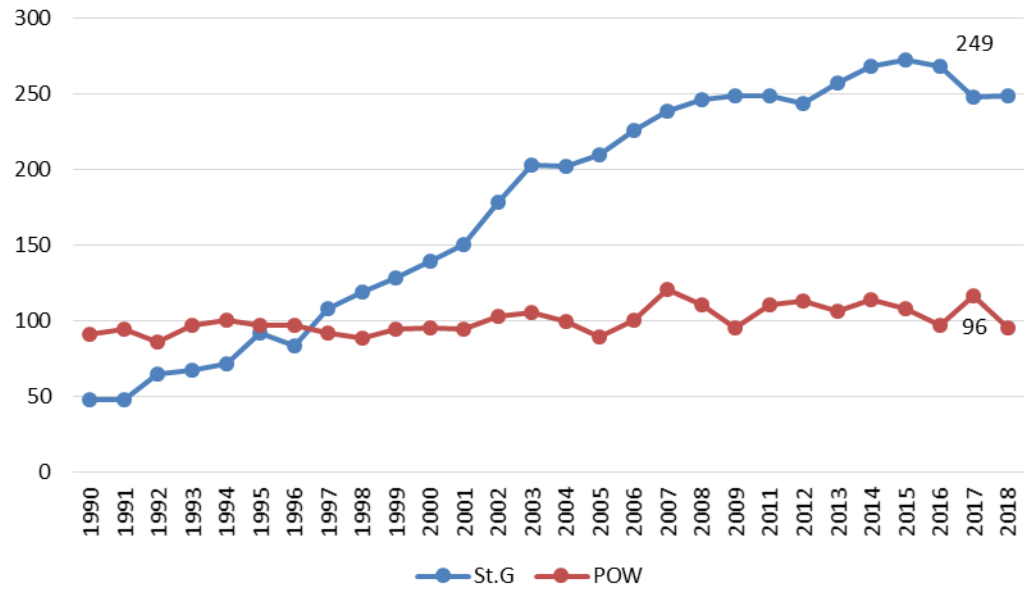


Figure 3. *Dialysis patients South East Sydney LHD (ANZDATA 31/12/18)*

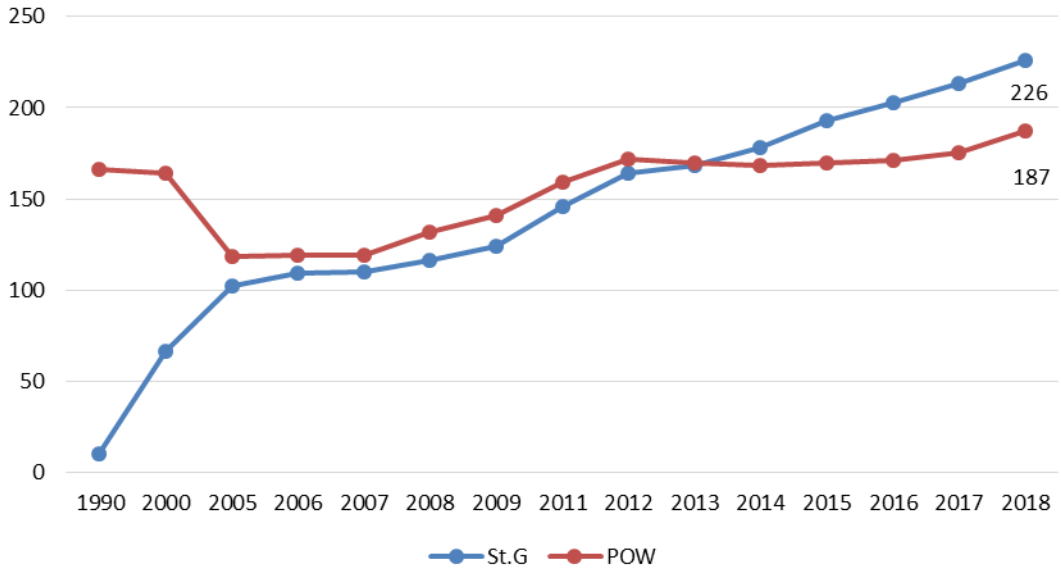


Figure 4. *Functioning Transplants South East Sydney LHD (ANZDATA 31/12/18)*

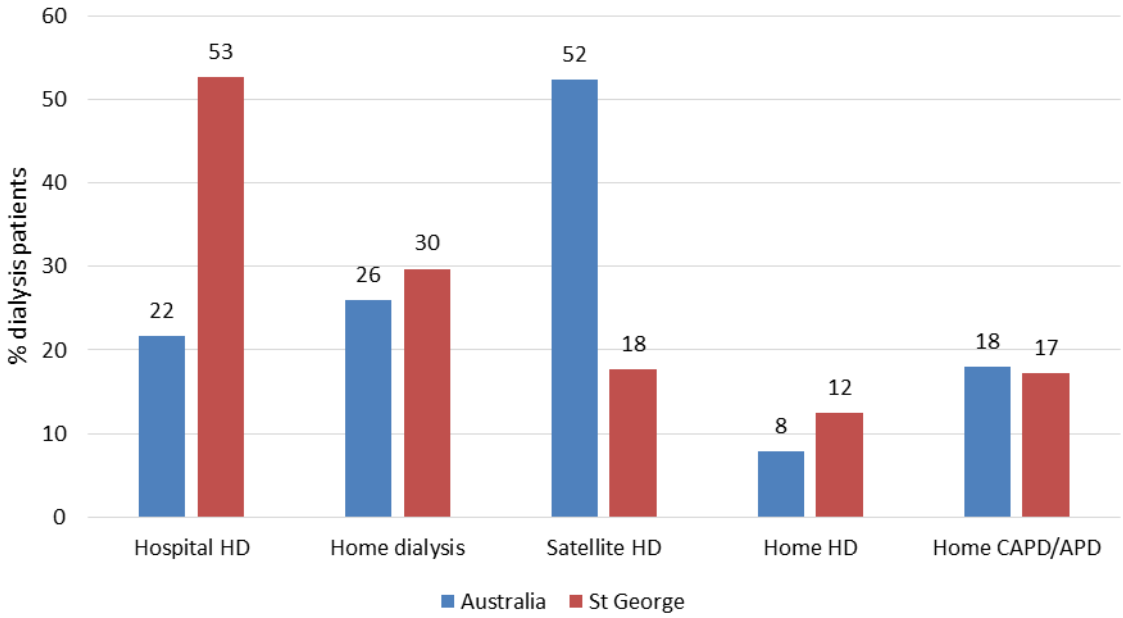


Figure 5. Mode of dialysis Australia & St George 2017 (ANZDATA 31/12/18)

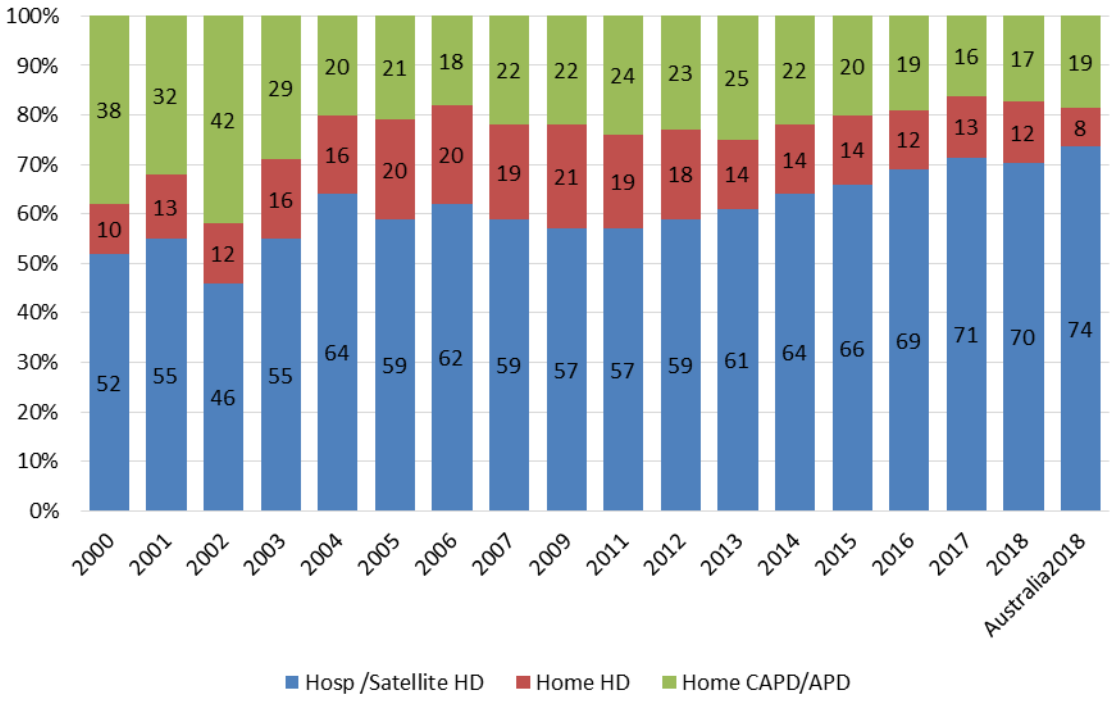


Figure 6. Mode of dialysis Australia & St George 2018 (ANZDATA 31/12/18)

2. Chronic Kidney Disease

Kylie Turner, Saiyini Pirabhahar, Ivor Katz

This report looks at the new CKD outpatient referrals to our renal department and the changing pattern over the years. In 2019, a total of 275 new referrals were received to the renal outpatient department which was 25% less than the previous year (fig 1). We believe this reduction is due to the triage system initiated in January 2019 where a 'triage consultant' reviewed all new referrals.

New referral numbers to Public Outpatient Clinics

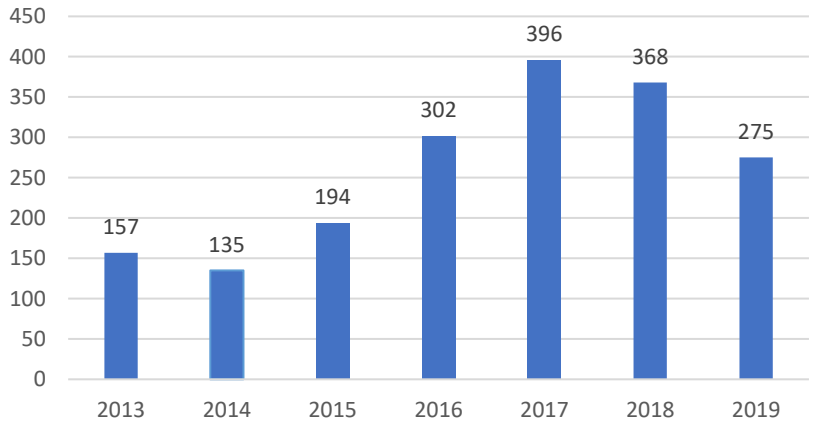


Figure 7. Total number of new outpatient referrals to St George Hospital Renal Dept

About 76% of these referrals were from the St George and Sutherland area of General Practice (Fig 8).

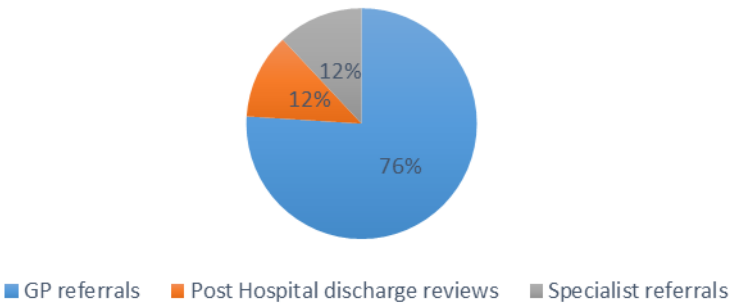


Figure 8. Origin of CKD referrals to CKD Outpatient

A new system of triage was implemented in August 2019 to ensure all new referrals could be seen timeously and appropriately. These changes are in addition to the existing KHA guidelines and were developed from the Kidney Failure Risk Equation (KFRE) Score (www.kidneyfailurerisk.com). The KFRE score is an algorithm developed to assist nephrologists and other clinicians with determining which patients are at highest risk of progression to end stage kidney disease (ESKD). This allows for better focus on the patients most likely to deteriorate. The KFRE score calculates the risk of progression to renal failure requiring dialysis or transplantation at 2 years and 5 years respectively. A 5 year risk below 3% is considered very low and has been considered the score at which no

nephrology follow up is necessary. A 2 year risk of >40% would indicate to a clinician that this patient is very likely to start dialysis soon.
The reason for including the KFRE score was to attempt to reduce the number of inappropriate patients being followed up. Table 1 shows the KFRE score at their initial renal consultation. In 2019 46% of patients had a low KFRE score and 64 (50%) of these patients were on follow up at the end of the year (Table 2).
The Table 2 defines the reasons for follow up of these low risk patients i.e. KFRE <3% 5 year risk. Even though they might have low KFRE score, they might have other issues such as uncontrolled blood pressure, low eGFR with mild proteinuria or have glomerular disease in remission. However, it is noticeable to see we have been discharging more low risk patients back to the GP over the years and so the implementation of KFRE appears to be having an impact. We have, 14% compared 40% of patients the year before, who appeared to inappropriate for follow up. However, these patients could have other reasons for ongoing follow up as mentioned above and this requires further investigation.

	2017 N=396	**2018 N=368**	**2019 N=275**
KFRE>3% at 5years	24%	24%	18%
KFRE<3% at 5years	34%	48%	46%
Patients with no KFRE score	42%	28%	36%

Table 1. KFRE risk at first consultation

	2017 n=102	**2018 n=92**	**2019 n=64**
CKD (eGFR≤30 mL/min/1.73m^2 and /ACR ≤30mg/mmol)	28%	19%	61%
Hypertension* with no proteinuria with eGFR≥60 mL/min/1.73m^2	13%	14%	13%
Hypertension* with no proteinuria with eGFR 30-60 mL/min/1.73m^2	8%	5%	4%
Hypertension# with microalbuminuria (ACR 2.5-30mg/mmol	14%	22%	8%
eGFR>30 with controlled BP and no albuminuria	37%	40%	14%

Table 2. Table 2: Patients with low KFRE score of <3% at 5 years and are on follow up
*Blood pressure >140/90mmHg
Blood pressure >130/80mmHg with microalbuminuria

An ongoing issue remains that referrals to the department that do not include a urine ACR (albumin to creatinine ratio). At least a third of patients referred from 2017 to 2019, did not have a urine protein results. This makes triage of patients with CKD difficult. Our current triage system now evaluates for missing information.

Despite attempts to simplify the reasons for referral to the department, these are still complex as is outlined in Figure 3 and 4. There is often an overlap of the 3 main reasons for referral which is a challenge for the general practitioner when deciding to refer the patient. However, we believe if KFRE was considered in the referral then these would be reduced.

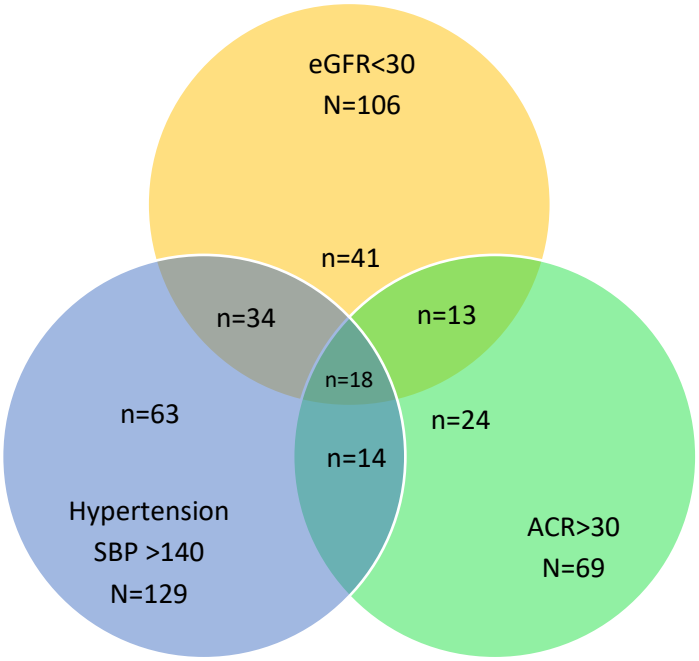
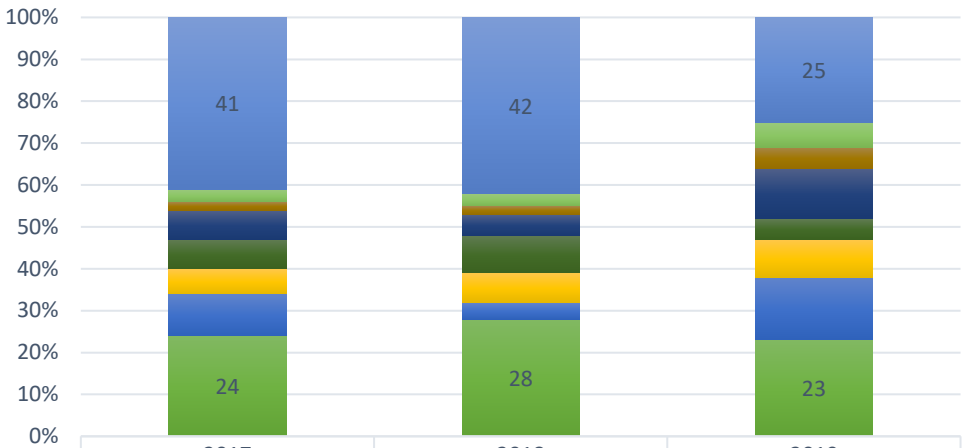


Figure 9. Reasons for referral in 2019

eGFR – estimated glomerular filtration rate in mL/min/1.73m2; ACR – urine albumin to creatinine ratio in mmol/mol; SBP – systolic blood pressure in mmHg.

Out of 275 referrals, 47% of the referrals were for uncontrolled hypertension, hypertension with albuminuria or low eGFR combined with hypertension.



	2017	2018	2019
None of the 3 reasons	41	42	25
All 3 reasons	3	3	6
Low eGFR + ALB	2	2	5
HT+low eGFR	7	5	12
HT+ALB	7	9	5
Albuminuria (>30)	6	7	9
eGFR<30	10	4	15
HT	24	28	23

Figure 10. Reason for referral to outpatient renal clinic.

To simplify the referral reasons, those patients with any significant renal dysfunction being either a reduction in renal function or having albuminuria i.e. eGFR<30mL/min/1.73m^2 or urine albumin to creatinine ratio (uACR) >30mmol/mol were classified as CKD. Patients only with hypertension and no CKD were classified as uncontrolled blood pressure. These 3 main reasons for referral are therefore i) Uncontrolled Hypertension (BP >140/90); ii) Severely reduced eGFR (<30mL/min/1.73m^2) and iii) Moderate albuminuria (ACR >30mg/mmol). The results of this simplified evaluation can be seen in Figure 11.

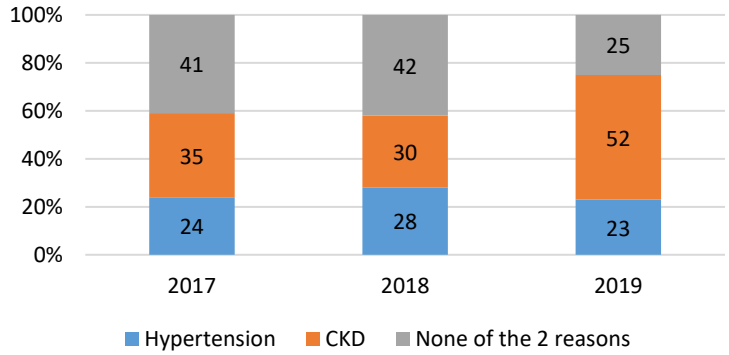


Figure 11. Simplified version of Referrals

The patients who did not fall into these two categories were referred for decline in renal function (AKI), glomerular disease and or haematuria or renal calculi etc.

3. Advanced Kidney Disease and Pre Dialysis Education Clinic

Kylie Turner / A/Prof Ivor Katz

Activity summary

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 2019, there were ***106 patients active within the Pre Dialysis Education clinic with a plan for renal replacement therapy***. This was an 18% decrease from the previous year.

Since April 2002 there have been 1137 people who have attended the clinic. In 2019 seventy one new patients attended the Pre Dialysis Education Clinic compared to 91 new attendees in 2018. There were 52 follow up appointments compared to 74 follow up appointments in 2018.

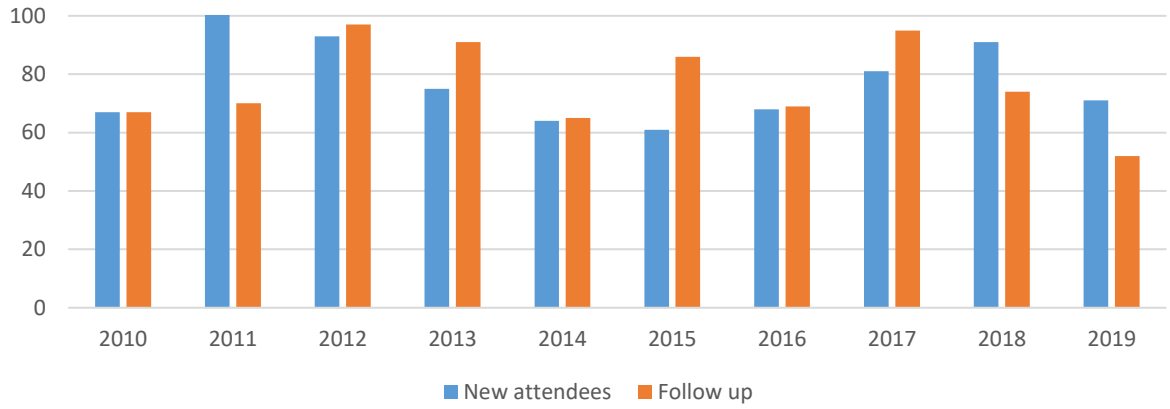


Figure 12. New attendees and follow up numbers for 2010-19

The age range of new patients seen in 2019 was 22 – 85 years. The average age was 64.4 years. The 58 Patients with eGFR <15 were active in the Pre Dialysis Education Clinic at the end of 2019 with 80 patients at the end of 2018. Below are the percentages of those patients and their chosen treatment pathways.

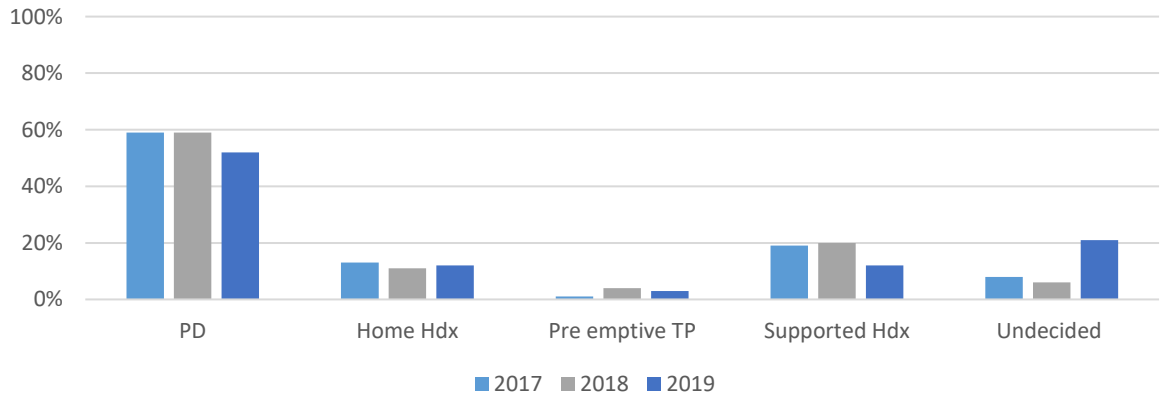


Figure 13. Percent of patients with eGFR <15 active in Pre Dialysis Education Clinic and chosen treatment pathways

4. Acceptance onto dialysis

Kylie Turner / A/Prof Ivor Katz

Activity summary

Out of 51 new patients who started dialysis in 2019, 23 (45%) patients commenced peritoneal dialysis, 0 (0%) started home haemodialysis and 28 (55%) started haemodialysis. Patients were analysed according to their first mode of dialysis.

- There were only 7 (14%) late referrals and this was below the National average 2018 (16%). Of note is that 2 of the late referrals received PD as first modality.
- Mean age at commencement in 2019 was 64 years for peritoneal dialysis and 66 years for haemodialysis. The age of patients starting haemodialysis was the same as the previous year and peritoneal Dialysis was slightly higher. This is still older than the National average age which is 62 years for HD and 60 years for PD (ANZDATA 2018).

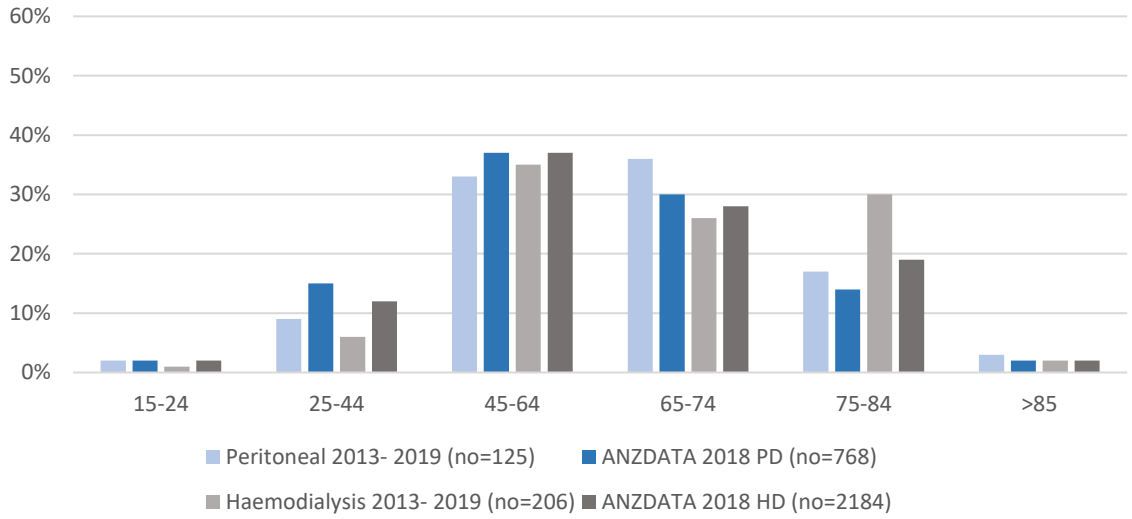


Figure 14. Age Groups of New Patients 2013-2019 compared to ANZDATA 2018

We continue to start more patients than nationally in the 65-84 age groups.

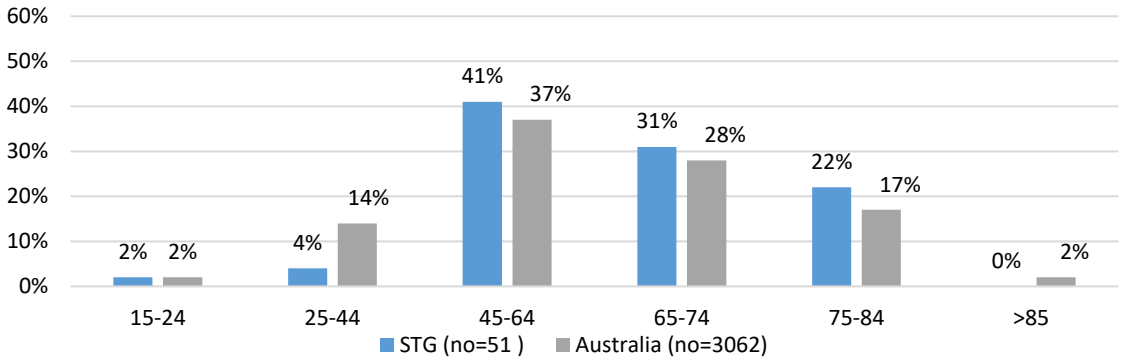


Figure 15. New Patients St George 2019 compared to ANZDATA 2018

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.

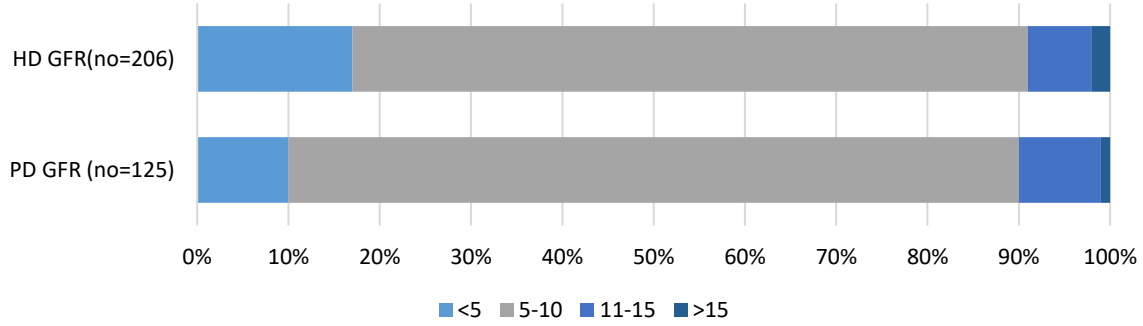


Figure 16. PD and Haemodialysis eGFR at commencement 2013-2019 (% in each range)

Baseline characteristics of new patients- Body mass index

#Body Mass Index (kg/m)	PD 2013 – 2019 (%) N=125	HD 2013 – 2019 (%) N=206
<18.5	2%	3%
18.5-24.9	34%	22%
25-29.9	27%	32%
30-34.9	25%	23%
≥35	12%	20%

Figure 17. BMI for St George Hospital new patients

*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. *Excludes patients who had haemodialysis prior to peritoneal dialysis.*

		St George HD 2013-2019 (n=206*)	ANZDATA HD 2018 (n=2193)	St George PD 2013-2019 (n=125*)	ANZDATA PD 2018 (n=782)
Average Age	(displayed as age in years)	66	62	64	60
Gender	Male	65%	65%	70%	63%
	Female	35%	35%	30%	37%
Late Referral	(< 3 months before first treatment)	17%	20%	10%	8%
Co - morbidities	Smoking (Current and former)	47%	51%	26%	43%
	Chronic Lung Disease (yes and suspected)	13%	16%	12%	10%
	Cerebrovascular Disease	9%	12%	9%	8%
	Coronary Artery Disease	39%	34%	28%	21%
	Peripheral Vascular Disease	16%	21%	12%	17%
	Diabetes	51%	34%	33%	25%

Figure 18. Baseline characteristics compared with ANZDATA- Excludes patients who had previous mode of dialysis

KPIs for Advanced Kidney Disease and Pre Dialysis Education Clinic and acceptance onto dialysis

The four benchmarks for predialysis 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 2019, there were 97 patients referred for pre dialysis education, this was an increase of 5% from 2018. Three of those patients referred in 2019 had commenced renal replacement therapy when referred so they will be excluded from the below numbers. Eighty nine percent of patients were referred according to the department referral guidelines. The 11% of patients referred who did not meet the referral criteria were referred due to impending surgery that was predicted to affect their remaining kidney function, recurrent renal malignancy, rapidly declining kidney function.

   In 2019, 51 patients commenced RRT 100% of new patients (excluding late referrals and one patient who was seeing a nephrologist in another area health service prior to commencing).

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

   For patients commencing dialysis in 2019, 94% started their planned dialysis choice compared with 96% in 2018. Two patients had originally elected for a PD pathway but unfortunately were deemed not suitable following abdominal surgery during their admissions where they needed to commence RRT. The other patient changed his mind in and preferred Hdx in a supported unit after starting Hdx acutely whilst in hospital.

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

   This benchmark means 60% of patients starting RRT had 'vaccinated immunity' defined as 'anti-HBs ≥10 International units/L'. Those with natural immunity and chronic infection were excluded in this analysis. There were 38% of patients that commenced dialysis in 2019 with vaccinated immunity. This is a 16% increase from 2018. In 2019 every patient seen in the Pre Dialysis Education clinic were verbally screened for HepB vaccination. The nephrologist was notified that the patient had been screened via the pre dialysis clinic letter from the Chronic Kidney Disease Clinical Nurse Consultant. Those patients where no serology results were current or available were provided with a pathology form at the Pre Dialysis Education Clinic to have their status tested. If the Hep B levels were <10 IU a letter was faxed to the GP requesting they start the Hep B immunization process. We hope to see ongoing improvements so that we can achieve our benchmark in the future and we will continue to alter our practice as required.

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

   In 2019, there were 61% of patients consented within 1 month of the patient commencing dialysis. This was an increase from 2018 where there was only 11%. By the end of 2019 of the new patients commencing dialysis there were still 31% of patients without a signed consent. Patients attending the Pre dialysis Education Clinic in 2019 received the consent for dialysis form and an information handout regarding dialysis and non-dialysis treatments within the St George Hospital Renal Department. At their next nephrologist appointment patients were encouraged to present the documentation for further discussion. We hope to see improvement with this benchmark in 2020.

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 94% starting their planned modality and the remaining 6% with relevant explanations as to why they started had to commence an unplanned modality.

We had a 5% increase in the numbers of patients referred from 2018 to 2019.

In 2020 we will focus on:

- Continue to ensure patients have a signed consent prior to commencing dialysis
- Yearly review of tracking spreadsheet to ensure active patients currently meet the criteria to remain active in the pre dialysis education clinic

5. CKD Virtual Medical Clinic (VMC)

Kylie Turner / A/Prof Ivor Katz

St George Hospital Renal Department initiated virtual medical consulting in 2013, where a pilot study was conducted that produced positive results:

- 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.
- No issues of computer literacy

As the outcomes were positive, and at least no different to 'standard' face to face clinic care, it was decided we would continue with this model of care.

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.

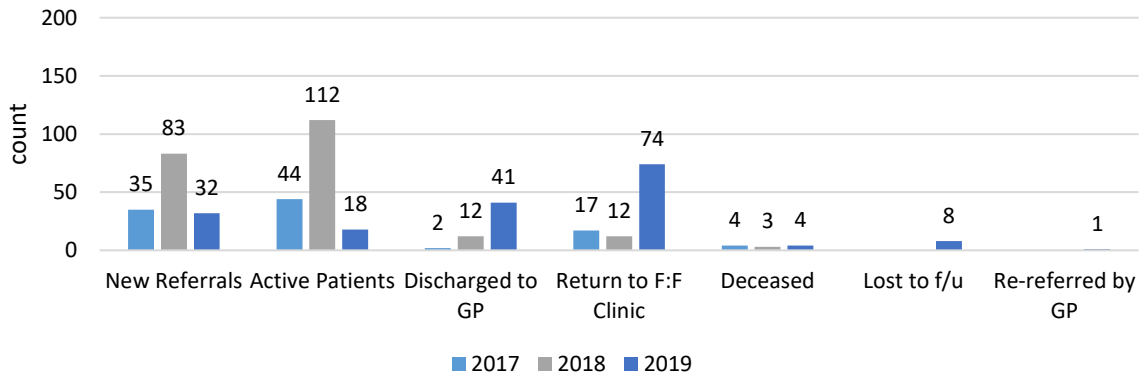


Figure 19. Virtual Medical Clinic 2017-2019

In May 2019 we reviewed all active patients in the VMC and made a decision to make it more streamlined to only have active patients who did not require face to face f/u. This saw the current patients having 6mth pathology follow up discharged from the program. The results of this overview reflects in the numbers in the above graph.

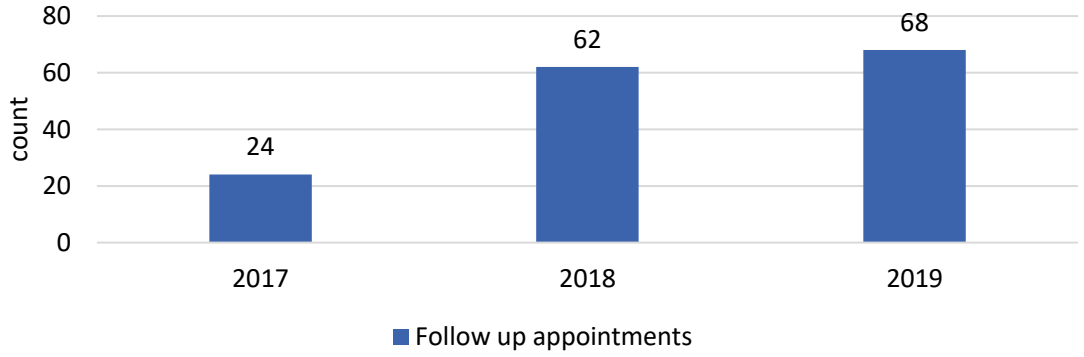


Figure 20. Follow-up appointments 2017-2019

	Active patients (no=16)
Age (Average)	74yrs
Female	31%
Male	69%
eGFR (average)	45mL/min/1.73m2
ACR (average)	8.4mg/mmol

Figure 21. Active VMC patients as at 31st Dec 2019

KPIs for Virtual Medical Clinic (VMC)

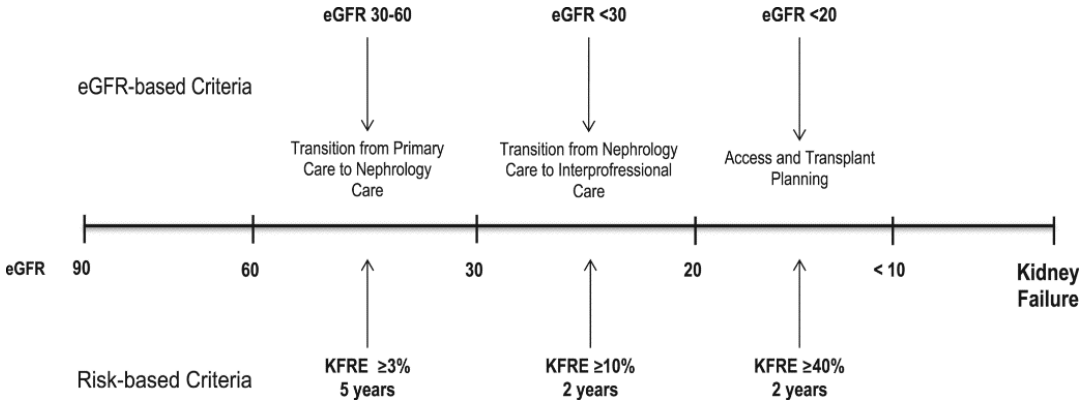
Two benchmarks for the virtual medical clinic have been established

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

   In 2019 out of the 32 patients who were referred to the VMC 84% met the clinic criteria of a KFRE 5yr risk of less than 3% this is an increase of 6% since 2018. Out of those 32 patients two were not referred with an ACR result which is an improvement from 2018 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.

6. Renal Vascular Access

Yanella Martinez-Smith, Jayson Catiwa

BACKGROUND AND PERFORMANCE INDICATORS

- Native arteriovenous fistula (AVF) remains to be the vascular access-of-choice for haemodialysis due to prolonged patency, minimum risk of infection and maintenance (Bylsma, Gage et al. 2017).
- The Renal Vascular Access Clinical Nurse Consultants (VA CNC) aims to monitor all fistulae from creation until the commencement of dialysis to ensure maturity; perform fistula monitoring and surveillance prior to and after dialysis has commenced; and ensure that a low level of arteriovenous access and catheter-related complications are maintained.

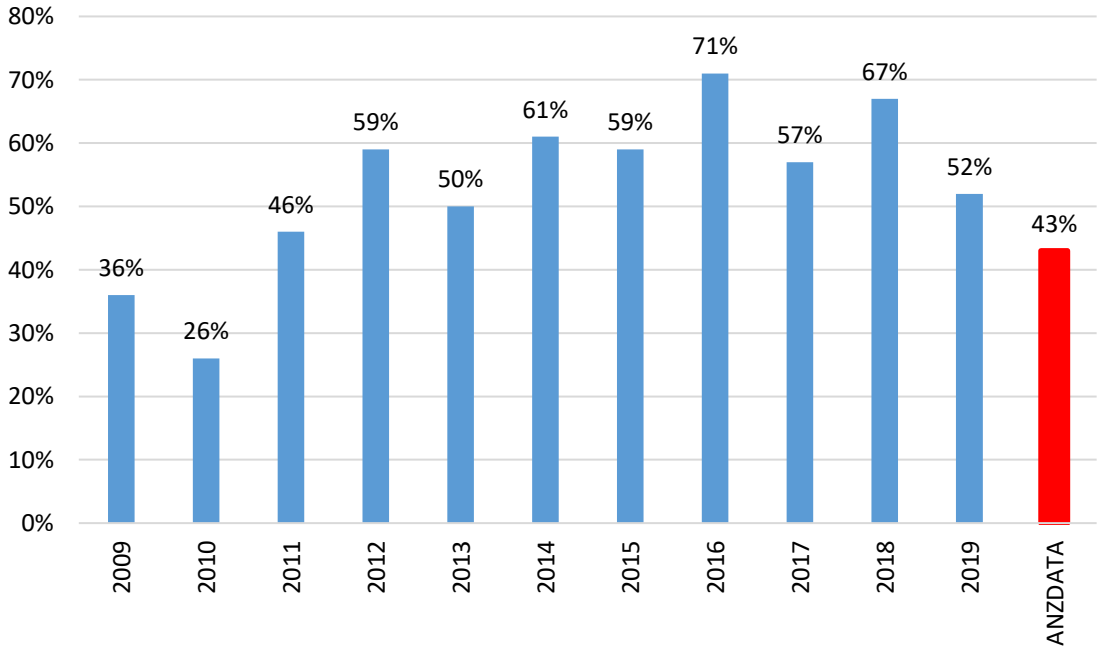
DATA BENCHMARK

- Data is benchmarked against ANZDATA Annual Report 2018, KDOQI 2019 and KHA-CARI 2013 guidelines.
- The key performance measures for vascular access are:
    1. > 43% patients commencing haemodialysis with a functioning access (ANZDATA Registry 2018).
    2. > 85% of prevalent patients dialysing through a native fistula (ANZDATA Registry 2018)
    3. <1.5 episodes/1000 catheter days of tunnelled or non-tunnelled catheter infection rate (KDOQI 2018)

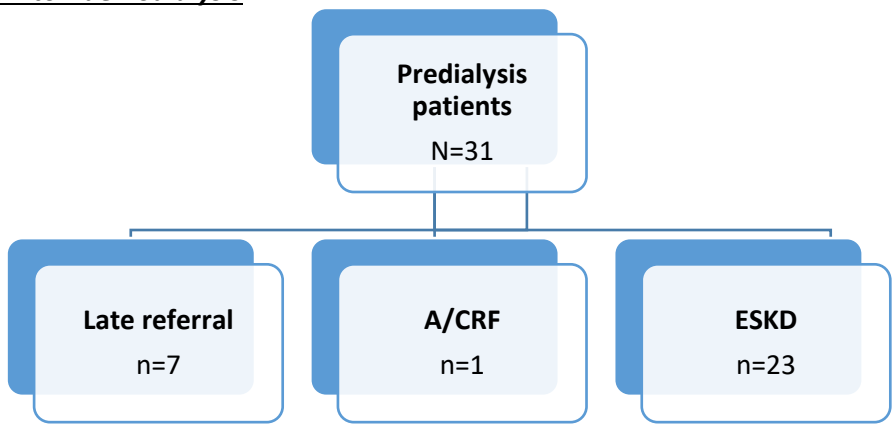
INCIDENT HAEMODIALYSIS PATIENTS

Functioning Access at Entry

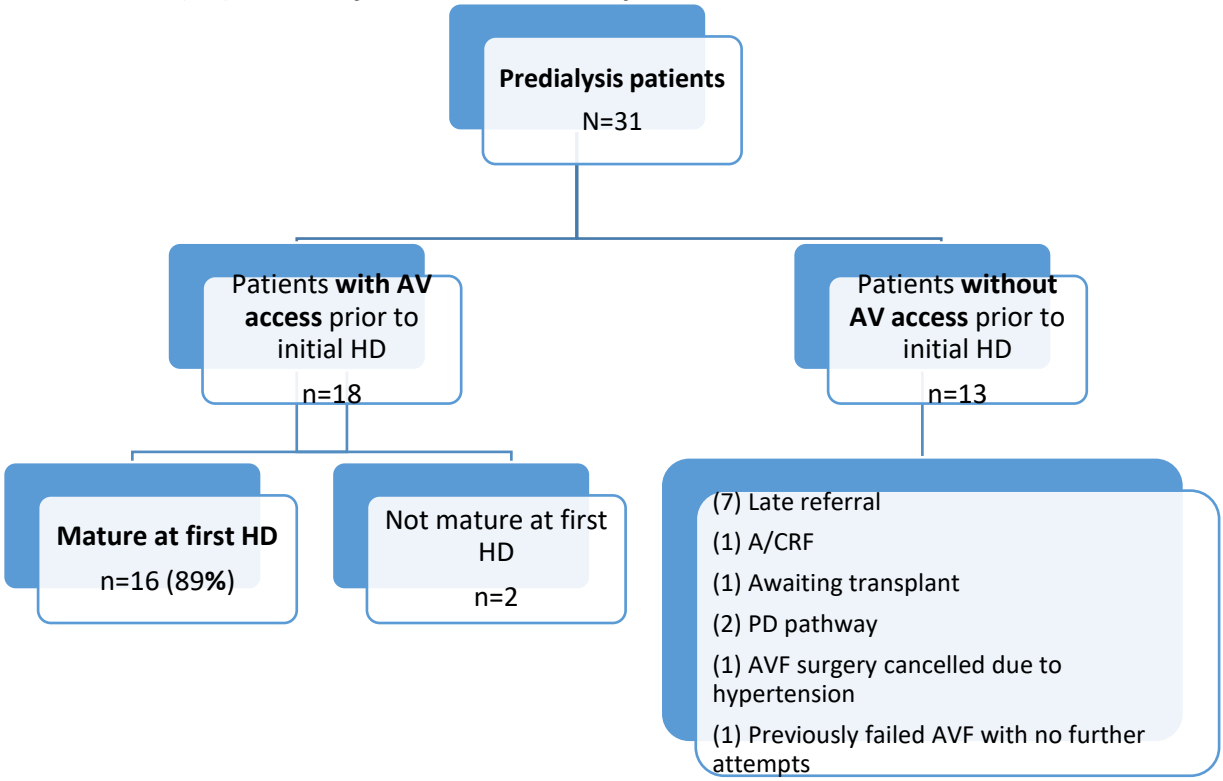
- The national average for patients having a functioning arteriovenous access at first dialysis was 43% according to the 2018 ANZDATA Report.
- In comparison, 52% of all new haemodialysis patients at St George Hospital Renal Department had a functioning access at first haemodialysis (see below).



Patients New to Haemodialysis



Arteriovenous (AV) Access Before Initial Haemodialysis

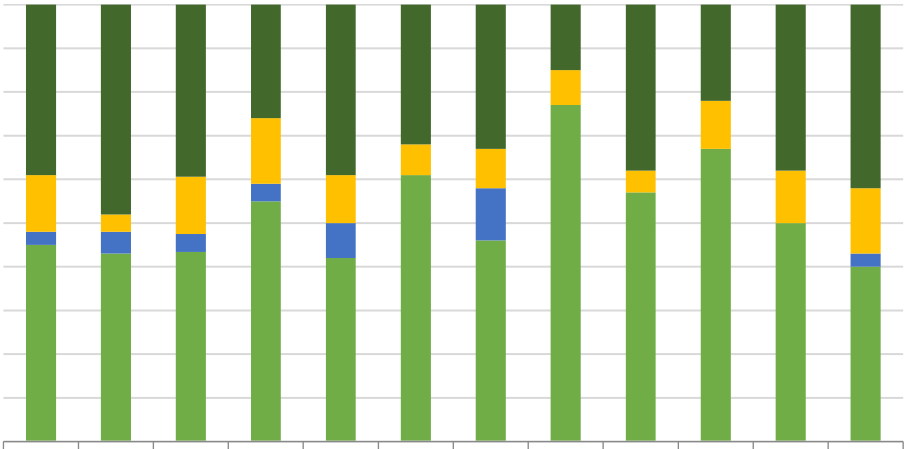


Comments

- 89% of incident patients (n=16) at St George Hospital Renal Department had a mature arteriovenous access at their first haemodialysis.
- Late referrals at St George Hospital Renal Department were at 23% compared to 18% reported in 2018 ANZDATA Registry.
- The aim is to have AV access created within 30 days from initial referral to the vascular surgeon.
- At St George Renal Department, the average time from initial referral to vascular access creation was 48 days in 2019 compared to 36 days in 2018.
- The average time from AV access creation to first cannulation in 2019 was 5.5 months compared to 6 months in 2018.

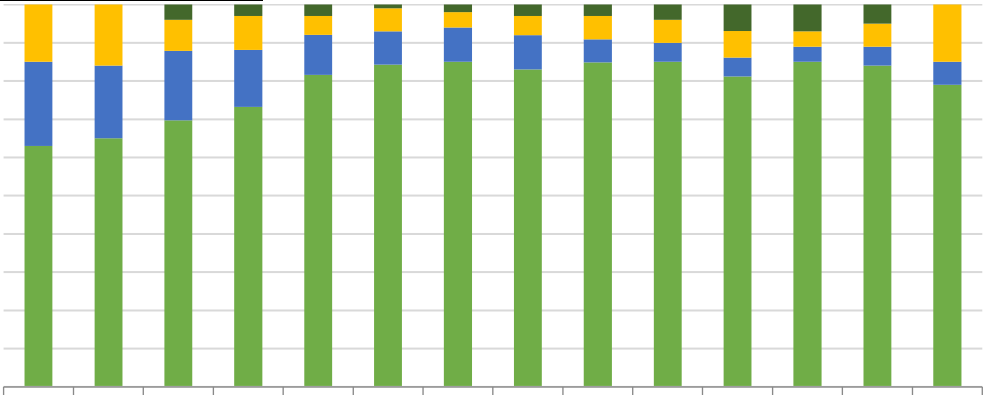
Vascular Access at First Haemodialysis

- In the 2018 ANZDATA Report, 40% of patients commenced with a native arteriovenous fistula (AVF) and 3% with an arteriovenous graft (AVG) equating to 43%. In contrast, majority of incident patients (42%) start haemodialysis treatment with tunnelled central venous catheters (CVC) while 15% with non-tunnelled catheter (Figure 2)
- In comparison, 50% of new patients commencing haemodialysis at St George Hospital Renal Department were utilising native AVF, which exceeds the 2018 ANZDATA benchmark (40%).
- 38% of the incident patients at St George Renal Department commenced initial haemodialysis via tunnelled CVC, mainly due to late referrals and transition from peritoneal dialysis without backup AV access. The numbers remains below the benchmark of 42% (ANZDATA Report 2018).



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	ANZDATA
Tunnelled CVC	39%	48%	39%	26%	39%	32%	33%	15%	38%	22%	38%	42%
Non tunnelled CVC	13%	4%	13%	15%	11%	7%	9%	8%	5%	11%	12%	15%
AVG	3%	5%	4%	4%	8%	0%	12%	0%	0%	0%	0%	3%
AVF	45%	43%	43%	55%	42%	61%	46%	77%	57%	67%	50%	40%

PREVALENT HAEMODIALYSIS PATIENTS



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	ANZDATA
Permanent TCC			4%	3%	3%	1%	2%	3%	3%	4%	7%	7%	5%	
TCC	15%	16%	8%	9%	5%	6%	4%	5%	6%	6%	7%	4%	6%	15%
Synthetic	22%	19%	18%	15%	11%	9%	9%	9%	6%	5%	5%	4%	5%	6%
Native	63%	65%	69%	74%	82%	84%	85%	83%	84%	85%	82%	85%	84%	79%

Comments

- There were 213 prevalent patients on haemodialysis at St George Renal Department on 31st Dec 2019.
- 89% of St George Hospital Renal Department patients were using AVF/AVG for haemodialysis, which exceeds both the 2019 ANZDATA benchmark of 85% and the 2006 KDOQI benchmark of 40% (Figure 3).
- 5% of patients at St George Hospital Renal Department were using a permanent catheter which met the 2006 KDOQI benchmark of <10%.

AV Access Infection Rates

- St George Hospital Renal Department patients' blood stream infection (BSI) rates were nil for synthetic and 2 BSI for the native arteriovenous access, respectively (Table 1). This data does not include home haemodialysis patients.

	Blood stream infection (BSI) range for AVF	Blood stream infection (BSI) range For AVG/SVG
2019	**2 BSI (0-0.69 BSI/100 pt months)**	**0 BSI (0 BSI/100 pt months)**
2018	0 BSI (0 BSI/100 pt months)	0 BSI (0 BSI/100 pt months)
2017	3 BSI (0-0.27 BSI/100 pt months)	0 BSI (0 BSI/100 pt months)
2016	1 BSI (0-0.08 BSI/100 pt months)	0 BSI (0 BSI/100 pt months)
2015	2 BSI (0-0.15 BSI/100 pt months)	0 BSI (0 BSI/100 pt months)
2014	0 BSI (0 BSI/100 pt months)	0 BSI (0 BSI/100 pt months)
2013	1 BSI (0-0.15 BSI/100 pt months)	2 BSI (0-2.3 BSI/100 pt months)
2012	1 BSI (0-0.07 BSI/100 pt months)	1 BSI (0-0.59/100 pt months)
2011	2 BSI (0-0.53 BSI/100 pt months)	4 BSI (0-4.5 BSI/100 pt months)
2010	2 BSI (0-1.16 BSI/100 pt months)	4 BSI (0-11.76 BSI/100 pt months)

AV Thrombosis Events

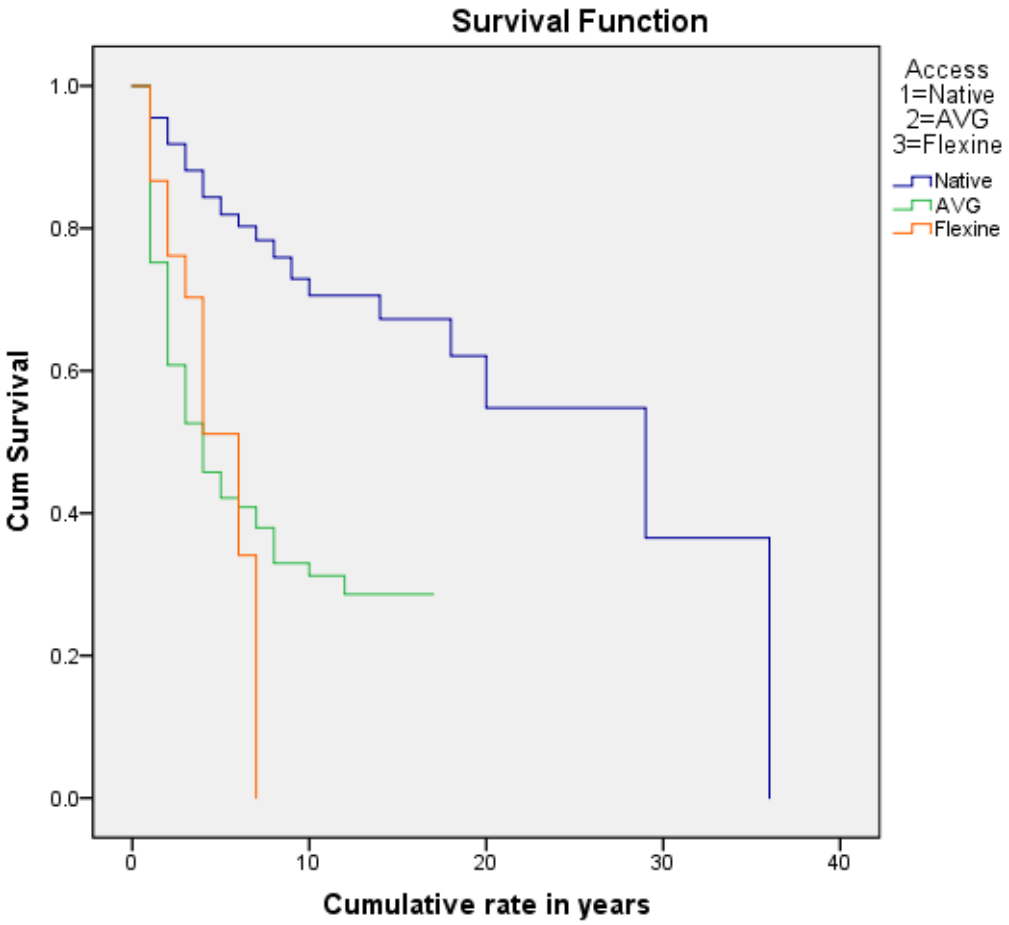
AV Thrombosis Events			
	AVF	**AVG/SVG**	**Average/month**
2019	**10 (10pt)**	**5 (3pt)**	**1.25**
2018	7 (7pt)	2 (1pt)	0.75
2017	9 (9pt)	6 (5pt)	1.25
2016	15 (14pt)	3 (3pt)	1.5
2015	20 (17pt)	16 (5pt)	2.5
2014	14 (13pt)	13 (8pt)	2.3
2013	8 (8pt)	12 (7pt)	1.7
2012	9 (9pt)	11 (9pt)	1.7
2011	6 (4pt)	16 (10pt)	1.8
2010	8	21	2.4

Comments

- The average thrombosis rate per month across arteriovenous access types is 1.25 episodes due to hypercoagulability of patients, haemodynamic instability and delayed intervention by vascular surgeons.
- Additional point-of-care surveillance through the Transonic machine for the detection of signs of failing vascular access has up to this date positively influenced St George Renal Department's monthly average thrombosis rate.

AV Access Survival

- KDOQI (2006) recommends AVF patency > 3.0 years and AVG patency > 2.0 years by life-table analysis



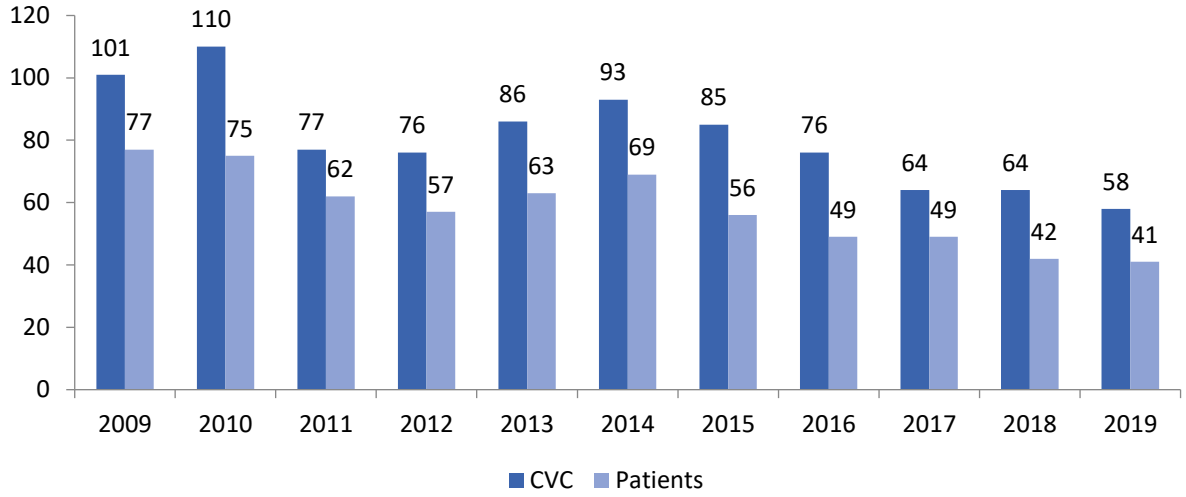
Comments

- Cumulative assisted patency is defined as the number of accesses which remain patent regardless of number of interventions during a time period.
- Data includes current and deceased patients since 2004 and excludes primary failure.
- Endpoint was access lost. Data was censored for deaths; a current functioning access; transplantation or transfer to another unit.
- Cumulative proportion surviving at end of the below intervals (Table 3)
- AVF at 5 years (80%), at 10 years (77%)
- AVG at 1 year (61%), 2 years (53%), 3 years (46%)
- Flexine grafts at 1 year (76%), 3 years (51%)
- Access survival continues to be similar to previous year's results

CENTRAL VENOUS CATHETERS (CVC)

CVC Activity Level

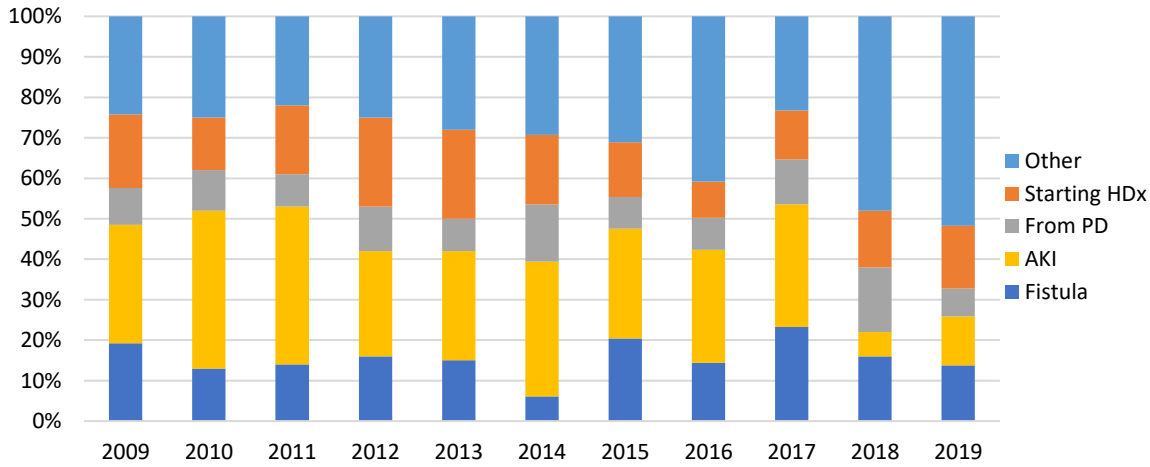
- Tunnelled cuffed catheters (CVC) are used to provide temporary access for both acute and chronic haemodialysis (HD) patients, including those with a primary AVF still to mature (KDOQI 2019). In addition, where creation of arteriovenous access is not feasible, HD can commence with the use of CVC (KHA-CARI Guideline 2013).



Comments

- The number of CVC inserted for AKI & CKD is lower than previous year (Figure 4).
- Total number of days all catheters are in-situ has decreased from 4700 catheter days in 2018 to 4243 catheter days in 2019.
- Average number of days all catheters are in-situ has remained the similar from 73 catheter days in 2018 to 73.5 catheter days in 2019.

Reason for Catheter Insertion



Comments

- Fistula group includes immature, revision or thrombosed access (Figure 5).
- The ICU department continues to manage more patients with AKI which has resulted in a reduced service by the renal department compared to previous years.
- Other includes replacing a non-tunnelled with a tunnelled catheter, incorrect placement, malfunction, thrombotic and infectious complications.

Catheter Infection Rates

- KDOQI 2019 recommends <1.5 episodes/1000 catheter days of tunnelled or non-tunnelled catheter infection rate.
- 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 (McCann & Moore 2010).

	Catheter related bacteraemia (CRB) rate	Exit site infections (ESI) rate
2019	**5% (0.71 episodes/1000 catheter days)**	**5% (0.71 episodes/1000 catheter days)**
2018	8% (1.06 episodes/1000 catheter days)	6% (0.85 episodes/1000 catheter days)
2017	7% (0.54 episodes/1000 catheter days)	6% (0.43 episodes/1000 catheter days)
2016	4% (0.30 episodes/1000 catheter days)	5% (0.41 episodes/1000 catheter days)
2015	1% (0.10 episodes/1000 catheter days)	5% (0.40 episodes/1000 catheter days)
2014	2% (0.23 episodes/1000 catheter days)	5% (0.59 episodes/1000 catheter days)
2013	1% (0.15 episodes/1000 catheter days)	2% (0.31 episodes/1000 catheter days)
2012	4% (0.62 episodes/1000 catheter days)	7% (1.03 episodes/1000 catheter days)
2011	1% (0.10 episodes/1000 catheter days)	6% (0.6 episodes/1000 catheter days)
2010	4% (0.69 episodes/1000 catheter days)	5% (0.82 episodes/1000 catheter days)

Comments

- For the 58 catheters inserted in 2019, 3 cases of catheter-related bacteraemia and 3 cases of exit-site infections have occurred, including 1 patient who developed both exit site infection and septicaemia.
- The gentamicin/heparin lock continued to be utilised in St George Renal Department as a recommended means to reduce CRB and exit site infection events. The KHA-CARI guideline further suggests that antibiotic locks be considered to salvage catheters (Chin 2012).
- Potential for emergence of antimicrobial resistance remains to be a major concern (Chin 2012); however random gentamicin levels of <0.5 mg/L indicates toxicity is unlikely. Bi-annual audits of the gentamicin level are being held in the department.

FUTURE PLANS

- Nurse-led vascular access clinic remains 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 the utilisation of 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 Transonic machine in the dialysis unit will continue for timely detection of the dysfunctional signs of the AV access.

SUMMARY

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

REFERENCES (see Appendix 2)

7. Haemodialysis

Evelyn Graf, Tracey Blow, Elizabeth Hogan, Louise Jordan, Brendan Smyth

Activity

St George Hospital operates a 19 chair haemodialysis service providing high level care haemodialysis and home haemodialysis training. On average in 2019, 85 patients were dialysed each month and a total of 9932 treatments were completed. In January 2019, the Fresenius Medical Care Dialysis Unit (FMC) opened in Kogarah, with 17 chairs. Capacity to expand this to 25 is available. On average in 2019, 80 patients were dialysed each month and a total of 10660 treatments were completed. Thus, between the two St George unit (incentre and satellite) there were 20,592 treatments completed (as compared to 20,180 treatments performed in 2018).

An additional 2 chairs in this unit are utilised for home dialysis training. In addition, 9 patients were transferred to home haemodialysis in 2019. Two patients transferred to the Medibank Private program and seven trained at the St George Satellite Clinic. One additional was unable to go home due to housing issues. Training times varied due to age and medical issues at the time from as little as 25 days to a maximum of 56 days. Respite dialysis increased towards the end of the year with regular sessions provided for 16 patients. Reasons for respite including, assisting with cannulation (4 patients), retraining (1 patient), following hospital admission (14 patients), partner/assistant away (2). Respite stays ranged from a few days up to two weeks.

The Sutherland Hospital operates twelve chairs for low care patients. In 2019, 6675 treatments were performed, 6% less than in 2018, and on average, 47 patients dialysed each month.

Activity for haemodialysis

The graph below shows growth patterns from 2012 with year on year change as a percentage. This includes haemodialysis for acute kidney injury and chronic kidney disease stage 5/end stage kidney disease (ESKD).

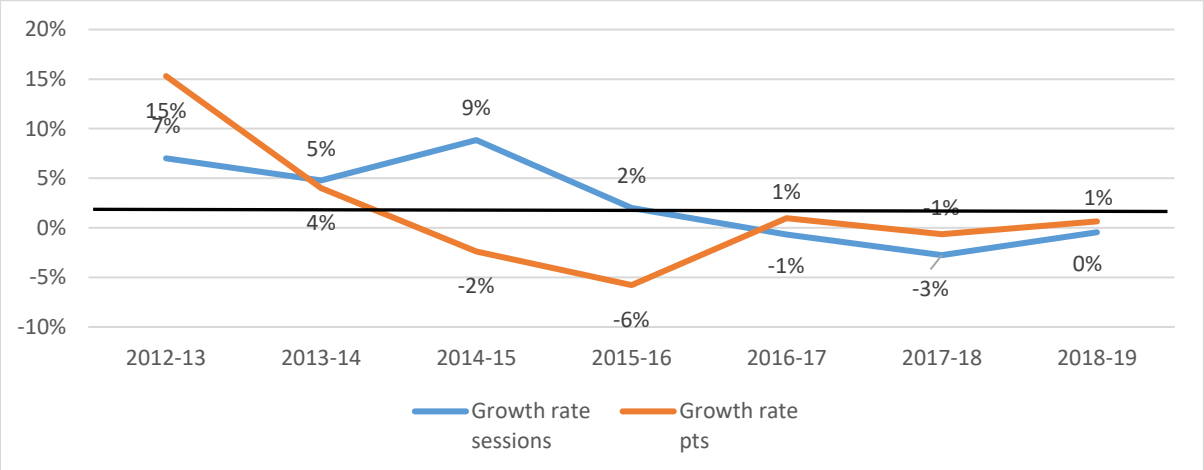


Figure 22. Growth Rates in Haemodialysis at St George (In-centre and Satellite) and Sutherland Dialysis Units

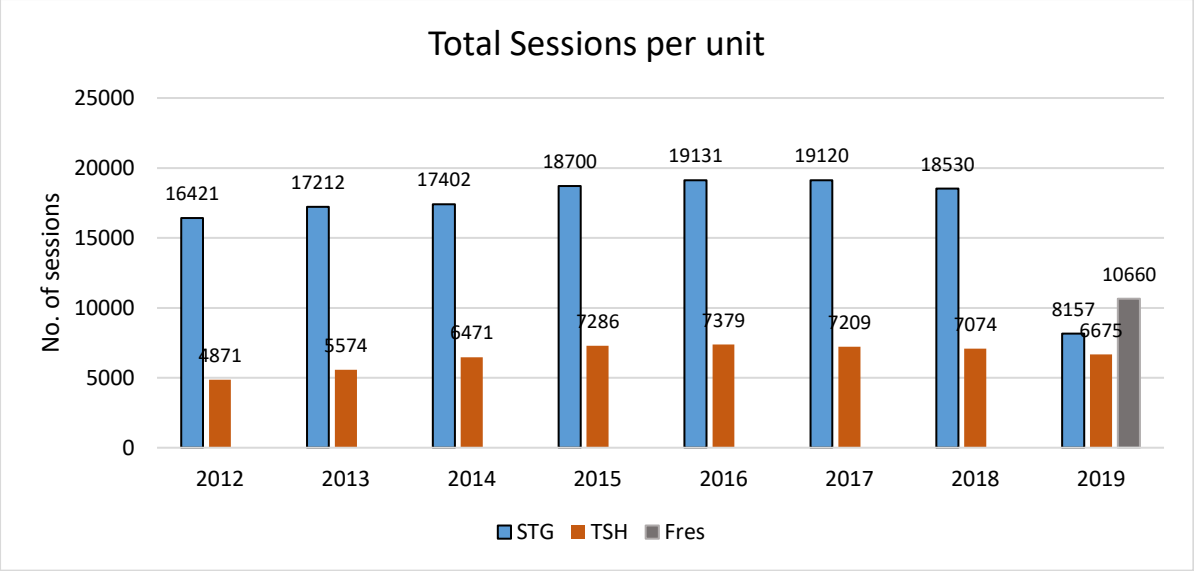


Figure 23. Sessions per unit

4W Incentre haemodialysis	**2015**	**2016**	**2017**	**2018**	**2019 4W**	**2019 FMC**
In-centre haemodialysis patients at beginning of year	126	123	135	133	130*	
Remained in 4W / Transferred to FMC (January 2019)					61	69
IN						
1. New Patients	27	29	24	20	19	7
2. Transfers from other units	11	2	11	18	8	5
3. Transfers from PD	7	10	13	6	7	4
4. Failed transplants	2	1	2	3	3	1
5. Transfers from Home Hdx/Satellite/incentre	4	5	8	4	5	14
6. Acute Kidney Injury*	27	24	22	11	2	1
7. Other	1	5		1	1	0
Subtotal	***79***	***76***	***80***	***63***	***45***	***28***
OUT						
7. Transplants	8	4	6	2	0	5
8. Transfers to other units/overseas	2	5	3	6	6	2
9. Transfers to Home Hdx	6	3	2		0	6
10. Transfers to PD	5	2	5	1	0	0
11. Transfers to Satellite/incentre	15	6	14	7	6	8
12. Regain Function	18	13	16	8	0	1
13. Deaths (medical)	12	11	21	17	14	1
14. Deaths (withdrawal)	16	20	15	15	7	1
Subtotal	***82***	***64***	***82***	***56***	***33***	***24***
NET GAIN/ LOSS	-3	12	-2	-14	+12	+4
In-centre haemodialysis patients at end of year					73	73
	123	135	133	119	146	

* The discrepancy in numbers between 2018 and 2019 is not explained. Despite extensive review of records, including extracts of dialysis admission data from hospital electronic medical record, it was not possible to determine where the deviation in counts originated between 2015 to 2018. The

decision was taken to leave the numbers from 2015 to 2018 untouched, with the numbers in 2019 having been verified.

Sutherland Dialysis unit	**2015**	**2016**	**2017**	**2018**	**2019**
Satellite haemodialysis patients at beginning of year	**47**	**48**	**48**	**48**	**48**
IN					
1. New Patients	2	0	0	0	0
2. Transfers from other units	1	1	0	2	2
3. Transfer from PD	0	0	1	4	1
4. Transfer from Incentre	12	7	14	11	11
5. Transfer from home/training				6	1
Subtotal	***15***	***8***	***15***	***23***	***15***
OUT					
5. Transplants	2	1	0	4	3
6. Transfers to Home Hdx	1	1	2	1	3
7. Transfers to PD	0	1	1	1	0
8. Transfers to Incentre	5	3	8	11	3
9. Transfer to other units	1	1	1	0	2
10. Deaths (medical)	5	1	3	5	2
11. Deaths (withdrawal)	0	0	0	1	3
12. Regain Function	0	0	0	0	2
Subtotal	***14***	***8***	***15***	***23***	***18***
NET GAIN/ LOSS	**1**	**0**	**0**	**0**	**-3**
Satellite haemodialysis patients at end of year	**48**	**48**	**48**	**48**	**45**

Home haemodialysis	**2015**	**2016**	**2017**	**2018**	**2019**
Home haemodialysis patients at beginning of year	**43**	**38**	**38**	**32**	**29**
IN					
1. New Patients	2	6	5		3
2. Transfer from PD	2	2	3	0	0
3. Transfers from other units	0	0	0	0	0
4. Transfer from Satellite	1	0	2		6
5. Failed transplants	0	0	2		0
6. Transfer from Incentre Hdx	0	2	2	0	0
Subtotal	***5***	***10***	***14***		***9***
OUT					
Transplants	7	5	4		2
Transfers to other units	1	0	0	0	0
Transfers to Incentre Hdx	2	3	0	0	0
Transfers to Satellite	0	0	3		1
Deaths	0	2	2		2
Subtotal	*10*	*10*	*9*		*5*
NET GAIN/ LOSS	-5	0	-5	-3	5
Home haemodialysis patients at end of year	**38**	**38**	**33**	**29**	**34**

Patient survival

The following survival data derives from data provided by ANZDATA which includes all patients ever treated by a dialysis modality at St George or Sutherland. All patients commencing dialysis after 1 January 2000 are included. Survival time is censored at transplantation or recovery of renal function.

The median survival of 5.5 years (95% CI, 5.1 to 5.9; n=1054) and mortality rate of 13.1 per 100 patient-years (95% CI, 12.0 to 14.3; n=4085.6 person-years) compares well to the national data (13.7 per 100-patient years). Similar to national data, there has been no change in dialysis survival for the past 15 years and patients receiving home haemodialysis consistently survive longer.

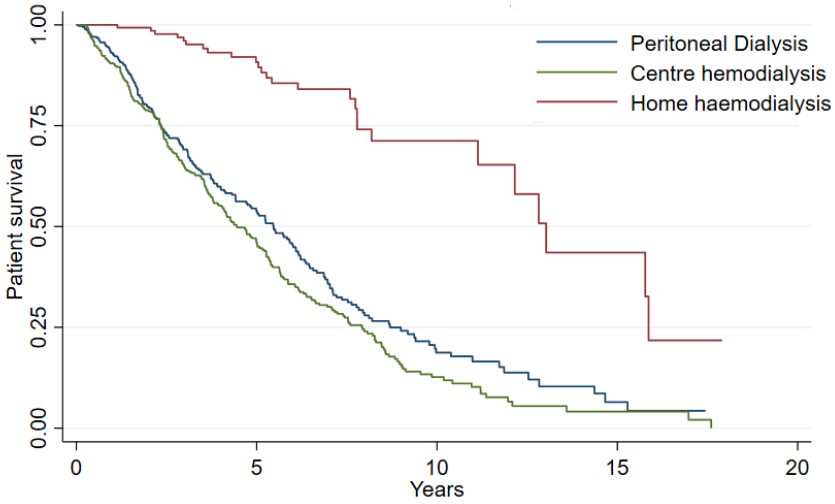


Figure 24. Survival curves by dialysis modality at 90-days

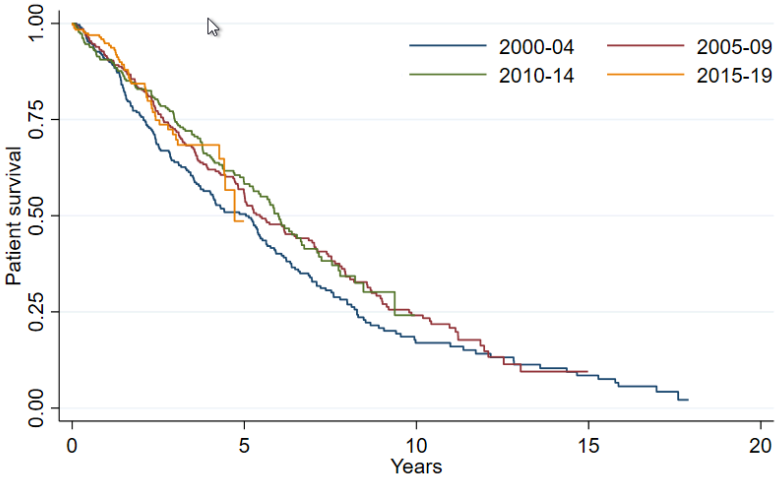


Figure 25. Survival curves (all dialysis patients) by 5-year interval.

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.

Anaemia management

The median haemoglobin was 112.5g/L (IQI 102 to 122) and the proportion of patients with haemoglobin between 110 and 129 was 48.7% (95% CI, 42.8 to 54.7). At the time of data collection, 70.1% of patients were on erythropoietin stimulating agents (ESA), 7.3% currently had ESA withheld and 22.6% were not on ESA.

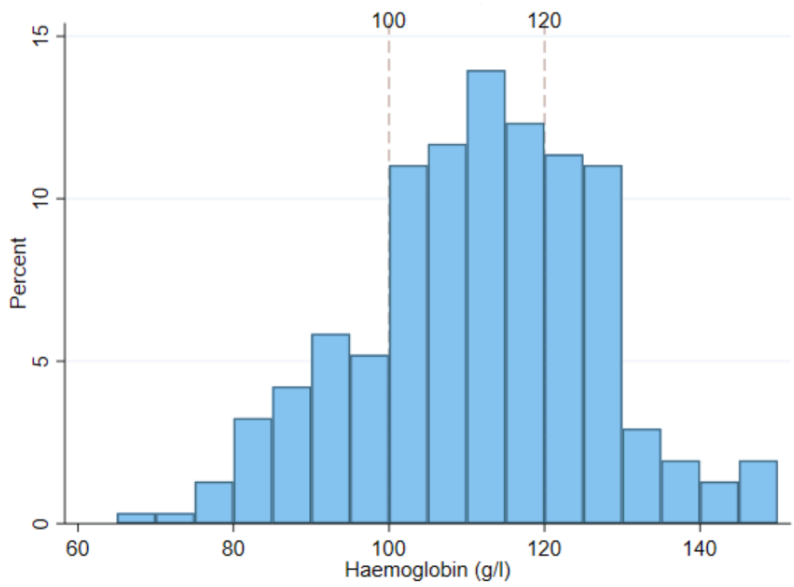


Figure 26. Haemoglobin values

Figure 4.19.1 - % Haemodialysis Patients with Hb 110-129 g/L - Australia 31 December 2018

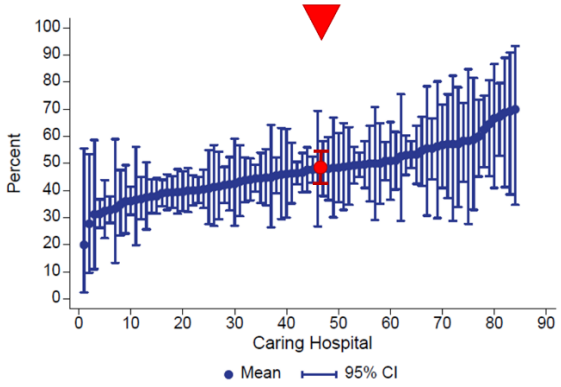


Figure 4.18.1 - Haemoglobin in Haemodialysis Patients - Australia 31 December 2018

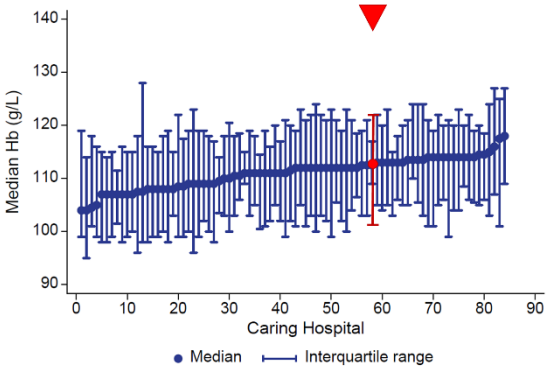


Figure 27. St George/Sutherland (red) and National Anaemia parameters (ANZDATA, 2018 Report)

The mean ferritin value was 508ng/L (95% CI, 462 to 554) and median value was 430ng/L (IQI, 261 to 696). 42.5% (95% CI, 36.5 to 48.7) of patients had a ferritin between 200 and 500ng/L. Mean transferrin saturation was 26.2% (95% CI, 24.8 to 27.5) and 67.0% (95% CI, 60.8 to 72.7) had a transferrin saturation between 20 and 50%. 41.7% of tests revealed ferritin between 200 and 800, and transferrin saturation between 20 and 50%. 34.5% of tests revealed both ferritin and transferrin saturation below target (<200 and <20%, respectively).

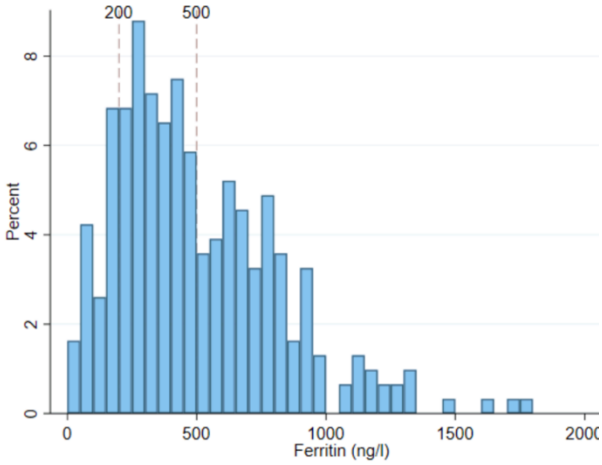


Figure 28. Ferritin values

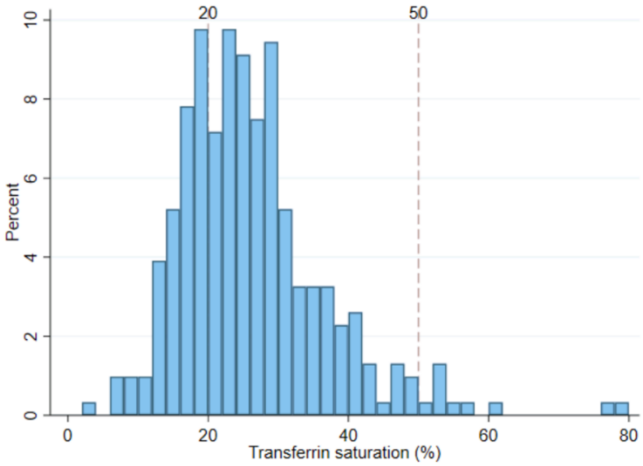


Figure 29. Transferrin saturation

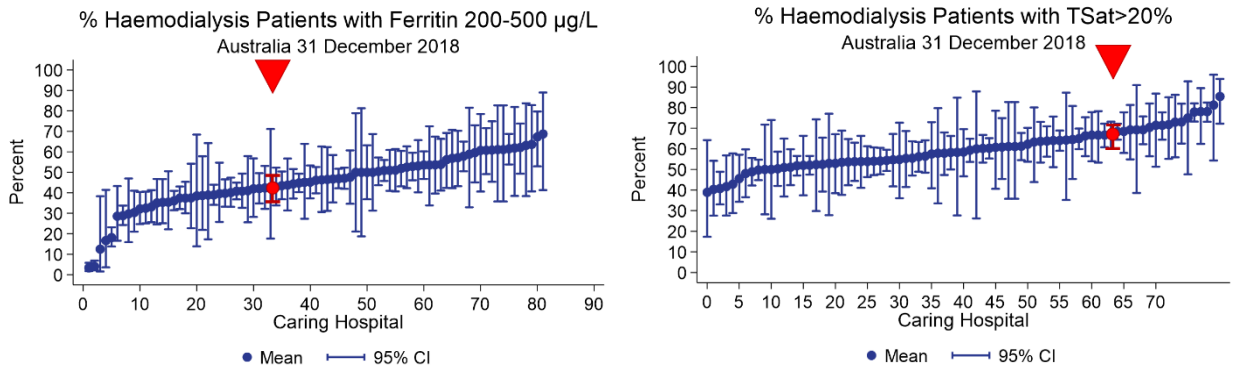


Figure 30. St George/Sutherland (red) and National iron parameters (ANZDATA, 2018 Report)

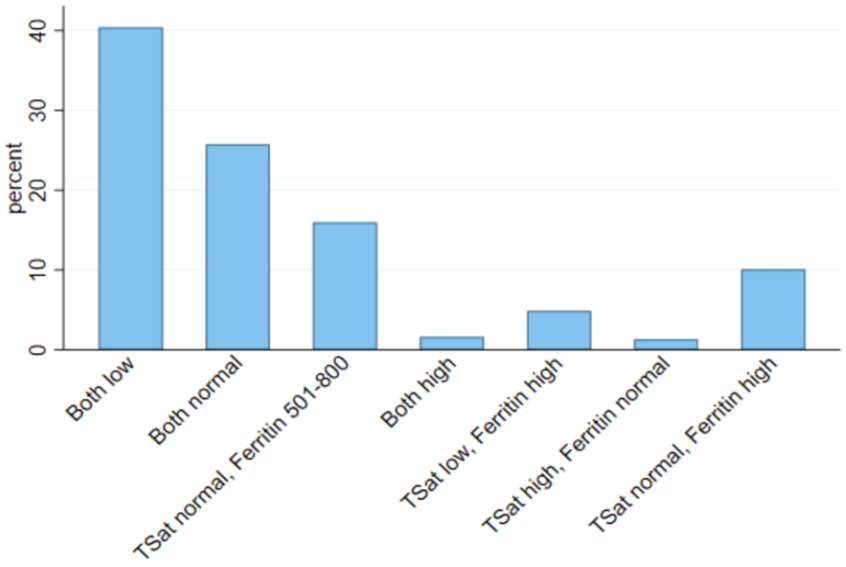


Figure 31. Ferritin and Transferrin saturation patterns.

Calcium, Phosphate and PTH

The mean calcium was 2.30mmol/L (95% CI 2.27 to 2.32), with 67.2% (95% CI 60.7 to 73.1) of tests in the target range of 2.1 to 2.4mmol/L. The mean phosphate was 1.55mmol/L (95% CI 1.49 to 1.62) and 56.0% (95% CI 49.8 to 62.0) had phosphate in the range of 0.8 to 1.60mmol/L. The median PTH was 21.8pmol/L (IQI 10.9 to 49.2) and 48.4% (95% CI 41.6 to 55.5) of test were in the range of 2 to 9 times the upper limit of normal (13.8 to 62.1).

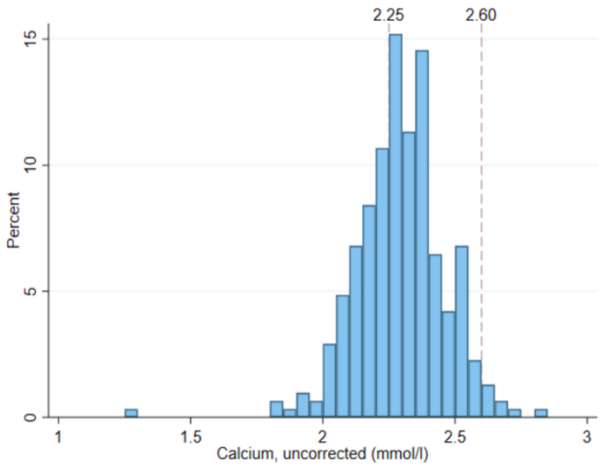


Figure 32. Calcium values.

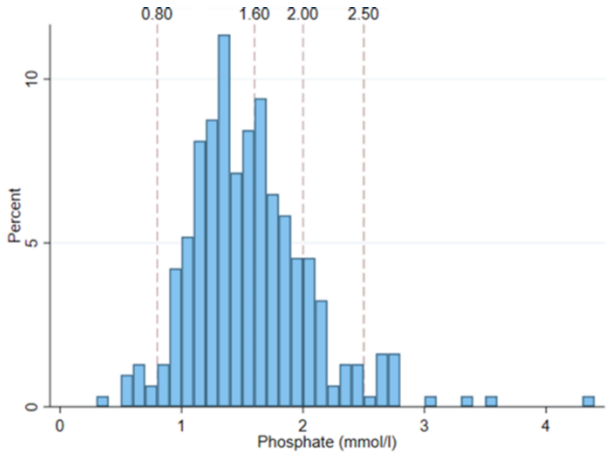


Figure 33. Phosphate values

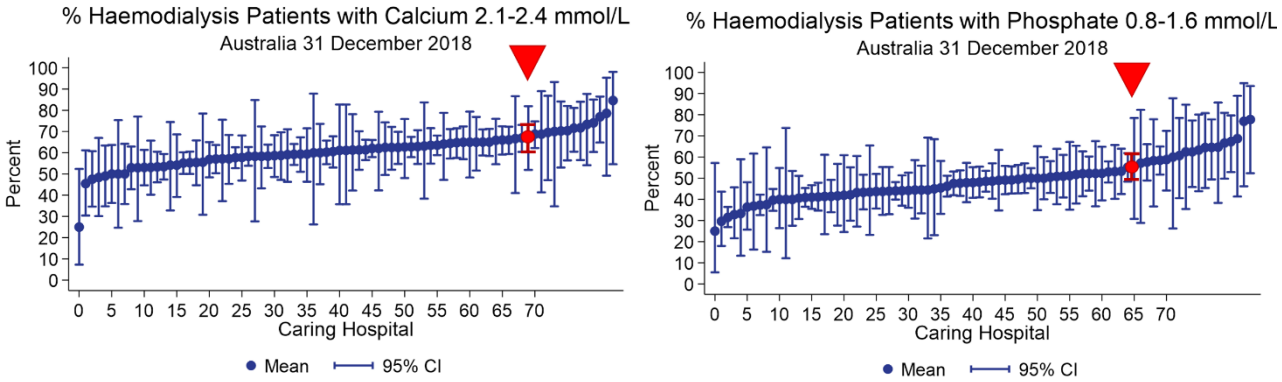


Figure 34. St George/Sutherland (red) and National calcium and phosphate parameters (ANZDATA, 2018 Report)

Dialysis adequacy

The mean urea reduction ratio was 76.9% (95% CI 75.9 to 77.8) and 85.9% (95% CI 80.2 to 90.2) of tests were 70 or greater. Mean Kt/V was 1.73 (95% CI 1.68 to 1.79).

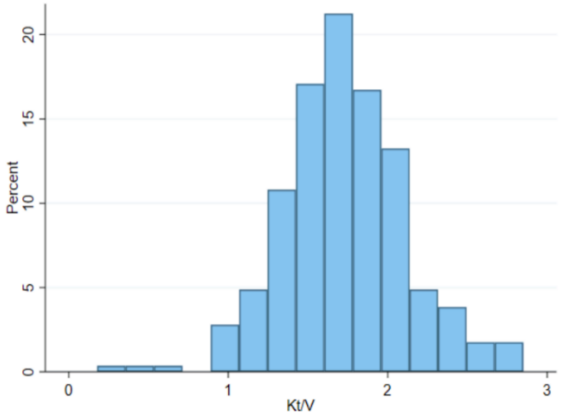


Figure 35. Kt/V

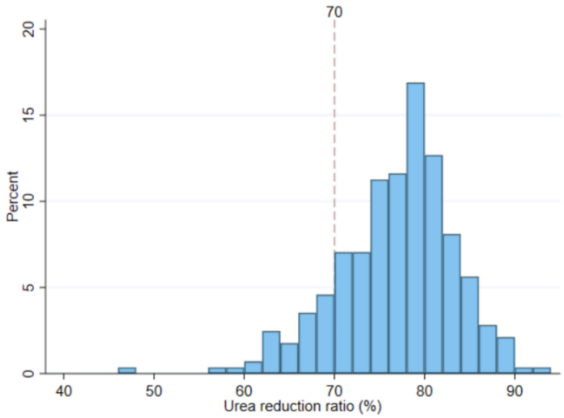


Figure 36. Urea reduction ratio

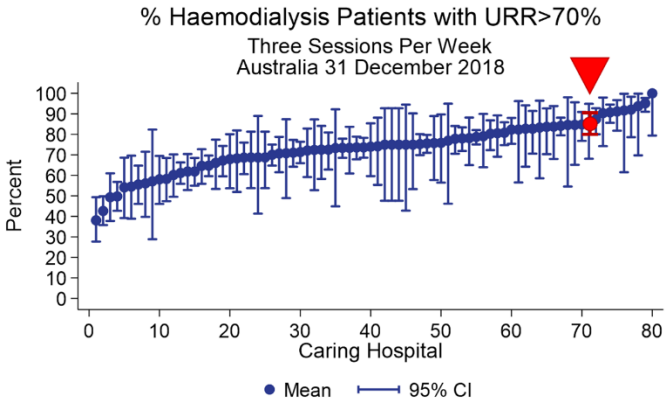


Figure 37. St George/Sutherland (red) and National URR (ANZDATA, 2018 Report)

Dialysis Duration (Hours on dialysis)

Duration (hours)	St George Hospital (%)	Sutherland Hospital (%)
< 4	2	3
4	39	41
4 – 4.75	21	30
5-6	34	24
7-7.5	4	**0**
8	3	**2**

Table 3. Dialysis duration per individual dialysis session at St George and Sutherland Hospitals

- Thirty nine percent (39%) of in centre or satellite haemodialysis achieved the KPI of >15 hours on dialysis per week.

Home Haemodialysis

Duration (hours per week)	Home haemo (n)	Frequency of dialysis
12 -14 hrs	3	3 x week = 22
15-17 hrs	13	Alternate days = 9
17.5-20 hrs	13	4 x week = 3
21-22 hrs	1	34 patients
22.5-28 hrs	3	
30-33 hrs week	1	

Table 4. Home haemodialysis dose (hours on dialysis)

- Eighteen patients (53%) are dialysing >17.5 hours week
- Four patients (12%) are performing overnight dialysis
- Twelve patients (35%) are dialysing on alternate days or more
- Twenty five patients (74%) are using an ESA.

Summary:

- The successful opening of the Fresenius Medical Centre Dialysis Unit was a landmark in the history of renal care in this area of Sydney and provides patients with greater options for care in their area.
- The number of delivered treatments continues to increase, albeit at a slower rate than previously.
- Patient survival, biochemical and dialysis adequacy parameters were consistent with or above the national averages.

8. Peritoneal Dialysis

Claire Cuesta and Franziska Pettit

Activity

Peritoneal dialysis was used to treat 18.5% of all dialysis patients in St George compared to 18% reported in the 42ND Annual ANZDATA report (2019).

A total of 67 patients were on PD in 2019 compared to 63 in 2018. In December 2019, the proportion of patients receiving automated peritoneal dialysis (APD) was 80% and 20% for continuous ambulatory peritoneal dialysis (CAPD). Our APD population continues to be above the proportion reported by ANZDATA of 69%.

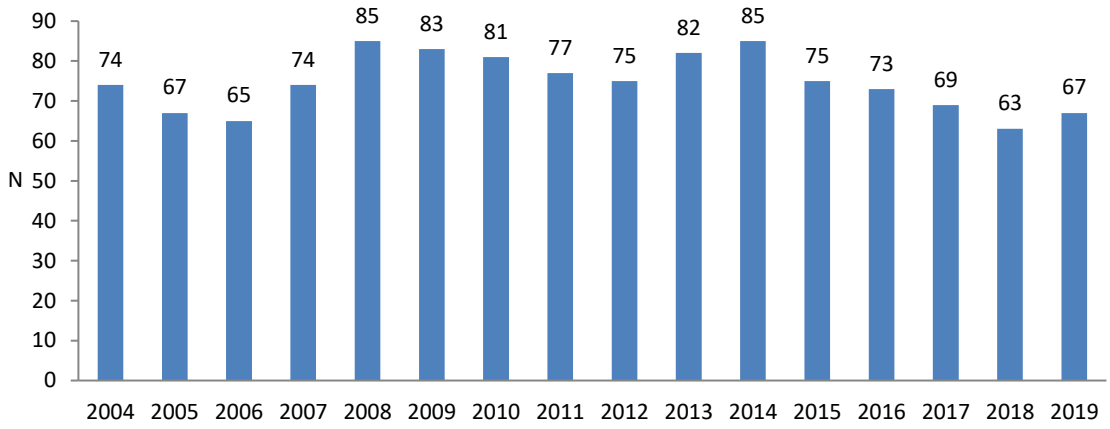


Figure 38. Total persons (prevalent and incident) on peritoneal dialysis

APD	*ANZDATA 69% (1661/2416)*	*St George 80% (36/45)*
CAPD	*ANZDATA 31% (755/2416)*	*St George 20% (9/45)*

PD patient flow

	PD patients December 31st 2018		**43**
In	New Patients	23	
	Transfer from another hospital	0	
	Transfer from HD	1	
	On hospital IPD	2	
	Returns from dialysis break	0	
	In Subtotal		**24**
Out	Transplants	2	
	Transfer to other units	2	
	Transfer to overseas	1	
	Transfer to Home Haemodialysis	0	
	Permanent Transfers to Haemodialysis	7	
	Return of renal function	1	
	Withdrawal from dialysis	3	
	Deaths on PD	9	
	Out Subtotal		**22**
	Net gain	**2**	
	PD patients December 31st 2019		**45**

Figure 39. PD Patient Flow

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

Parameter	Target	Apr 17	Oct 17	Apr 18	Oct 18	Apr 19	Oct 19	ANZDATA 19
Corr Ca	2.1-2.4 mmol/L	29%	42%	59%	57%	53%	67%	-
PO4	0.8-1.6 mmol/L	53%	46%	47%	48%	46%	36%	36%
CaPO4	<4.0 mmol/L	42%	44%	41%	44%	44%	40%	-
Uncorrected CaPO4	<4.0 mmol/L	60%	52%	55%	61%	55%	50%	54%
Albumin	33-48 g/L	31%	24%	34%	26%	28%	32%	-
PTH	7-45 mmol/L	63%	61%	59%	59%	54%	61%	-

Figure 40. Biochemical targets

- Serum Calcium
  - 67% of patients achieved the target for corrected calcium in October 2019, better than last year. The ANZDATA benchmark was for uncorrected calcium only.
  - 46% of patients have serum Ca level 2.2-2.4 in October 2019. The mean calcium result was 2.21 (SD 0.18).

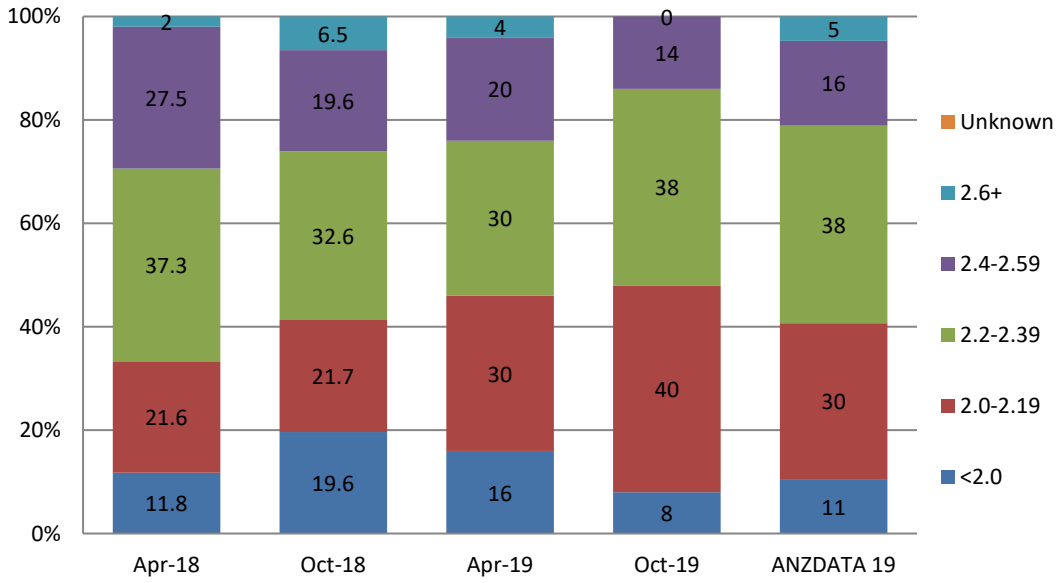


Figure 41. Uncorrected Serum Calcium (mmol/L)

- Phosphate
  - In October 2019, 44% of patients were within the target for serum phosphate of 0.8-1.6 mmol/L. The mean phosphate result was 1.84 mmol/L (SD 0.58).

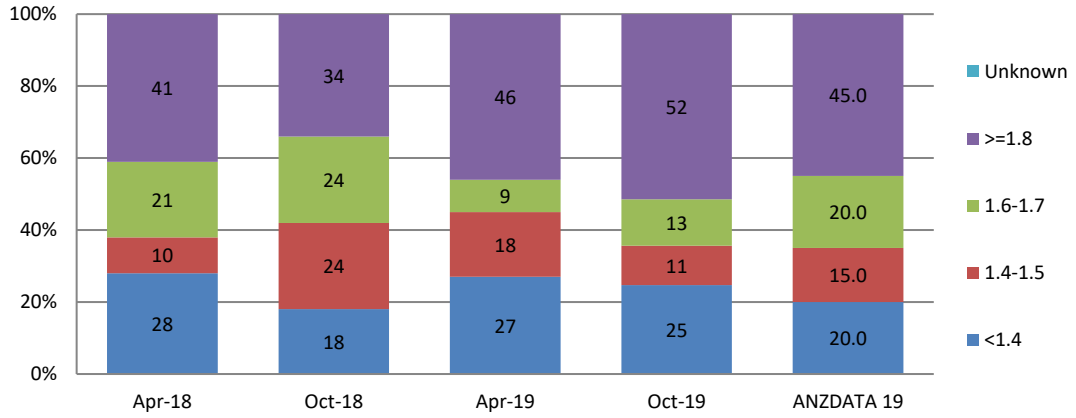


Figure 42. Serum Phosphate (mmol/L)

- Calcium Phosphate Product
  - ANZDATA calculated the calcium phosphate product with uncorrected calcium. There were fewer patients with high uncorrected calcium x phosphate (≥ 5) in 2019 compared to ANZDATA 2019, the median uncorrected calcium x phosphate product was 4 (CI 3.7, 4.5)
  - We also calculate Calcium phosphate product with corrected calcium, the median for our corrected Calcium phosphate product in 2019 was 4.29 (CI 4, 4.9)

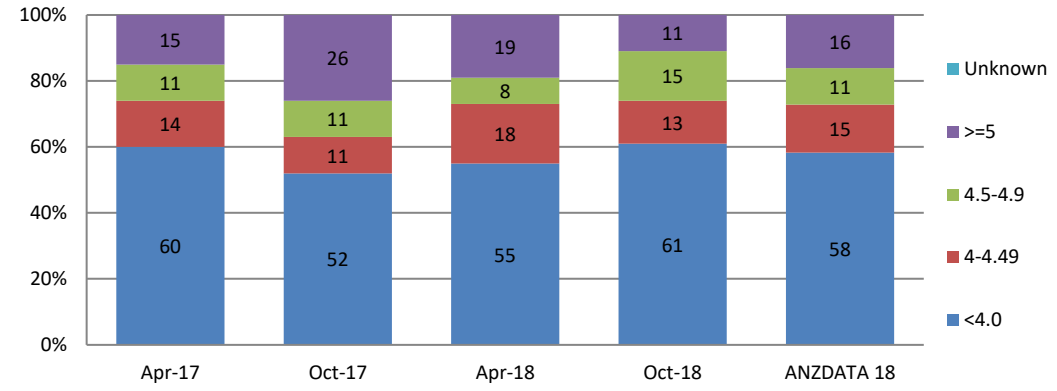


Figure 43. Uncorrected Calcium x Phosphate Product

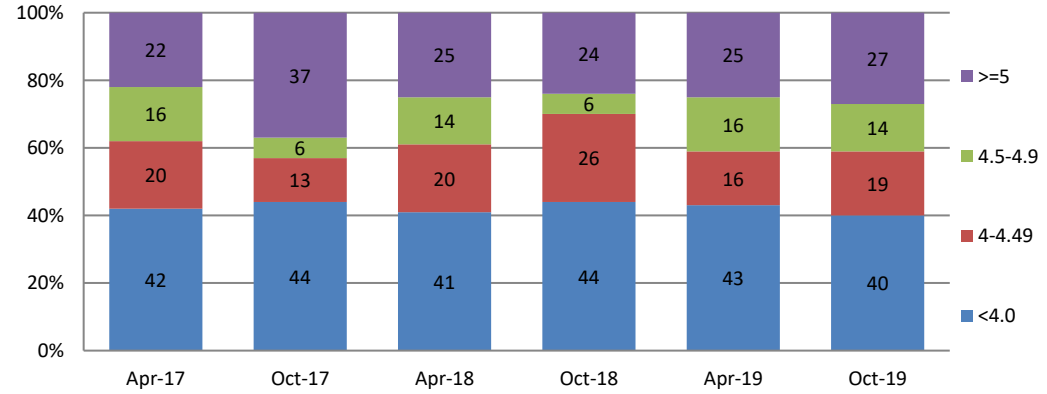


Figure 44. Corrected Calcium x Phosphate Product

- Albumin
  32% of PD patients had albumin level within 33-48 g/L in 2019, slightly better than last year at 26%. 29% of PD patients had albumin level 30-32 g/L and mean albumin level was 30g/L (SD 5.2).

- PTH
  In October 2019, 61% of PD patients had PTH 7-45 mmol/L. The median PTH result in 2019 was 35.5 mmol/L (CI 31, 56). More patients (29%) have higher PTH in 2019 compared to last year at 24%.

2. **Haematological targets**

- Haemoglobin
  - 54% achieved our target of 100-120 g/L in October 2019 similar to ANZDATA 2019, mean Hb was 106 g/L (SD 17, min 70, max 142).
  - In October 2019, 93% of PD patients with Hb <100 were receiving erythropoiesis stimulating agents (ESA). Half of the patients with high Hb (>120) were also receiving ESA. These patients had stopped or reduced ESA dose or frequency. 14% of patients who had Hb below 100 g/L had iron studies below the target range (ferritin 200-800 ug/L and transferrin 20-50%). These patients received iron infusion

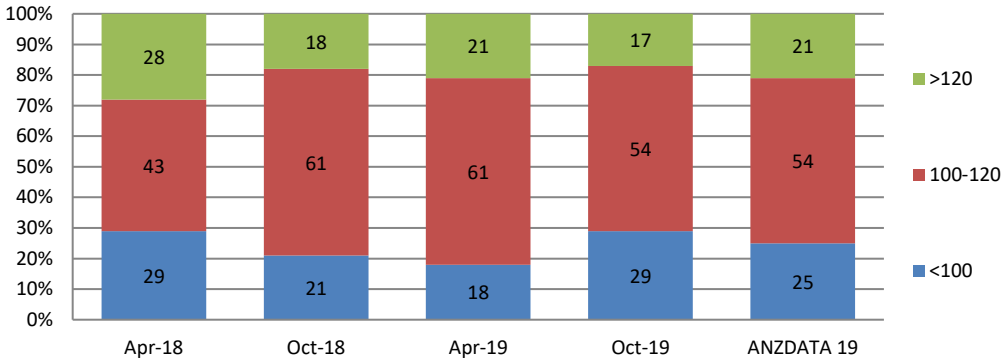


Figure 45. Haemoglobin in Peritoneal Dialysis patients

- HbA1c (Glycosylated Haemoglobin)
  - 59% of peritoneal dialysis patients in 2019 has diabetes.
  - 97% patient with diabetes were screened for HbA1C in October 2019. The mean HbA1C result was 6.7% (SD 1.2, min 4.4%, max 11.1%). 36% of screened diabetic patients had results below 7.
  - 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), 61% of screened diabetic patients were within ISPD target in 2019.

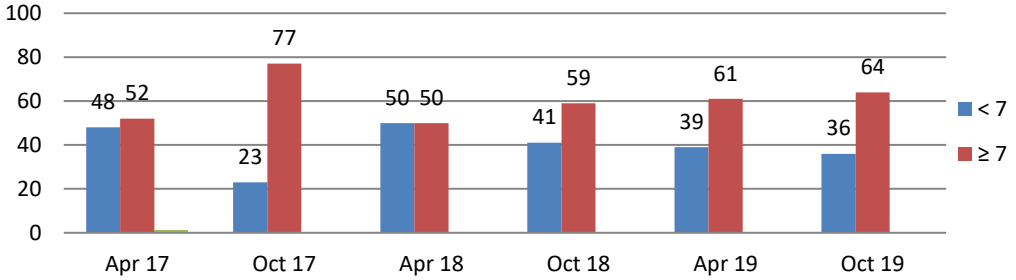


Figure 46. HbA1c results in PD patients

- Lipids

  76% of PD patients (N=37) in October 2019 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 87% of high-risk PD patients and 2019 Cholesterol and LDL results were better.

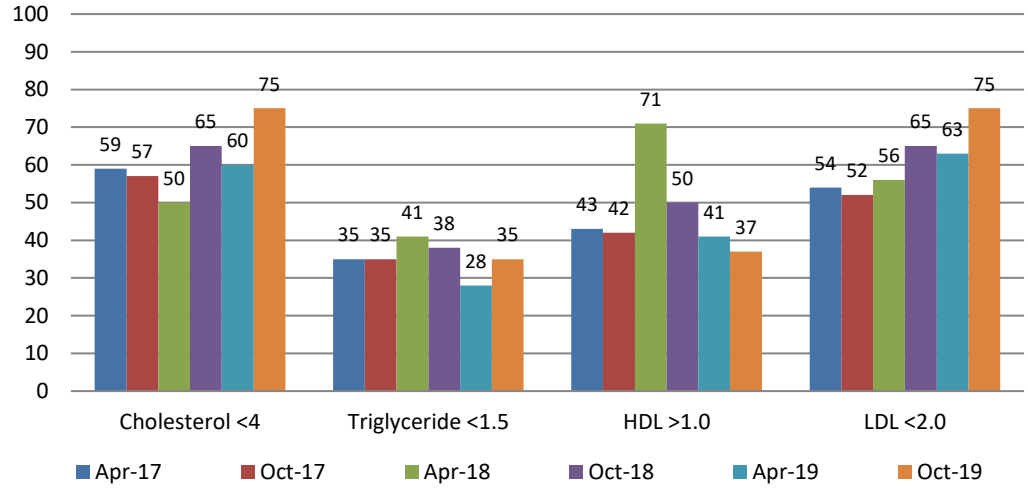


Figure 47. Lipids within normal limits in high risk patients only

- Iron

  Iron replete refers to ferritin levels between 200-800ng/mL as well as iron saturation between 20-50%. 47% of PD patients were iron replete in October 2019, slightly better than last year at 44%. Median ferritin was 337 ug/L (CI 271, 527), median transferrin was 22.10% (CI 22, 30). Our iron profile for October 2019 was similar to ANZDATA 2019.

Parameter	Target	Apr 17	Oct 17	Apr 18	Oct 18	Apr 19	Oct 19	ANZDATA 19
Ferritin	200-800 ug/L	61%	69%	53%	57%	68%	62%	49%
Transferrin	20-50%	67%	69%	47%	57%	68%	58%	62%

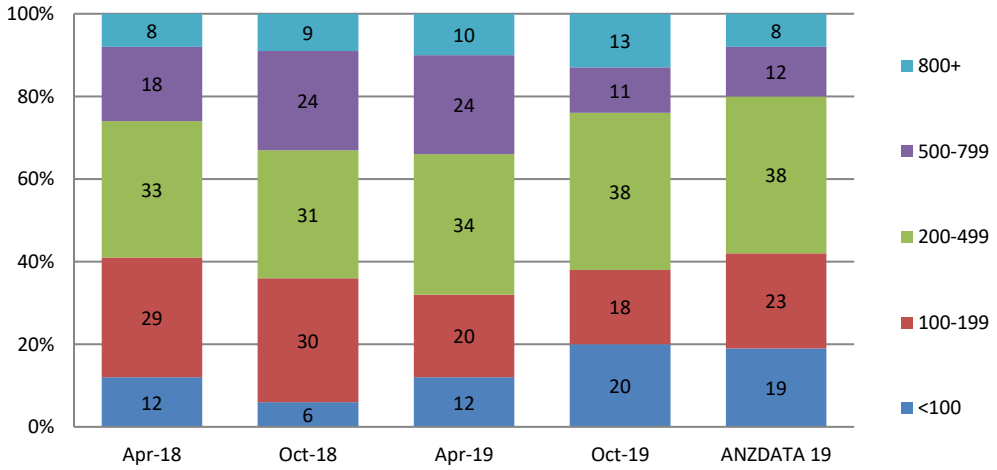


Figure 48. Ferritin

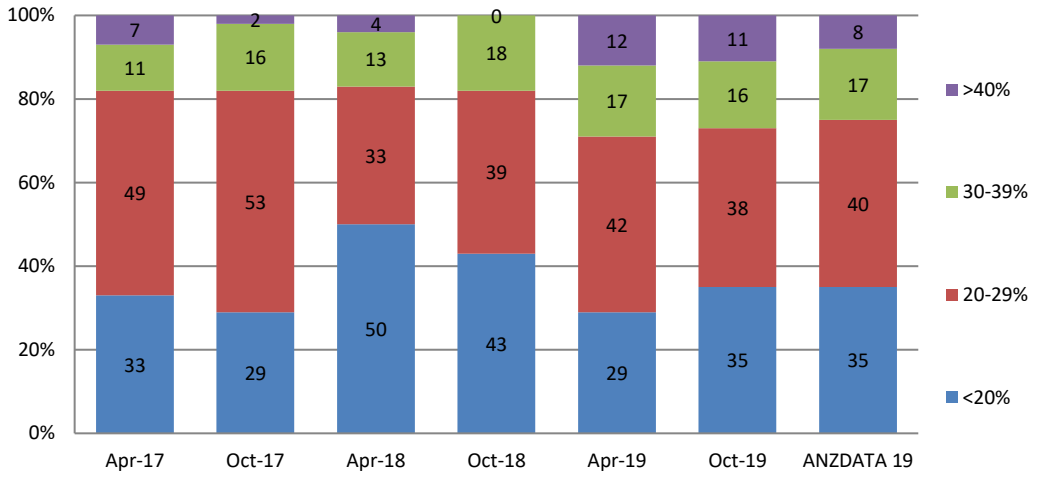


Figure 49. Iron Saturation (Transferrin)

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 2019, the mean Kt/V was 2.3 (SD 0.74, min 1.15, max 4.20)
  - 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 2019, median creatinine clearance was 84.3 L/week/1. 73 m2 (CI 73,94, min 32, max 185.31) and 89% of APD patients had creatinine clearance of >45 L/week/1.73m2 (ISPD target for patients on APD).

Parameter	Target	Apr 17	Oct 17	Apr 18	Oct 18	Apr 19	Oct 19
KT/V	≥ 1.7	77%	80%	72%	73%	67%	79%
CCL	>50L (L & LA) or >60L (H & HA)	72%	75%	69%	73%	67%	77%
CCL (ISPD)	>45L (for APD patients)	84%	84%	92%	95%	73%	89%

Figure 50. Dialysis adequacy

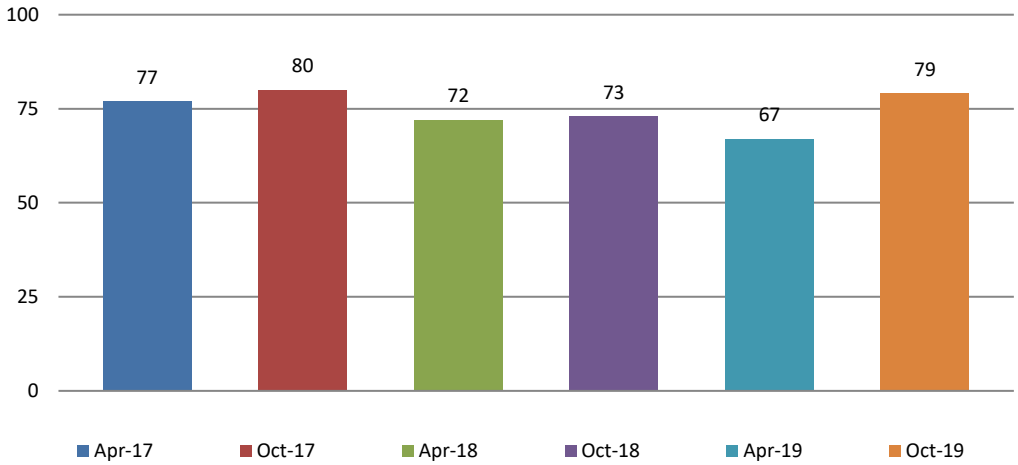


Figure 51. Kt/V ≥1.7

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 2013-2018. The 5-year patient survival rate for St George Hospital was better than the national rates of Australia and New Zealand. The 5 –year technique survival rate was better than the national rate of Australia.

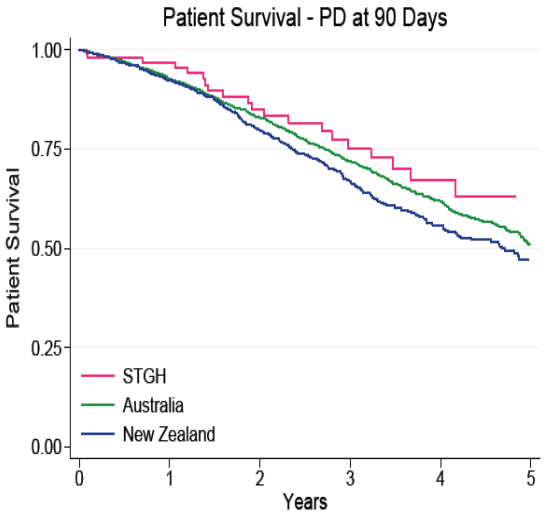


Table 23: PD patient survival

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	104	100.0	4597	100.0	1311	100.0
3 months	91	98.0 (92.2-99.5)	4203	98.6 (98.2-98.9)	1207	98.6 (97.8-99.1)
6 months	84	98.0 (92.2-99.5)	3797	97.1 (96.5-97.5)	1103	96.7 (95.6-97.6)
1 year	75	96.8 (90.3-99.0)	3072	92.7 (91.9-93.5)	933	92.4 (90.7-93.8)
2 years	52	85.1 (74.5-91.5)	1889	82.9 (81.5-84.2)	584	79.5 (76.7-82.0)
3 years	33	75.1 (61.9-84.2)	1010	72.0 (70.1-73.7)	329	66.8 (63.2-70.1)
4 years	20	67.3 (52.5-78.4)	494	61.8 (59.4-64.1)	167	55.8 (51.6-59.9)
5 years	8	63.1 (46.7-75.6)	153	51.0 (47.6-54.3)	56	47.3 (42.0-52.3)

Figure 52. PD Patient survival – PD at 90 days. ANZDATA individual hospital report 2013-2018

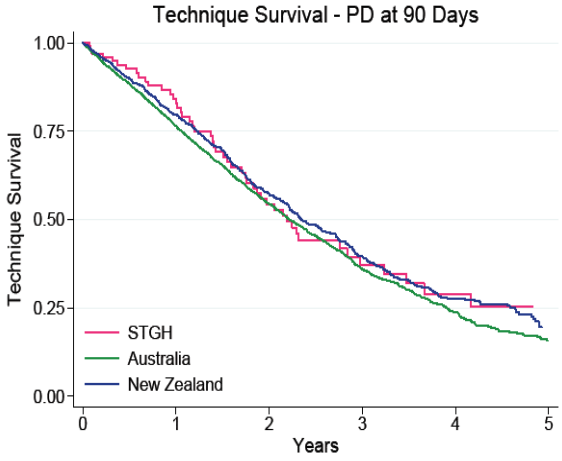


Table 19: PD technique survival

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	104	100.0	4597	100.0	1311	100.0
3 months	89	96.0 (89.6-98.5)	3994	93.6 (92.8-94.3)	1164	95.0 (93.7-96.1)
6 months	80	92.6 (85.1-96.4)	3462	88.4 (87.4-89.3)	1025	90.0 (88.1-91.5)
1 year	67	84.1 (74.6-90.3)	2526	76.4 (75.0-77.7)	800	79.7 (77.3-81.9)
2 years	34	54.3 (42.2-64.9)	1223	54.4 (52.6-56.2)	415	57.1 (53.8-60.2)
3 years	15	37.0 (24.9-49.2)	505	35.8 (33.8-37.9)	191	39.5 (35.9-43.1)
4 years	9	29.0 (17.2-41.9)	193	23.6 (21.4-25.8)	82	27.7 (23.9-31.6)
5 years	4	25.4 (13.7-38.8)	47	15.7 (13.3-18.3)	21	19.5 (15.0-24.3)

Figure 53. PD Technique Survival – PD at 90 days. ANZDATA individual hospital report 2013-2018)

5. **Technique Failure**

- ANZDATA 2019 reported the commonest primary cause of technique failure (ceasing peritoneal dialysis apart from deaths and transplant) was "total dialysis/technical failure" at 44%, followed by infection at 31%. At St George Hospital, the primary cause of technique failure in 2019 was similar to ANZDATA with "total dialysis/technical failure" being the main cause at 50%. These were due to pleuro-peritoneal leak and inadequate solute clearance due to peritoneal membrane failure.
- Seven patients were transferred to haemodialysis permanently in 2019. Mean age of patients at time of transfer to haemodialysis was 60 years (min 23, max 82) and mean time on PD at time of transfer to haemodialysis was 15.2 months (min 0.2, max 38.6).

Primary reason for technique failure	2012 n=9	2013 n=12	2014 n=17	2015 n=9	2016 n=14	2017 n=13	2018 n=11	2019 n=10
Infective	22%	30%	23%	0%	18%	21%	18%	10%
Total Dialysis/Technical Failure (inadequate dialysis, leaks)	78%	60%	60%	89%	64%	65%	64%	50%
Social (acopia)	0%	10%	17%	11%	18%	14%	9%	10%
Other causes (transfer to other unit or transfer outside of Australia)	0%	0%	0%	0%	0%	0%	9%	30%

Figure 54. Primary reason for technique failure

6. **PD-related Infection rates**

- Peritonitis episodes and rates
  - 2019 peritonitis rate results continue to surpass the national benchmark and was better than last year. The St George peritonitis rate over a 3 year period from 2017–2019 was 1/90.7 months.
  - 87% (39/45) of patients on peritoneal dialysis in 2019 were peritonitis-free.
  - The average time on dialysis for current patients who have had peritonitis was 46.6 months, and for those who are peritonitis free was 21 months. The average time on dialysis for all patients who have had peritonitis in 2019 was 41.2 months, and for those who were peritonitis free was 21.1 months. Both data suggests the longer patients stay on PD, the higher the risk of developing peritonitis
  - In 2019, 3% of our patients could expect peritonitis in any one year, in comparison to 46% 13 years ago
  - The number of episodes of peritonitis and the number of patients who had peritonitis in 2019 slightly increased from last year. The proportion of peritoneal dialysis patients who were 3 years peritonitis-free in 2019 was 74%, better than ANZDATA 2019 at 47%.

Table 20: Rates of peritonitis (per patient-year)

	STGH			Australia		
Year	Episodes	Years	Rate (95% CI)	Episodes	Years	Rate(95% CI)
2013	10	56.76	0.18 (0.08-0.32)	831	2179.07	0.38 (0.36-0.41)
2014	8	64.32	0.12 (0.05-0.25)	847	2296.38	0.37 (0.34-0.39)
2015	5	55.20	0.09 (0.03-0.21)	906	2408.88	0.38 (0.35-0.40)
2016	10	52.53	0.19 (0.09-0.35)	822	2403.54	0.34 (0.32-0.37)
2017	8	45.43	0.18 (0.08-0.35)	771	2353.09	0.33 (0.30-0.35)
2018	7	42.58	0.16 (0.07-0.34)	771	2349.11	0.33 (0.31-0.35)
Overall	48	316.81	0.15 (0.11-0.20)	4948	13990.06	0.35 (0.34-0.36)

Figure 55. Rates of peritonitis (per patient-year) ANZDATA Individual Hospital Report 2013-2018

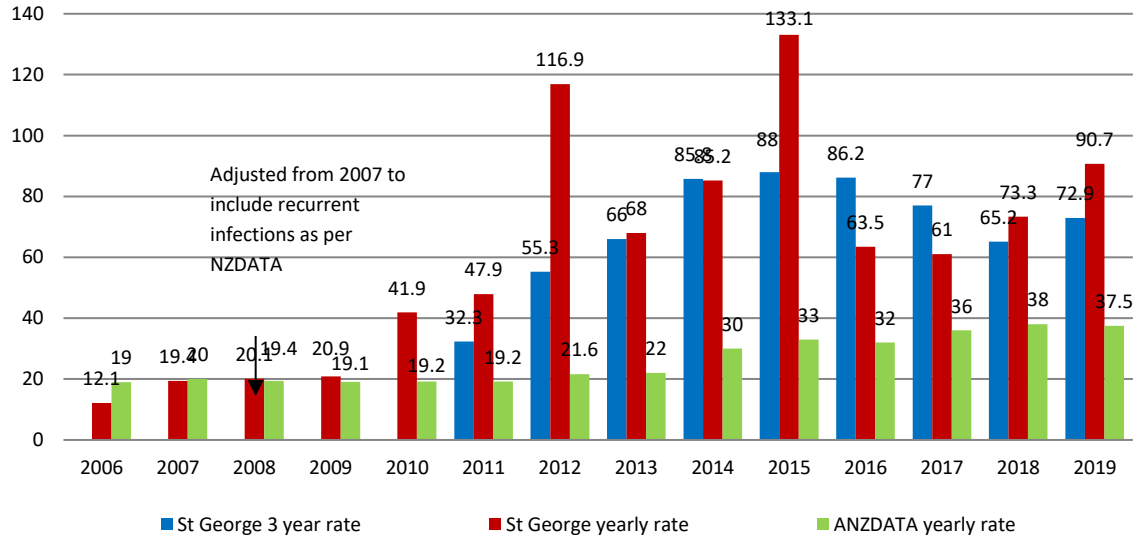


Figure 56. Patient months per episode of peritonitis

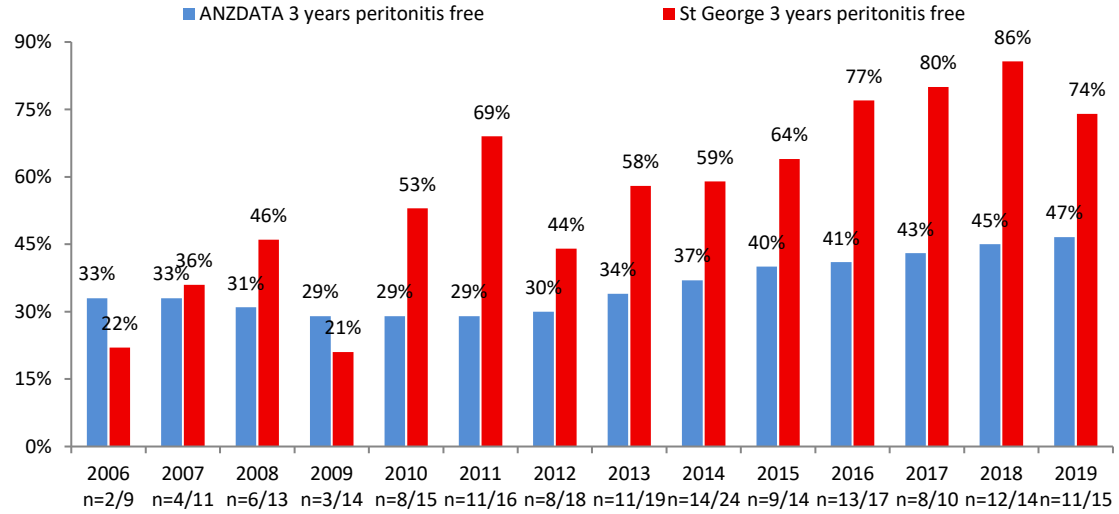


Figure 57. Proportion of patients 3 years peritonitis free

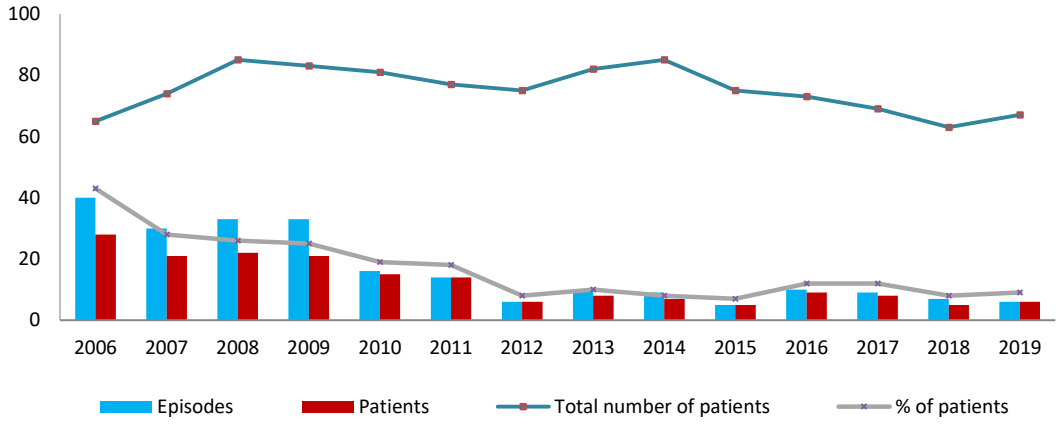


Figure 58. Peritonitis Episodes

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total patients	65	74	85	83	81	77	75	82	85	75	73	69	63	67
Peritonitis episodes	40	30	33	33	16	14	6	10	9	5	10	9	7	6
Patients with at least 1 episode of peritonitis	n=28 43%	n=21 28%	n=22 26%	n=21 25%	n=15 19%	n=14 18%	n=6 8%	n=8 10%	n=7 8%	n=5 7%	n=9 12%	n=8 12%	n=5 8%	n=6 9%
Patients with at least 1 episode of Exit site infection	n=14 22%	n=12 16%	n=12 14%	n=13 16%	n=16 20%	n=16 21%	n=11 15%	n=3 4%	n=8 9%	n=4 5%	n=4 5%	n=5 7%	n=4 6%	n=5 7%

Figure 59. Peritonitis episodes

- 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. 1 patient was transferred permanently to haemodialysis as a result of peritonitis in 2019.

Change in treatment as a direct result of peritonitis (%)	2009*	2010*	2011*	2012*	2013*	2014*	2015	2016	2017	2018	2019
Interim Haemodialysis	0	6	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 (3/9)	10 (1/10)	44 (4/9)	28 (2/7)	17 (1/6)
Catheter removed	15 (5/33)	41 (7/17)	14 (2/14)	16 (1/6)	30 (3/10)	33 (3/9)	0 (3/9)	10 (1/10)	44 (4/9)	28 (2/7)	17 (1/6)

Figure 60. Change of treatment as a result of peritonitis

- Half of the peritonitis episodes in 2019 were culture negative, followed by gram positive organisms.
- There were no MRSA peritonitis infections since 2011 and no fungal peritonitis since 2018.

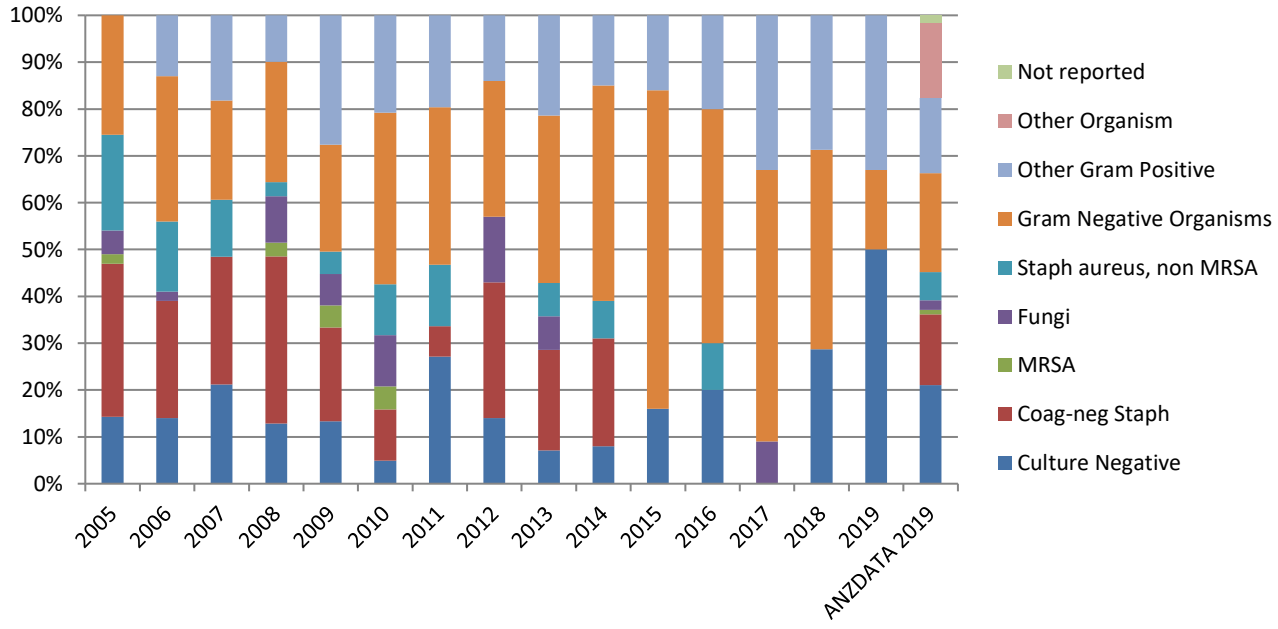


Figure 61. Peritonitis Causative Organism

- Exit Site Infections (ESI)
  - ANZDATA does not collect data on exit site infections, we can only compare to previous year's result.
  - 2019 exit site infection rate was 1/108.8 months. Exit site infection rate over a 3 year period from 2017–2019 was 1/89.1 months.
  - Gram negative organisms (Pseudomonas Aeruginosa) was the commonest organism of exit site infection in 2019.
  - 7% of PD patients had exit site infection in 2019.

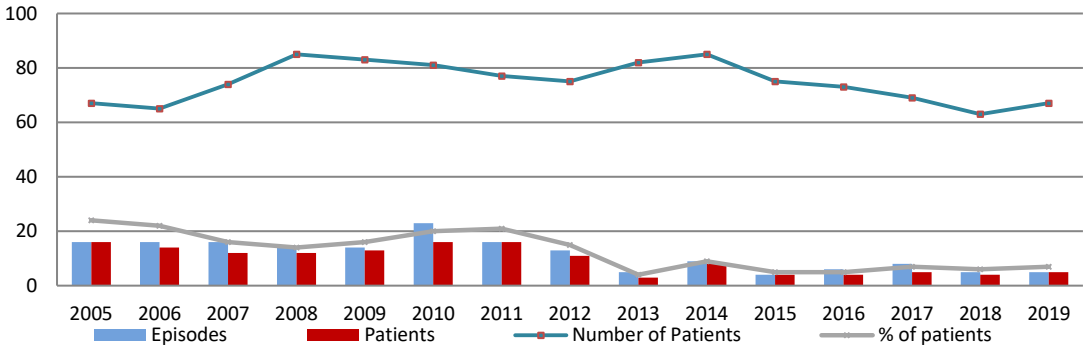


Figure 62. Exit Site Infection Episodes

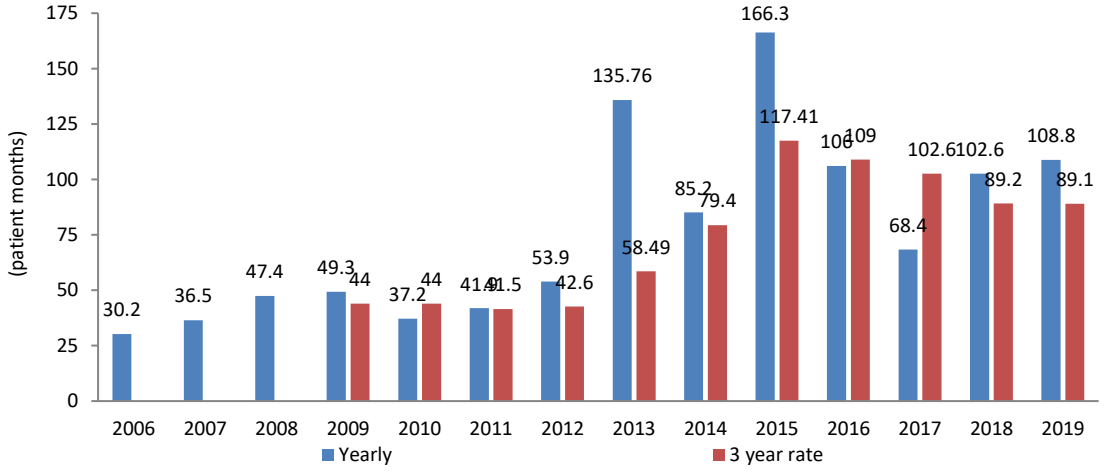


Figure 63. Exit site infection rate per patient months

Figure 64. Exit site infection causative organisms

7. **Change of Modality and Deaths**

We have fewer transfers to haemodialysis, fewer kidney transplants and more deaths than the national average. Average age of our patients at time of death was 75 years (min 68, max 87) and average time on PD at time of death was 32.7 months (min 0.7, max 75.1).

	SGH 2012 (%)	SGH 2013 (%)	SGH 2014 (%)	SGH 2015 (%)	SGH 2016 (%)	SGH 2017 (%)	SGH 2018 (%)	SGH 2019 (%)	ANZDATA 2019 (%)
Transplants	5	4	11	17	4	10	14	5	14
Changed to haemodialysis	16	15	26	17	19	40	23	16	22
Deaths	9	8	5	4	12	25	7	20	11

Figure 65. Change of Modality and deaths

Note: The rates were calculated using the total number of patients on peritoneal dialysis at 31.12.2019 (n=45), 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 was a slight increase in our total patient number in 2019.
4. Improvements with iron and lipids management in 2019.
5. More patients were iron replete and our Hb profile in 2019 was similar to ANZDATA.
6. More patients reached the Kt/V and Creatinine clearance target in 2019.
7. Patient survival, technique survival and peritonitis rates continue to be better than the national rates.
8. Our peritonitis and exit site infection rates improved in 2019. 97% patients were peritonitis-free on their first year of PD.
9. The percentage of patients who were peritonitis-free at 3 years remains higher than the ANZDATA 2019. 87% patients on peritoneal dialysis at the end of 2019 were peritonitis-free.
10. Fewer change to haemodialysis in 2019 than that of the national rate and in comparison to last year.
11. Consistently similar to the national data and the previous years was “total dialysis and technical failure” as the primary reason for PD technique failure.

Research activities

- The “Transition from PD” project is to support a planned patient transition to haemodialysis or conservative care from peritoneal dialysis. The protocol from 2017 and due for review in 2020 with a structured risk assessment and management pathway for all PD patients is continuing to benefit patients identified at risk of PD failure through early planning, referrals and education.
- St George PD unit has agreed to participate in 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. Due to commence in early 2020 pending site ethics (HREC & SSA) approval.

Management: Clinical and QA activities

- Mailing of pre-filled blood request forms to patients with SMS reminders will continue in 2020 to improve patient compliance for blood testing, HbA1c screening for patients with diabetes and lipid screening for high risk patients.
- Continue to flag patients with poor biochemistry and haematology results through renal clinic, 2-monthly multi-disciplinary team (MDT) patient review meetings and electronic communication to dietitian and nephrologists to improve calcium, phosphate, PTH and nutrition management.
- Pre PD assessment and education program continued through group and individual face to face sessions for predialysis patients choosing PD. Group education sessions will be discontinued in 2020 due to poor attendance in 2019. Individual sessions will continue with increased booking flexibility.
- All effective initiatives and projects will continue i.e. clinic review checklist project, nurse-facilitated iron management, bi-annual patient newsletters, 2-monthly MDT patient review, 1:1 comprehensive training and retraining program and outpatient follow-up and support.
- Continue to improve peritoneal dialysis care in the acute or inpatient setting through the:
  - Progressive competency – based training program for renal ward nurses in:
    - Converting to Claria PD machine and 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
- Repeat patient satisfaction survey in early 2020
- Due to increased need for assisted PD, 9 nursing homes within the SGH catchment area were trained on PD. All are willing to accept PD patients pending bed availability. There was also a private nursing agency trained on PD. The structured PD support and training program tailored to nursing home nurses to streamline the uptake of PD patients into aged care facilities will continue throughout 2020.
- Continue the 3-yearly review of PD policies to keep in line with national (CARI) and international (ISPD) clinical practice guidelines.

9. Transplantation

Tania Burns

The aim of this report is to provide data about patients who have had 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 243 kidney transplant recipients and 71 living kidney donors were under the care of the SGH team during 2019.
- Fifteen people received a kidney transplant: six from live donors and nine from deceased donors.
- Six people donated a kidney.
- Two of the live donor transplants were pre-emptive.
- Six transplant recipients died with functioning grafts.
- Six transplant recipients had graft failure and returned to dialysis.
- Three transplant recipients transferred out and three transferred in.
- A total of 55 people were reviewed at the SGH transplant assessment clinic by a nephrologist from Prince of Wales hospital, the transplanting unit.
- At 31/12/19 36 SGH dialysis patients were on the transplant waiting list and two SGH patients had dates booked for pre-emptive live donor transplants.
- A Renal Transplant Celebration was held on 15/3/19 with approximately 180 SGH transplant recipients and living donors, friends and family and SGH staff in attendance.
- Fifty three people attended two pre-transplant patient education evenings.

Transplant patient flow

1/1/19 SGH transplant patients registered with ANZDATA	**225**
In	
Transplanted	15
Transferred care in	3
In Subtotal	**18**
Out	
Transferred care out	3
Died	6
Graft failure transferred back to dialysis	6
Out Subtotal	**-15**
Net Gain	**3**
31/12/17 SGH transplant patients	**228**

Post-transplant follow up

Of the 243 kidney transplant recipients cared for at SGH in 2019:

- 226 were primary grafts, 14 are second grafts and 3 are third grafts
- 77 of these patients received grafts from live donors
- 33 were pre-emptive transplants

KPIs to 12 months post-transplant:

- Rates of biopsy proven acute rejection in first 6 months <25%in the first 6 months post-transplant and <5% between 6 and 12 months or after 12 months
- Rates of new onset diabetes after transplant (NODAT) <15%
- Rates of BK nephropathy <5%
- Rates of BK viraemia <15% (where BK viraemia defined as >850copies per ml)
- Rates of CMV viraemia <30% (CMV viraemia defined as PCR CMV measurement > 500 copies/mL)
- Rates of CMV infection <30%

In the first 12 months post-transplant SGH renal transplant recipients demonstrate rates of acute rejection, CMV viraemia and CMV infection below the benchmarks, while rates of NODAT, BK viraemia, and BK nephropathy are above benchmark.

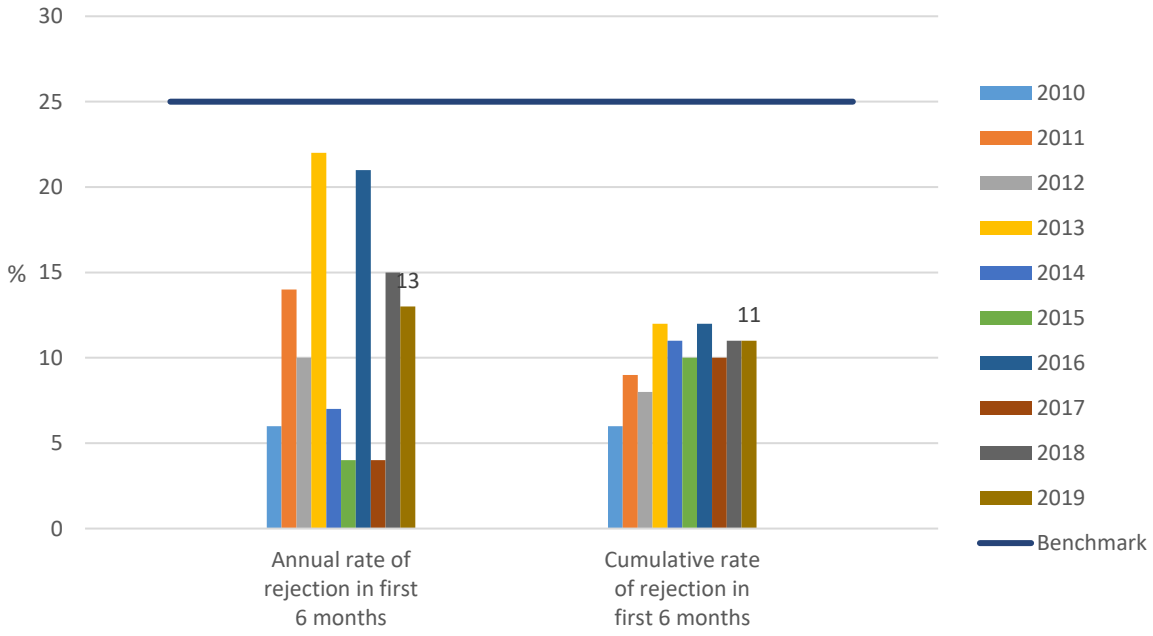


Figure 66. Rate of biopsy proven acute rejection in first 6 months

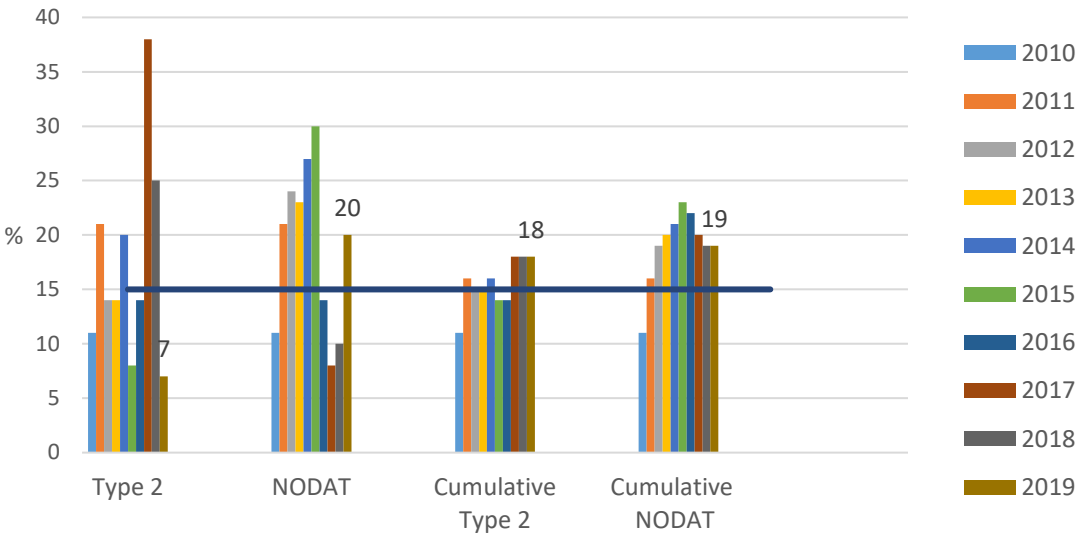


Figure 67. Rate of diabetes in first 12 months

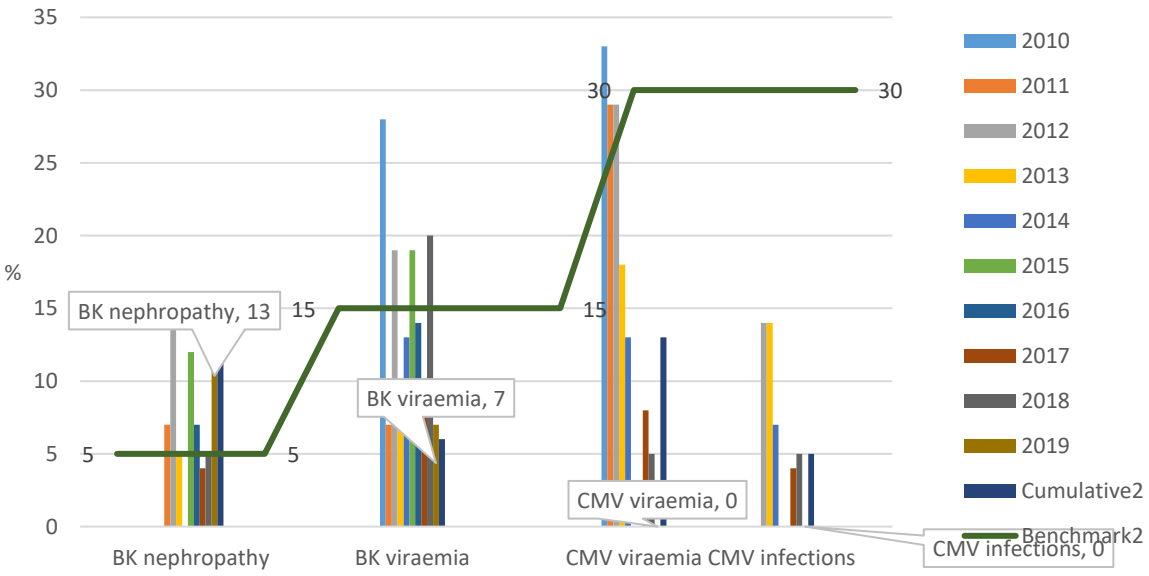


Figure 68. Infection in first 12 months

Graft and Patient Survival ANZDATA report for transplants 2012-2018; n=112

Benchmarks are against the national average

1. **Deceased Donors**

- Compared with national data:
  - Recipients of deceased donor grafts from SGH hospital are slightly older (82% vs. 74% >45years); more commonly of Asian descent (28% vs. 14%); and have spent a longer time on dialysis (92% vs. 68% >2yrs dialysis) than the national average.
  - SGH recipients of deceased donor organs have better than national patient and graft survival.

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	77	100.0	3481	100.0	430	100.0
3 months	73	98.7 (91.0-99.8)	3260	98.9 (98.5-99.2)	399	98.6 (96.9-99.4)
6 months	66	98.7 (91.0-99.8)	3064	98.4 (97.9-98.8)	375	98.4 (96.6-99.2)
1 year	60	97.1 (89.0-99.3)	2681	97.5 (96.9-98.0)	342	97.8 (95.8-98.9)
2 years	50	97.1 (89.0-99.3)	2019	95.2 (94.4-96.0)	233	97.1 (94.9-98.4)
3 years	42	97.1 (89.0-99.3)	1405	93.3 (92.2-94.2)	161	95.7 (92.6-97.5)
4 years	21	97.1 (89.0-99.3)	882	90.5 (89.1-91.8)	102	93.0 (88.6-95.7)
5 years	13	91.7 (70.9-97.9)	432	88.5 (86.7-90.1)	49	91.0 (85.5-94.5)

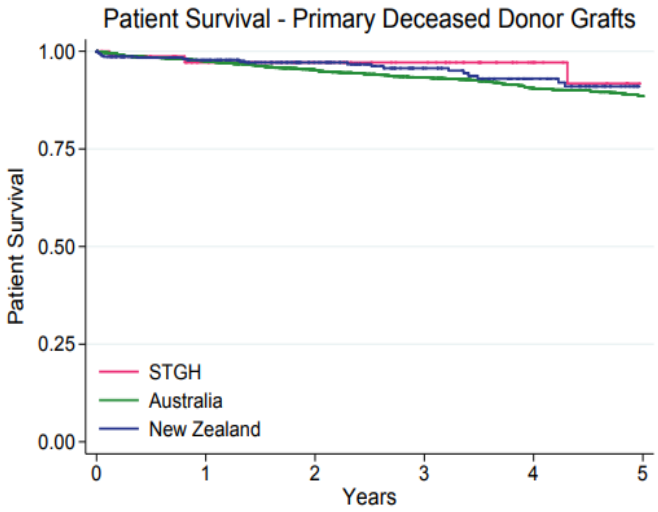


Figure 69. Patient survival - primary deceased donor grafts (ANZDATA Individual Hospital Report 2013-2018)

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	82	100.0	4035	100.0	470	100.0
3 months	77	97.5 (90.5-99.4)	3728	97.5 (96.9-97.9)	432	97.4 (95.5-98.5)
6 months	70	97.5 (90.5-99.4)	3495	96.4 (95.8-97.0)	406	97.0 (95.0-98.2)
1 year	63	96.1 (88.3-98.7)	3029	94.7 (93.9-95.4)	365	95.5 (93.1-97.1)
2 years	52	94.5 (85.9-97.9)	2250	92.1 (91.1-93.0)	248	93.5 (90.6-95.5)
3 years	43	94.5 (85.9-97.9)	1517	89.0 (87.7-90.1)	166	89.5 (85.4-92.4)
4 years	23	94.5 (85.9-97.9)	939	85.2 (83.6-86.7)	104	86.4 (81.4-90.1)
5 years	14	89.5 (72.1-96.3)	446	81.8 (79.8-83.7)	50	84.4 (78.7-88.7)

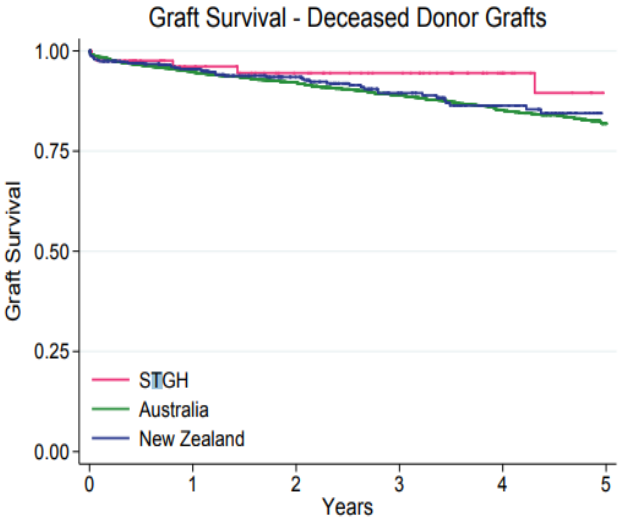


Figure 70. Graft survival –Primary deceased donor grafts (ANZDATA Individual Hospital Report 2013-2018)

2. Live Donors

- Compared with national data:
  - Recipients of living donor grafts from SGH hospital are slightly older (68% vs. 57% >45years) and are more commonly of Asian descent (16% vs. 9%).
  - 48% SGH living donor transplant recipients received their transplant pre-emptively compared to 38% in Australia as a whole.

SGH recipients of living donor organs have better than national patient and graft survival.

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	29	100.0	1221	100.0	379	100.0
3 months	29	100.0	1162	99.8 (99.2-99.9)	355	98.9 (97.2-99.6)
6 months	28	100.0	1104	99.6 (99.0-99.8)	338	98.9 (97.2-99.6)
1 year	27	100.0	1005	99.4 (98.7-99.7)	300	98.6 (96.7-99.4)
2 years	15	100.0	790	98.5 (97.5-99.1)	242	97.9 (95.6-99.0)
3 years	11	100.0	562	97.3 (95.9-98.2)	173	97.9 (95.6-99.0)
4 years	9	100.0	382	96.4 (94.6-97.6)	112	97.3 (94.4-98.7)
5 years	5	100.0	180	95.3 (93.1-96.9)	51	97.3 (94.4-98.7)

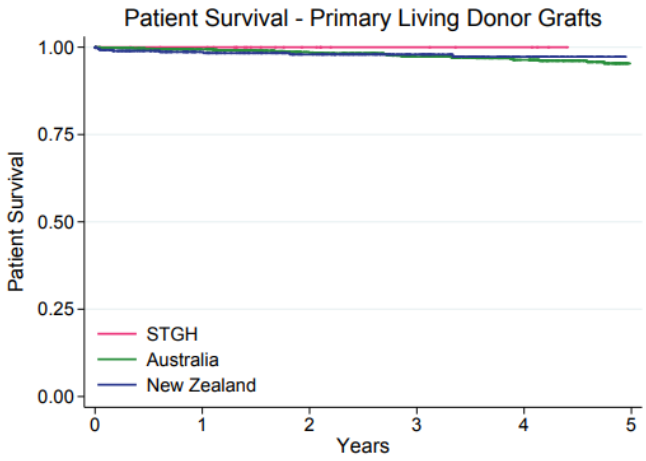


Figure 71. Patient survival - primary living donor grafts (ANZDATA Individual Hospital Report 2013-2018)

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	31	100.0	1378	100.0	409	100.0
3 months	31	100.0	1300	98.8 (98.0-99.2)	382	98.8 (97.1-99.5)
6 months	30	100.0	1236	98.6 (97.8-99.1)	363	98.5 (96.7-99.3)
1 year	29	100.0	1129	98.0 (97.1-98.6)	323	97.7 (95.5-98.8)
2 years	16	94.4 (66.6-99.2)	885	96.8 (95.7-97.7)	256	96.3 (93.6-97.8)
3 years	10	94.4 (66.6-99.2)	628	94.7 (93.1-96.0)	181	96.3 (93.6-97.8)
4 years	8	94.4 (66.6-99.2)	416	92.5 (90.4-94.2)	113	94.3 (90.4-96.6)
5 years	5	94.4 (66.6-99.2)	197	90.9 (88.3-93.0)	50	94.3 (90.4-96.6)

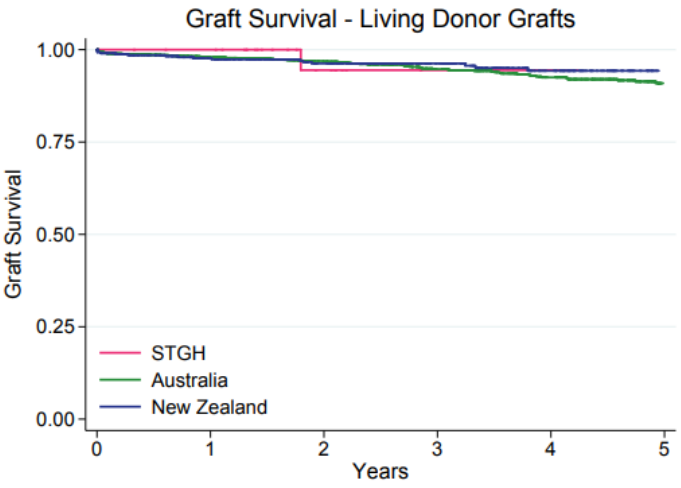


Figure 72. Graft survival for living donor grafts (ANZDATA Individual Hospital Report 2013-2018)

3. Waiting list data

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

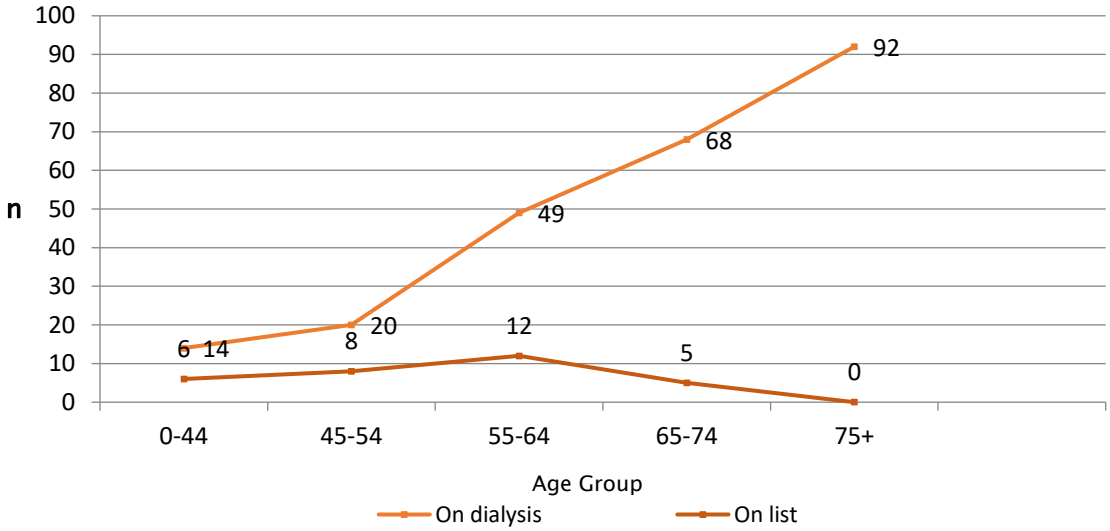


Figure 73. Number of people on dialysis and on the transplant waiting list May 2019

Although the numbers are small, the percentage of patients listed for transplant in each age group compares favourably with 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.

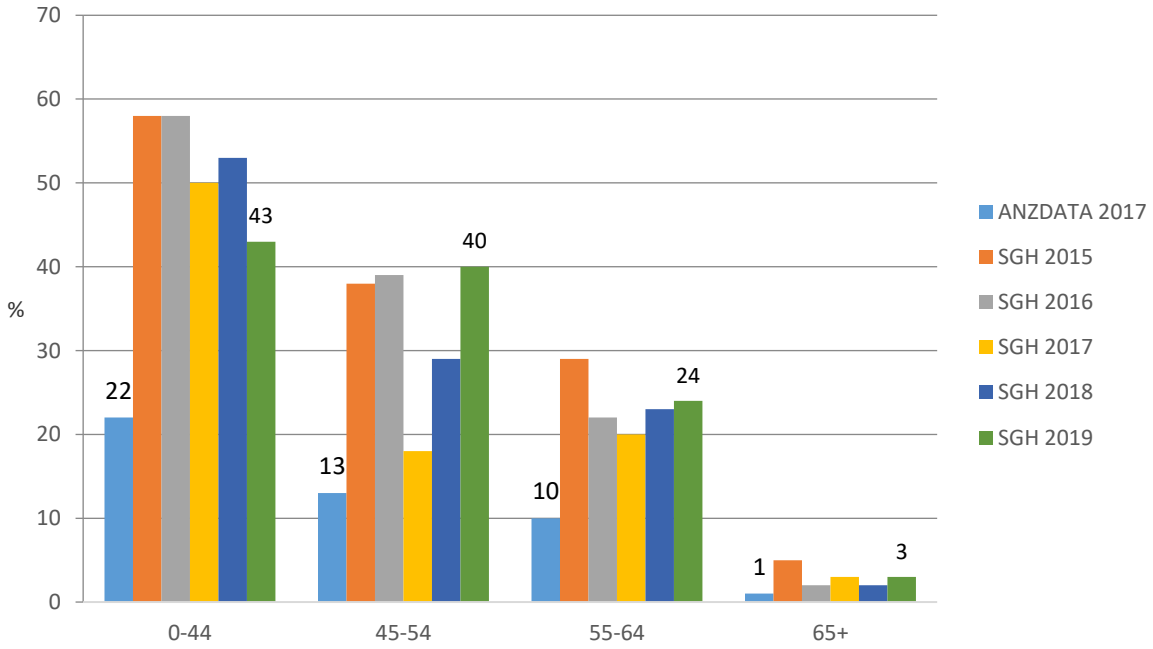


Figure 74. Percentage of SGH dialysis patients listed for transplant compared to ANZDATA 2017

4. Donor Data

KPIs:

- All living kidney donors to be reviewed annually
- Living donor assessment to be completed in <12months

- During 2019 66 donors (93%) attended for review with the remaining 5 followed up by letter.
- Among the donors there were no deaths and no one on dialysis.
- Creatinine ranged from 57-155umol/L, eGFR from 38-90mL/min/1.73m^2 and albumin creatinine ratio from 0–4.34g/mmol.
- Twenty SGH renal donors have CKD stage 3A (GFR 45-59) and 4 have CKD stage 3B (GFR 30-44).
- Sixteen donors had hypertension requiring treatment, with ten requiring one agent and six requiring two.

Renal Donor patient flow

1/1/19 SGH renal donors registered with ANZDATA	**65**
In	
Donated	6
Transferred care in	0
In Subtotal	**6**
Out	
Transferred care out	0
Died	0
Out Subtotal	**0**
Net Gain	**6**
31/12/19 SGH renal donors	**71**

Six people under the care of SGH proceeded to donate a kidney during 2019. For five of those donors the whole process from referral to the coordinator to kidney donation took from 20-54 weeks. The sixth donor took 90 weeks but donation was delayed because the pair was enrolled in the paired kidney exchange.

Twenty five new donors presented to SGH for work up during 2019. One went ahead and donated in 2019. Seventeen did not proceed: five due to medical reasons; two because another donor went ahead for the same recipient; and ten did not make any progress after the initial phone call. At 31/12/19 a total of 6 people remain in assessment at SGH and two are fully assessed with dates for donation scheduled for 2020.

5. Plans for the next 12 months

- Pre-transplant education planned for 7/4/19

10. Renal Supportive Care Service

Frank Brennan, Kelly Li, Elizabeth Josland, Alison Smyth, Jessica Stevenson, Hannah Burgess, Su Bahceci, and Anna Hoffman

Overview

- The 10th Renal Supportive Care Symposium was held in July 2019 and was attended by health professionals from around Australia and overseas.
- Numerous education sessions and site visits were conducted for RSC staff across NSW. St George staff also mentored two international visitors to the hospital from the United States (two weeks) and Chile (one afternoon).
- The ninth annual Renal Memorial Service was held in September 2019 and was attended by approximately 30 people. This service aims to provide families and friends of past renal patients with a supportive environment to commemorate their loved ones.
- 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/renal-supportive-care.

RSC Service Activity

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
TOTAL	3482	12%	727	11%	13504	611	516

Figure 75. RSC Activity 2009-1019

Patient Demographics and Outcomes

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

	Conservative	Dialysis	Transplant	Pre-Dialysis/ undecided	Total
No. of patients (count)	634	410	35	96	1175
Age (average, years)	82	70	60	74	76
Age (range, years)	(29, 99)	(17, 90)	(27, 80)	(41, 92)	(17, 99)
eGFR (average)	16	13	36	27	16
Diabetes (%)	50%	54%	36%	43%	50%
IHD (%)	45%	45%	23%	33%	43%
Dementia (%)	10%	5%	0%	0%	7%
2 or more co-morbidities* (%)	88%	86%	64%	84%	86%
Current or former smokers (%)	22%	30%	14%	12%	24%

Figure 76. *Patient demographics on first visit/ consult 2009-2019*

Inpatient services

- Inpatients are predominantly seen by the CNCs. The majority of new inpatient referrals continue to be for pain and symptom management.
- There is an average of 4 new inpatient referrals per month

Outpatient services

- There is an average of 5 new clinic referrals per month
- Telehealth consults commenced in 2018. 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, 59% had a reduction in their total symptom score by the 3rd clinic visit.
- Of the 153 (25%) patients that reported severe/ overwhelming pain at their first visit, 94% 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 chart below shows figures for patients as of Dec 2019.

- 79% of non-dialysis patients attending the RSC clinic, that are competent had an advance care plan

NFD - RSC clinic	**95**
With ACP	41
Without ACP - Suitable	11
Discussed	1
For Follow-up	10
Without ACP- not suitable	**43**
Unable due to Dementia/ Incompetent/ Social	8
Nursing home patients	7
New Clinic Patient - Less than 3 appointments	17
Lost to Followup -Not seen >2yrs	11

% Completed	79%
	(41/52)

Research, Publications, Teaching and Presentations

Research

- Health Literacy (HREC 16/015 LNR/16/POW/33). Measuring the rate of health literacy of both RSC patients and their self-identified surrogate decision maker.
- Dialysis/transplant symptoms: investigate and compare the symptom burden of dialysis and transplant patients
- A prospective randomised, trial of the efficacy and side effect profile of gabapentin in the management of uraemic pruritus in haemodialysis patients and patients managed conservatively
- Frailty: to determine whether there is a decline over time in a non-dialysis CKD renal supportive care population
- 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.
- Dialysis Symptoms: Determine if there is improved symptom scores in ESKD patients on dialysis after attendance at RSC clinic
- Prevalence of Taste Changes in patients with end stage kidney disease
- Pathophysiology and management of taste changes in CKD
- CKD managed without dialysis: survival symptoms and QOL
- The influence of Advance Care Plans in clinical care during hospitalisation

Publications

- Bridge DT, Donnelly SM, Brennan FP. Medical assistance in dying: a disruption of therapeutic relationships. Med J Aust 2019;(4):189.
- Urban K, Foote C, Brennan F, Brown MA, Lee B. Quality of death of renal patients dying in an acute hospital setting - does Renal Supportive Care lead to better deaths? Nephrology 2019; 24: 511-517.
- Brennan F, Lohman D, Gwyther L. Access to Pain Management as a Human Right. American Journal of Public Health 2019; 109 (1): 61-65.
- Brennan F. The Victorian Voluntary Assisted Dying Act comes into operation. Internal Medicine Journal 2019;49: 689-693.
- Brennan F. A response to "Fragile objects; a visual essay." Bioethical Enquiry 2019;16(2): 191-192
- Brennan FP. Poetry and Palliative Care. Progress in Palliative Care 2019; Published online November 18 2019. DOI: 10.1080/09699260.2019.1689324.
- Brennan FP. Renal Supportive Care – An Overview. In : Szonowska B. (ed) Palliativa v nefrologii. Maxdorf Jessinius, Prague, 2019.
- Brennan FP. Uremic pruritus and Restless Legs Syndrome – pathogenesis and management in patients with end stage renal disease. In : Szonowska B. (ed) Palliativa v nefrologii. Maxdorf Jessinius, Prague, 2019.
- Kathryn Ducharlet, Jennifer Philip, Hilton Gock, Mark Brown, Samantha L. Gelfand, Elizabeth Josland, Frank Brennan. Moral Distress in Nephrology: Perceived Barriers to Ethical Clinical Care. Published online: AJKD-D-19-00298R2, 2019. https://doi.org/10.1053/j.ajkd.2019.08.018

Education Days and Teaching

- The 10th Renal Supportive Care Symposium took place in August 2019 with sponsorship provided by Amgen and Roche.
- In August the team attended a Dubbo Hub meeting/education day organised by the Dubbo team and included a visit to a GP practice. This was well attended and stimulated lively discussion. We also gained valuable insight following the Aboriginal Liaison Officer's important dialogue concerning Aboriginal health and unrelenting loss.
- The first Combined St George Hub meeting was held at Royal North Shore Hospital on 27 September. This day included updates and presentations from multiple Hub renal departments resulting in productive discussion valuable future planning for the service moving forward.

Presentations

- Dr Frank Brennan gave multiple presentations in 2019, including national and international conferences, lectures, teaching sessions and the RSC symposium.
- Dr Brennan gives a series of half-hour tutorials on all aspects of RSC to the junior doctors in the Renal Department.
- Elizabeth Josland and Alison Smyth provided multiple in-services for new ward staff, coordinated the RSC Symposium and mentored staff from other hospitals.
- Su Bahceci (dietitian) presented at the St George RSC Symposium and at the education day for Hub members, as well as providing education and mentoring to the RSC dietitians across NSW.

Networks

- All team members continue to be involved in local and state-wide network groups.

Achievements for 2019

- 10 years of RSC at St George Hospital was recognised in an article in the St George and Sutherland Shire Leader in July 2019 *'St George Hospital's Renal Supportive Care Service improves patients' quality of life'*.
- Dr Brennan participated in International workshops on renal supportive care and symptom management in ESKD in India, South Africa, Thailand, and the United Kingdom. Dr Brennan also spoke at multiple conferences nationwide and our Renal Supportive Care Symposium.
- The service hosted multiple doctors, nurses and allied health professionals from across Australia and overseas.

Performance indicators and outcomes for 2019

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.
   - 65% of patients (conservative and dialysis) had an improvement or maintained their total symptom score between first and third visit to the RSC clinic
   - 65% 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.*
   - 79% of competent NFD patients who are seen in the RSC clinic have an ACP.
   - Of the 99 dialysis patients identified as requiring an ACP in 2019, 56% (n=48) 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**
   - 72% of RSC dietetic consultations were for patients attending for conservative management, with 90% of conservative patients being reviewed one or more times in clinic
   - 28% of RSC dietetic consultations were for patients attending for symptoms support (e.g. pre-dialysis, dialysis-dependent, transplant), with 96% of symptom support patients being reviewed one or more times in clinic

11. Hypertension

George Mangos and Jennifer Beddoe

Twenty four hour ABPM monitoring

2019 was a very busy year for the 24hr ABPM service with a total of four hundred and ninety three studies been performed. Of these three hundred and ninety six, compared to two hundred and ninety seven in 2018, were for clinical purposes. The remaining monitors were completed for research purposes.

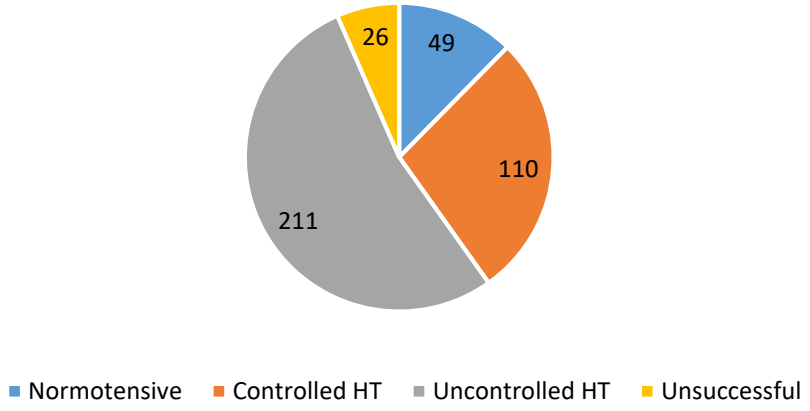


Figure 77. 2019 Outcome data for the studies undertaken for clinical purposes only

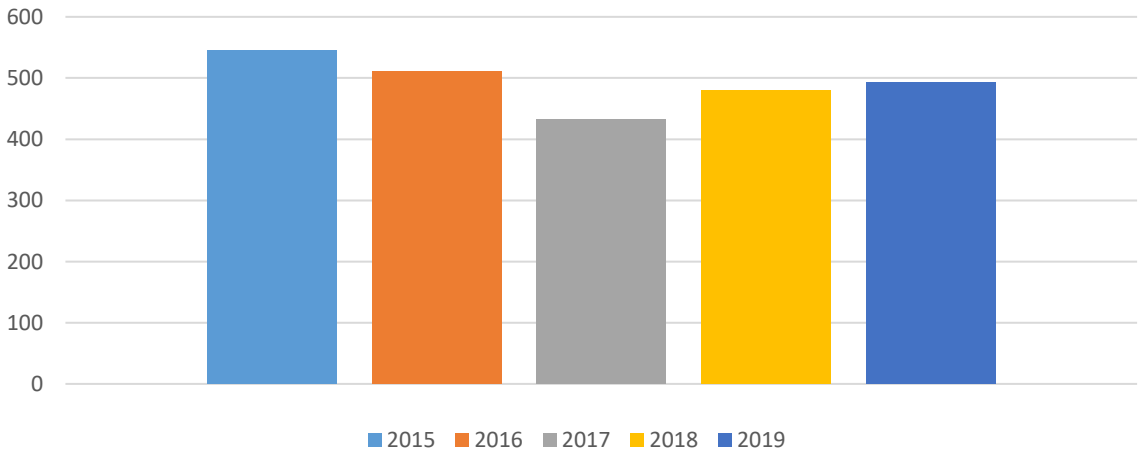


Figure 78. Total number of ABPMS 2015-2019

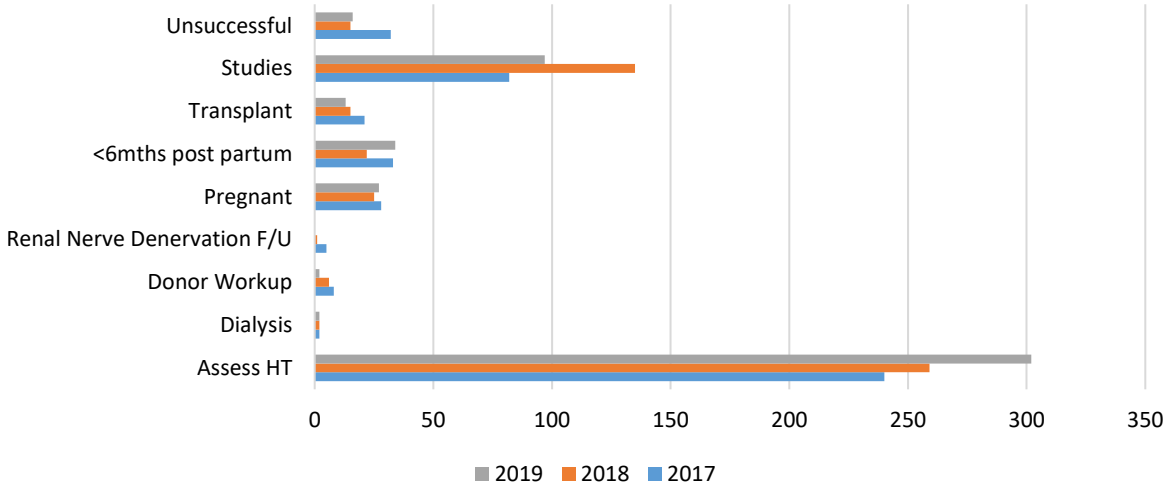


Figure 79. Reason for referral 2017-2019

The ABPM service continues to be involved in research activities and will be contributing to the SPYRAL-ON study examining the effectiveness of renal denervation

Home monitor checks

During 2019 sixty one home monitor checks were completed, compared to fifty four in 2018.

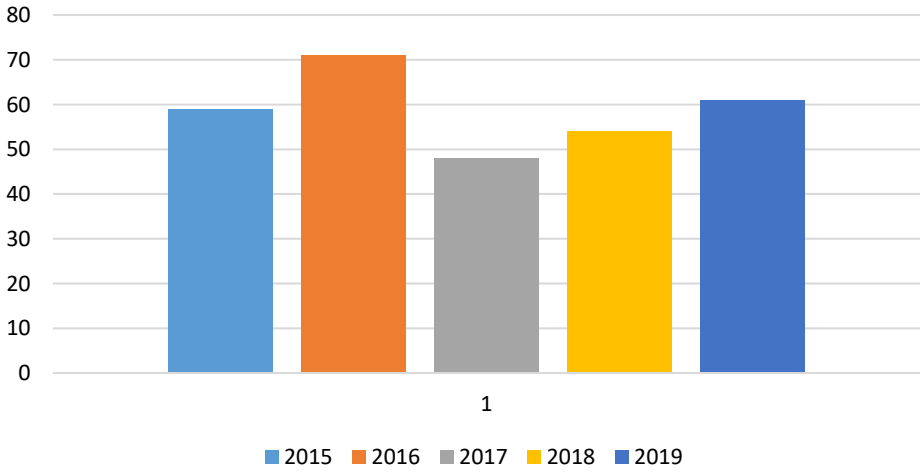


Figure 80. Home Monitors 2015- 2019 Activity graph

12. Hypertension in Pregnancy

Franziska Pettit and 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 2019 there were 2442 births at St George Hospital, up from 2307 in 2018. 213 (9%) of these were complicated by a hypertensive disorder.5 were twin pregnancies and were excluded from this analysis.
- Of the 208 singleton pregnancies in 2019 180 (85%) were consulted to the renal team. The remaining 28 were managed by the obstetric team.
- There were no episodes of pulmonary oedema, dialysis or maternal deaths during 2019 here at St George.
- One mother was transferred from Wagga Wagga after suffering an eclamptic seizure at 21/40. Her pregnancy was terminated on medical grounds.
- One Fetal death in utero at 20/40 occurred in a women who presented with the features of pre-eclampsia at a very early gestation.
- Treatment for severe HT has changed from Nifedipine 10mg stat to Labetalol 200mg stat due to Nifedipine 10mg no longer been available.
- Both the Day Assessment Unit (DAU) and Obstetric Medicine clinic (OMC) saw an increase in activity

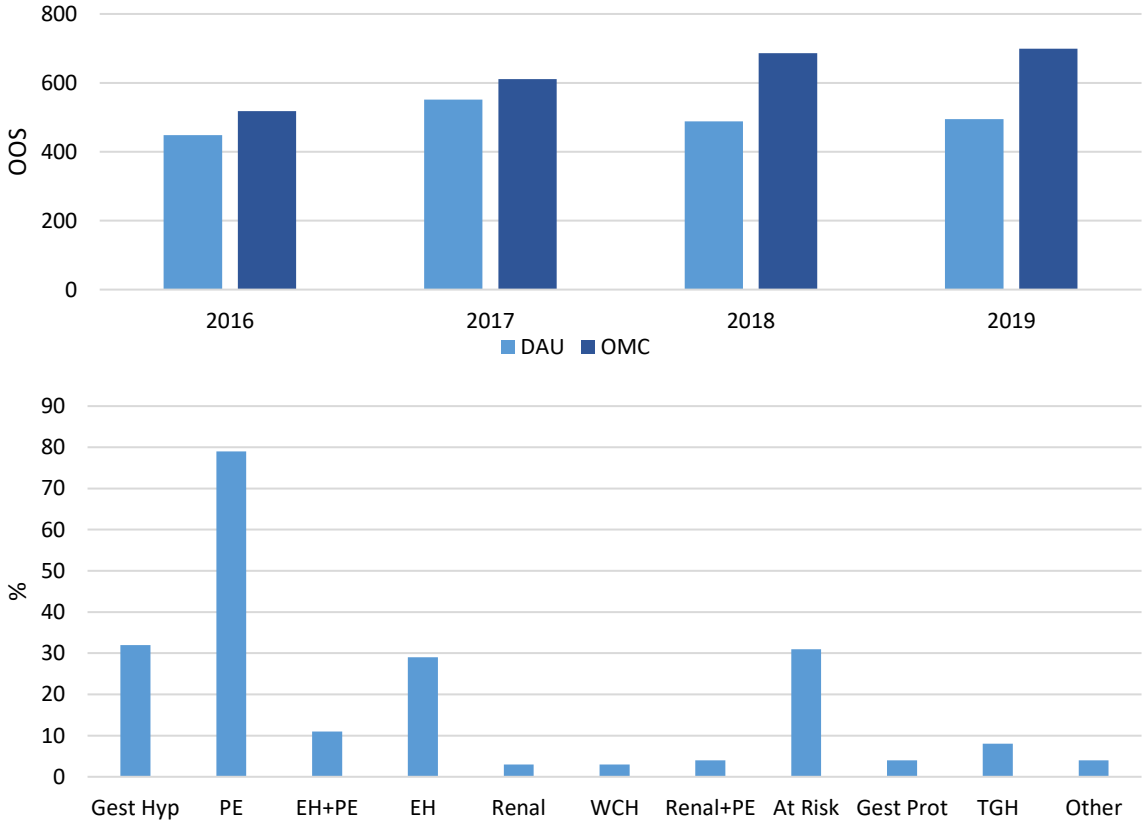


Figure 81. Diagnosis of women with Singleton Pregnancies in 2018

GH=Gestational Hypertension; PE=Preeclampsia; EH+PE=Essential hypertension + Preeclampsia; EH= Essential hypertension; TGH=Transient gestational hypertension; Gest Prot=Gestational proteinuria

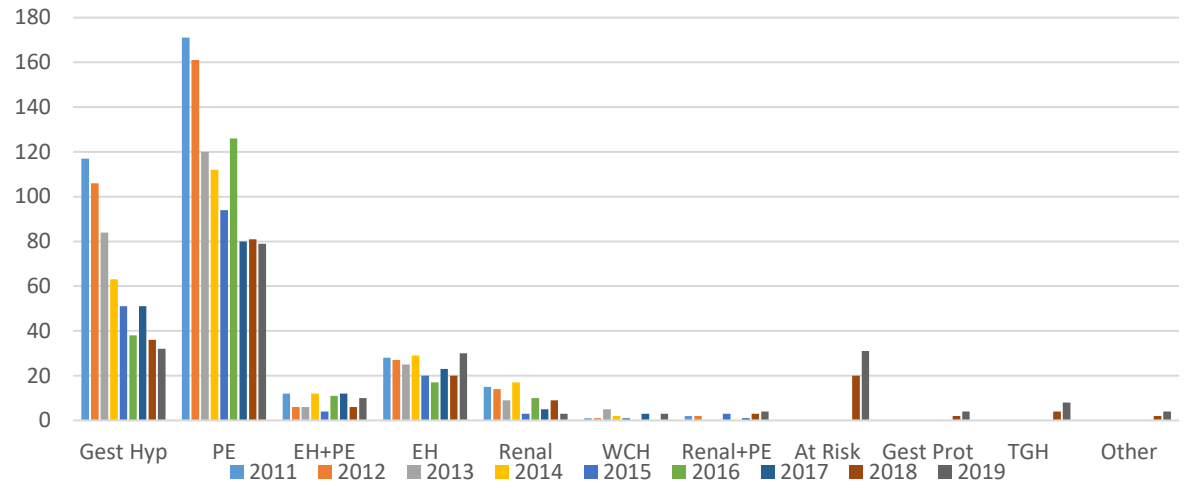


Figure 82. Diagnosis of women with singleton pregnancies 2011-2019

	No	Severe HT	ICU	Neuro	AntiC	Eclampsia	Liver	Renal	Platelets	SGA<10	NICU	PNM	CS
							AST >41	Creat > 90	<150				
Gest Hyp	34	12	0	0	0	0	0	0	0	6	0	0	12
PE	79	31	12	11	9	0	16	2	12	25	3	1	47
EH+PE	11	4	1	1	1	0	3	0	4	2	2	1	6
EH	29	6	0	0	0	0	2	0	0	1	3	0	13
Renal	3	0	0	0	0	0	0	0	1	0	0	0	0
Renal + PE	4	1	1	0	0	0	1	1	1	1	1	0	1
At Risk	29	1	0	0	0	0	0	0	0	1	0	0	8
Gest Prot	4	0	0	0	0	0	0	0	0	1	0	0	3
TGH	8	3	0	0	0	0	0	0	0	1	0	0	4
WCH	3	0	0	0	0	0	0	0	0	0	0	0	1
Other	4	0	0	0	0	0	2	0	1	1	0	0	0
Grand Total	208	58	14	12	10	0	24	3	19	39	9	2	95

Figure 83. Diagnosis and outcomes of women with singleton pregnancies 2019

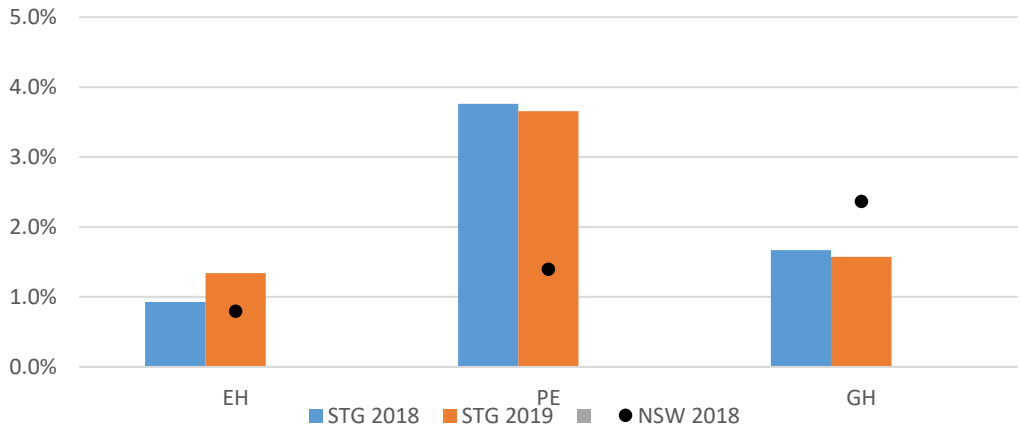


Figure 84. Comparison of all pregnancies at St George Hospital, 2019, complicated by PE, GH or EH against NSW health data, 2018.

Conclusion

- There was increase in the number of deliveries at St George in 2019 but the percentage complicated by a hypertensive disorders remained the same at 9%. It has remained steady at this rate for the last 3 years.

13. St George Renal Biopsy Review – Audit of Complications

Partha Shanmugasundaram

	Total	Transplant biopsies
Number	125	39
Total complications	8(6.4%)	2 (5.1%)
Macroscopic haematuria	4(3.2%)	2 (5.1%)
Symptomatic Perinephric haematoma	4(3.2%)	None
Transfusion	2 (1.6%)	None

Comparison of total complication rates from previous years

	2012	2013	2014	2015	2016	2017	2018	2019
Total Number	86	118	123	98	134	126	127	125
Complication rate	7.2%	5.1%	6.5%	12.2%	5.2%	7.1%	3.9%	6.4%

Comparison of specific complication rates expressed as percentage (number)

Year N	2015 N=98	2016 N=134	2017 N=126	2018 N=127	2019 N=125	Last 5 years N=601
Total complications	12.2(12)	5.2(7)	7.1(9)	3.9(5)	6.4(8)	6.8(41)
Macroscopic Haematuria, %(n)	9.2(9)	3(4)	2.3(3)	3.1(4)	3.2(4)	4.7(24)
Perinephric Haematoma, %(n)	3.1(3)	1.5(2)	3.2(4)	0.8(1)	3.2(4)	2(14)
Perinephric bleed – angioebolisation, %(n)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Required blood transfusion	6.1(5)	0(0)	0(0)	0(0)	1.6(2)	1.2(7)

Our bench marks (Am J Kidney Dis 60(1):62-73. 2012) are:

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

The rate of all complications over the last 5 years was 6.8%. There was a slight increase in the need for blood transfusion post biopsy this year at 1.2 %, above the benchmark of 1%. However, the benchmarks for macroscopic hematuria and need for embolization were met in 2019 as was with the last 4 years.

14. Nutrition Services

Maria Chan, Caitlin Delaney (1.58 FTE SGH)
Jessica Stevenson (0.74 FTE) – see report under RSC, Jessica Young (0.3FTE TSH)

Dietitian activity in patient care (SGH):

Occasions of service	2017		2018		2019	
	new	total	new	total	new	total
Inpatient (wards and 4W day-stay HDx)	224	772	149	654	178	695
Outpatient (CKD, Home HD & PD, TP, DIACC)	117	413	115	257	147	625
Total (in and outpatient)	341	**1185**	264	**911**	325	**1320**

Service type, St. George Hospital:

2019		Non-dialysis dependent CKD	RRT					Total	Current Staffing (FTE)
			Home HD	In-centre HD	DIACC	PD	TP		
Outpatient/day-stay patient	New	~97 (= 82 from pre-dialysis assessment clinic + ~20 (direct referral to Renal Nutrition Clinic, Dept. of Nutrition & Dietetics)	6	73	7	22	15	216	1.0
	* Total at any time point	~180	33	64	80	45	220	592	
	Short term & *ad hoc* intervention (e.g stones, HT)	~15						15	
Inpatient (new admissions)			Data not collected, estimated					~105	0.6

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

Chronic Kidney Disease (non-dialysis dependent):

- **Pre-Dialysis assessment clinic :**

Table 3 Nutrition characteristics of patient attending the pre-dialysis assessment clinic

Parameter	2019
Number	n=73/80 (new) 91.2 % seen by dietitian
Malnutrition, mildly – moderately and severely, SGA B &C	35.6 %

Summary of nutritional characteristics since the inception of the clinic in 2002

Parameters (baseline)	**Time period**						
	Apr 2002 to Mar 2007	Apr 2007 to Mar 2012	2015	2016	2017	2018	**2019**
Number	176	324	49	56	69	42*	**73**
Age (yr)	65.2±13.8	66.4±15.2	66.8±15.9	65.7±14.5	66.0±13.3	n/a	**64.3±17.3**
GFR (ml/min/1.73m^2)	13.2±4.5	17.2±5.5	16.5±3.7	18.3±2.5	14.6±3.6	16	**17±10.9**
Malnutrition, SGA B &C (%)	39.7	42.0	36.5	35.7	49.3	37.7	**35.6**

* Incomplete data entry

Comments:

- > 95% of patients did not receive nutrition intervention for CKD prior to the clinic
- Prevalence of malnutrition continued to be high, ~ 35.6 % in 2019.
- Recommendation: early referral to dietitians is recommended to prevent malnutrition and onset of symptoms, as well as managing other risk factors/comorbidities.

Haemodialysis:

- Revisiting of supplemental Intradialytic Parenteral Nutrition (IDPN) with case series in 2017 demonstrated the safety and effectiveness of IDPN.
- It was continued to be used for nutritional support in selected patients in 2019. Next step: to do Clinical Business Rules and workplace instruction for IDPN

Peritoneal Dialysis: no audit performed

Transplant:

- 14 patients received kidney transplant and returned to acute transplant clinic. 12/14 (86%) were seen by the dietitian at SGH. The 2 patients who missed r/v by SGH dietitian did receive initial diet education at POW

Inpatient:

- Subjective global assessment (SGA score) of <u>new</u> referred inpatients:
  - A, well nourished: 27%
  - B, mild-moderately malnourished: 64%
  - C, severely malnourished: 9%
    Comment: high prevalence of malnutrition SGA B & C (73%) was observed in new referred inpatients.

Miscellaneous:

Research:

- Ongoing - Dietary Approaches to Manage Progressive and End stage Renal disease (DAMPER) study: CKD nutrition intervention on CKD progression and outcomes after initiation of dialysis. Data collected for nutrition intervention vs. no intervention e.g. time to initiation of dialysis, change of nutritional status etc.
- Survey of "Renal Dietitians and Patients to Determine What Nutritional Outcomes Matter to Patients with Non-Dialysis Dependent Chronic Kidney Disease". Data collection completed and to write up. Key findings are:
  1. Both dietitian and patient groups rated 35/48 (73%) outcomes of similar importance.
  2. "Quality of life" and "symptom control" were perceived by both dietitian and patient groups to be nutritional outcomes of very high importance.
  3. "Delaying the need for dialysis" was rated the highest by patients
  4. Dietitians and patients rated "maintaining good rapport and regular contact") as being of higher importance than "reaching biochemical targets e.g. serum phosphate"

  Conclusions: This study revealed that dietitians and patients share common nutritional outcome priorities and perceive whole body outcomes as more important than biochemical markers. However, discrepancy existed in the expectation for improving intermediate outcomes e.g. knowledge vs. preventing CKD progression/dialysis respectively. Therefore, individualised goal setting is vital to improve patients' dietary management journey.

  Abstract was presented in the WCN, SGH &TSH medical symposium and Patient experience forum, NSW Health

  Implementation to routine clinical practice: set goals with patients as part of CKD nutrition intervention
- Development of eHealth e.g. using PEXIP and SKYPE to improve follow-up and teaching (e.g. virtual classroom).

Publications and invited lectures:

- These included two invited lectures, and four conference abstracts for poster presentations.

Education/consultation (provision of):

- Maria continues to be on steering committee of the Council of Renal Nutrition, NKF USA to develop international renal specialist dietitians training –GRID (*Global Renal Internet Course for Dietitians*) which is expected to be launched early 2020. The objective of the course is to improve knowledge and skill of dietitians in renal care, ultimately to improve the global outcomes of patients with CKD.

Conclusions:

- Nutrition care is a multidisciplinary process to provide structured, timely and quality care as per best practice guidelines. There is a need to review strategies to improve current practices.

Plan (ongoing):

- To develop and implement more cost effective renal nutrition management strategies, including better referral and follow-up strategies to achieve structured care for all pathways.