Department of Renal Medicine
St George & Sutherland Hospitals

2016

Annual Report and Quality Indicators

Health
NSW GOVERNMENT
South Eastern Sydney Local Health District

Introduction

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.

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.

Prof. Mark Brown

Director, Renal Medicine. St. George Hospital.

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1. Executive Summary

ANZDATA Activity Overview

- Dialysis and transplant patient numbers at St George Hospital have increased steadily between 1990-2015
- Dialysis and functioning transplant patients at St George hospital have increased significantly since 1990
- 46% of dialysis patients at St George Hospital are on Hospital haemodialysis (HD) compared to the Australian average of 23%, due to the lack of a satellite dialysis unit. The proportions of St George patients on home dialysis is higher than the Australian average (36% compared to 29%).

New Patients

- After attending the Pre-dialysis clinic, approximately a quarter (26%) opt to have a home therapy, more commonly PD. A higher proportion were undecided compared to previous years (20% compared to 8% in 2015).
- New patients starting dialysis at St George are older than national average
- Benchmarks for Pre-dialysis
  1. 66% of patients (excluding late referrals) have a timely referral to the Pre-dialysis Program (Benchmark: 100% ≥eGFR 15).
  2. 95% of patients who are known to the unit and have attended Pre-dialysis Clinic commenced their planned dialysis choice (Benchmark: 70%).
  3. 89% of patients at the commencement of RRT had a review in the pre-dialysis assessment and education program between 3 -12 months (Benchmark: 80%)

Hypertension

- Five hundred and ten 24 hour ABPM studies were performed, 34 of these were on pregnant women. There was also an increase in the number of home monitor BP checks compared to last year (70 vs 59).
- 52% of referrals were to assess hypertension, 25% were for research.
- Of the 381 patients who had a clinical ABPM, 210 had uncontrolled hypertension by ABPM criteria. 34% of these who were uncontrolled were taking 3 or more agents.
- Fifteen patients underwent RSNA between 2012 and 2015. Overall results do not support a role for RSNA in highly selected treatment resistant hypertensive patients.

Haemodialysis

- Activity was steady in 2016 with an overall growth of 2% across the sites.
- At Sutherland Hospital 7387 HD treatments were completed in 2016; up from 7289 in 2015. On average, 48 patients dialysed each month.
- At St George Hospital, 20,651 treatments were completed in 2016, compared with 20,339 in 2015. On average 129 patients were dialysed each month
- Due to increasing demand, 'night chairs' were increased to 16 at St George Hospital from 12 in 2015.
- Clearance, using both Kt/v and Urea Reduction Ratio (URR) are better than national averages
- 53% of our patients are within the Haemoglobin target range (100-120g.dL), compared to 27% nationally
- 37% of patients had serum ferritin levels within target (200-500mcg/L) compared to 42% nationally
- On average 46% of patients had iPTH levels <20 pmol/L
- A larger number of patients (80%) were within the target calcium level 2.2-2.5mmol/L compared to 58% nationally.
- A larger number of patients (36%) were within the serum phosphate range 1.4-1.7mmol/L compared to 29% nationally.

Vascular Access

- 95% of patients had a mature access at their first haemodialysis compared to 57% nationally.
- Average time from initial referral to access creation was 52 days (benchmark: 30 days).
- Average time to first cannulation in 2016 was 7.2 months
- 77% of patients commenced dialysis with a native fistula compared to the ANZDATA benchmark of 40%.
- 15% of patients commenced their first haemodialysis via a tunnelled catheter compared to the ANZDATA benchmark of 43%.
- 90% of patients were using a fistula/graft for haemodialysis, compared to the ANZDATA benchmark of 86% and KDOQI benchmark of 40%.
- 4% of patients were using a permanent catheter (below the KDOQI benchmark of < 10%)
- Thrombosis rate for St George Hospital does not meet benchmark: AVF = 1.25 episodes/pt-year (aim <0.25). AVG/SVG = 0.25 episodes/pt-year (aim <0.5)
- For 2016, 3 catheter-related and 1 exit-site infections for a total of 76 catheters in situ

Peritoneal Dialysis

- A total of 73 patients were on PD in 2016 (including hospital IPD) compared to 75 in 2015.
- Similar or better than national average: haemoglobin (50% vs 27%), serum calcium (80% versus 58%), serum phosphate (36% vs 29%), transferrin saturation (59% vs 56%).
- Eleven patients were transferred to haemodialysis permanently in 2016. Two of these patients transferred due to poor compliance to PD.
- 82% (42/51) of patients on peritoneal dialysis in 2016 were peritonitis-free. The proportion of peritoneal dialysis patients who were 3 years peritonitis-free in 2016 was 77%, a slight improvement from last year of 64% and better than ANZDATA 2015 at 41%.

Transplants

- 211 kidney transplant recipients and 53 living kidney donors were seen in 2016.
- Fourteen people received a kidney transplant: 6 live donors and 3 through the paired kidney exchange
- Deceased donor survival was slightly lower at 12 months than national average, 95.5 vs 97.5%; equivalent patient survival at 5 years, 91 vs. 90.3%. DD graft survival is less than expected at 12 months (90.2 vs 94.5%)
- LD patient and graft 1 and 5 year survival is 100%.
- Compared to ANZDATA there are more St George dialysis patients listed for transplant in every age group and those not listed for transplant have an established medical contraindication to transplantation.
- 91% of living donors attended an annual review in 2016

Renal Supportive Care

- Outpatient clinic occasions of service increased in 2016 (445 compared to 345 in 2015). There were 250 phone consultations, 27 home visits, an average of 28 dialysis consults and 83 inpatient consultations per month.
- There were an average of 5.9 new inpatient referrals per month (similar to 2015 of 5.4 new referrals per month).
- 74% of non-dialysis patients attending the RSC clinic have an advance care plan
- 80% of patients attending RSC clinics have been reviewed by a dietitian in the past year**.** 65% had an SGA recorded.
- The most prevalent symptoms were pain, lack of energy, poor mobility, itch and difficulty sleeping. 61% of patients had a reduction in total symptom score by the 3rd clinic visit.
- The total return rate of the QOL survey was 54% (237/437); this is a reduction from 2015 (60%).
- Home haemodialysis and transplantation had an advantage in self-reported QOL, but peritoneal dialysis results in the variables of ' role physical', 'general health', 'vitality' and 'social functioning' are worse than hospital haemodialysis

Obstetric Medicine

- In 2016 there were 2544 pregnancies at St George Public Hospital, 200 (8%) of these were complicated by hypertension in pregnancy and 164 of these were seen by the Renal Obstetric Medicine group.
- There was a further fall in the number of women presenting with hypertensive disorders of pregnancy to our unit
- There was a small fall in the overall number of deliveries and of these 7% developed a hypertensive complication.
- PNM rate was excellent (5 per 1000 cases) – NSW PNM rate for **all pregnancies** is 8.2 per 1000 pregnancies

Chronic Kidney Disease

- Most referrals are for patients with a decline in renal function (41%)
- Most patients are > 60 years of age
- The average time to review from referral was 35 days, and 18 days for people with Stage 5 ESKD
- The iConnect program continues to see newly referred low risk referrals (eGFR>30/uACR<30) within 36 days and high risk referrals (eGFR<30 and uACR>30) within less than 20 days.

Renal Biopsy

- The rate of complications over the last 5 years was 7%.
- All three parameters met the accepted benchmark in 2016 (Am J Kidney Dis 60(1):62-73. 2012)
    - Macroscopic hematuria 3.5%
    - Blood transfusion 1%
    - Angio-embolisation 0.6%
- A structured (formative and summative) assessment of renal biopsy skills of the advanced trainees is in place and the efficacy and acceptance of this assessment process will be evaluated over the next few years.

Nutrition Services

- All 19 new PD patients received initial assessment and education by the dietitian (100% compliance)
- 100% (10/10) newly transplanted renal patients received nutrition intervention at the acute transplant clinic
- Dialysis patients accounted for approximately 60% of caseload for the inpatient dietitian, and 100% of these required follow-up after discharge from hospital.
- 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.

Overall Summary

- Increase in activity, particularly haemodialysis
- Need for more Home HD
- Good patient outcomes for ESKD
- Very good results for peritonitis and all vascular access measures
- Transplant graft survival improving
- Overall very good quality results

2. ANZDATA Activity Overview

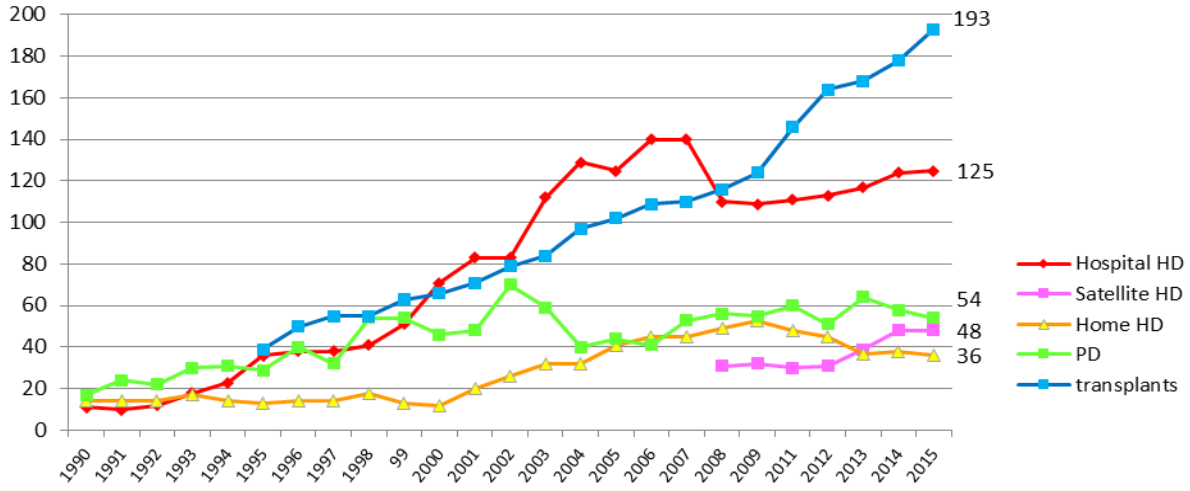


Figure 1. *Dialysis & transplant patients St George hospital 1990-2015 (ANZDATA 31/12/15)*
NB. Hospital HD includes potential satellite patients until 2008

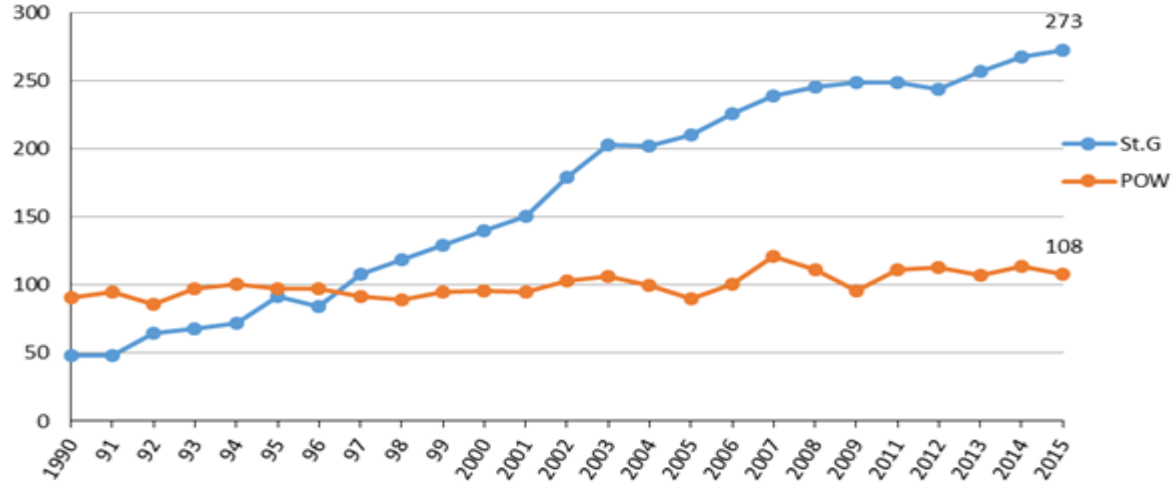


Figure 2. *Dialysis patients South East Sydney LHD (ANZDATA 31/12/15)*

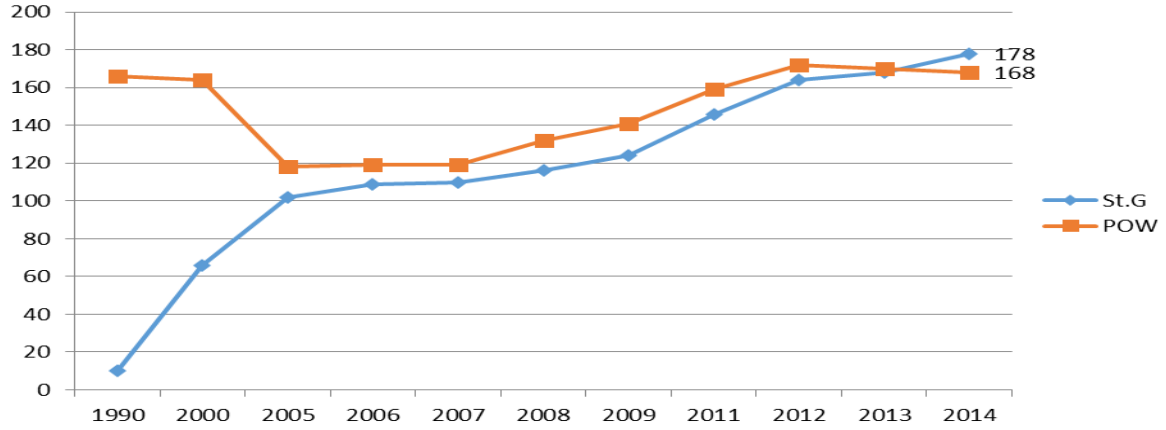


Figure 3. *Functioning Transplants South East Sydney LHD (ANZDATA 31/12/14)*

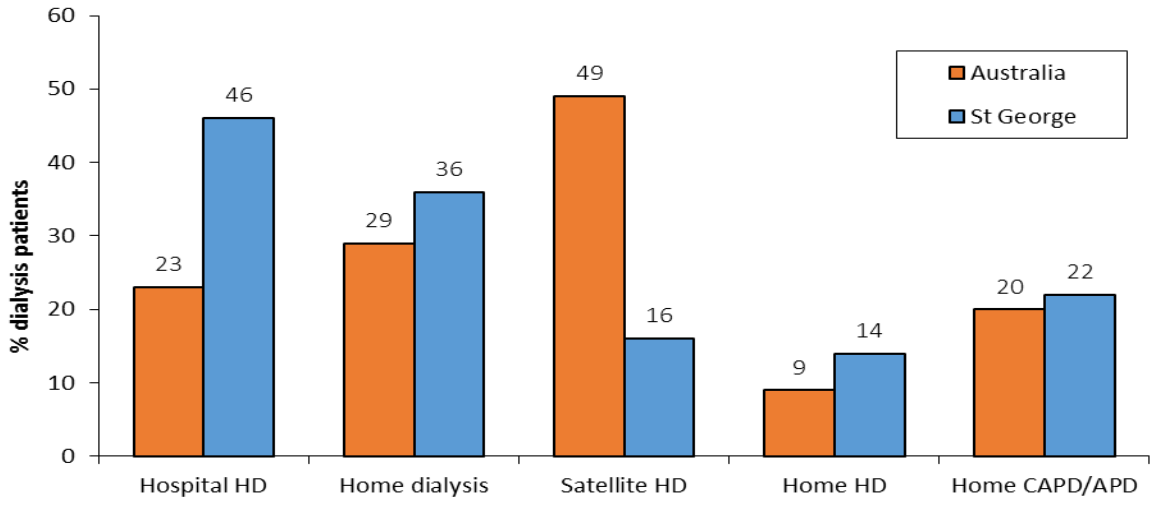


Figure 4. *Mode of dialysis Australia & St George 2015 (ANZDATA 31/12/15)*

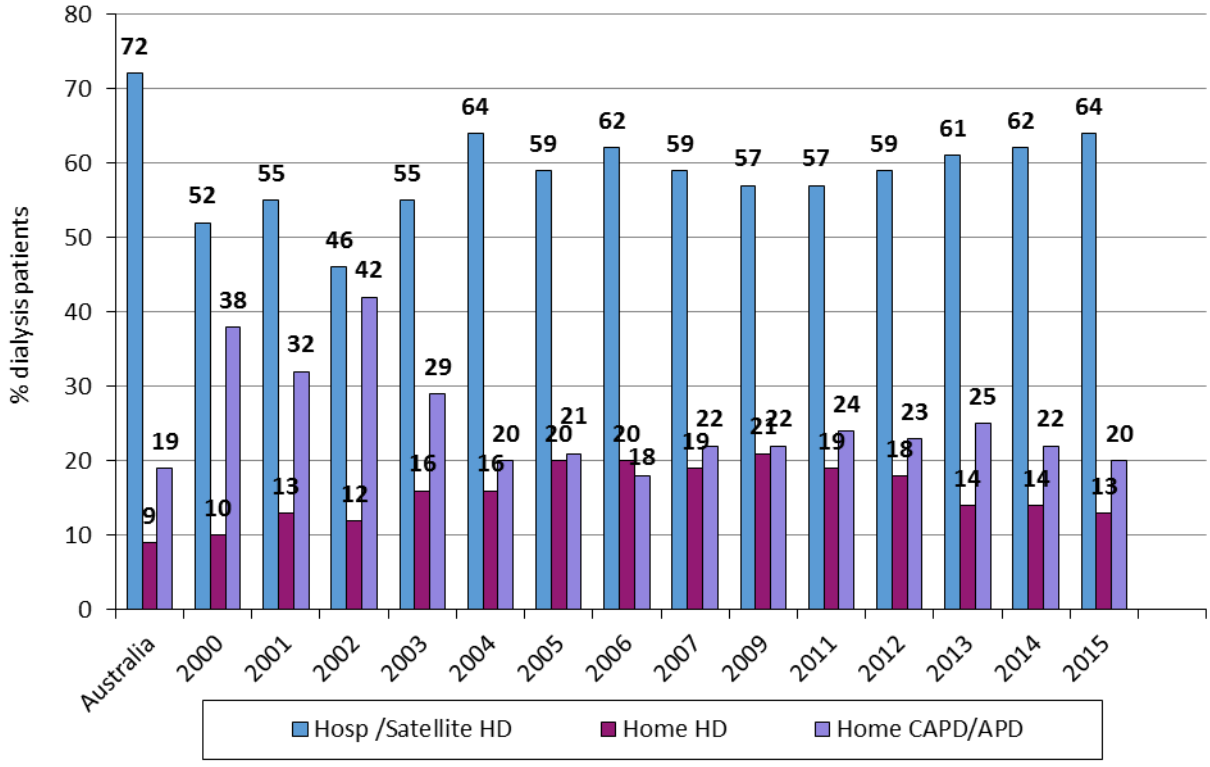


Figure 5. *Mode of dialysis Australia & St George 2015 (ANZDATA 31/12/15)*

3. Predialysis Program

Shelley Tranter/ Kylie Turner

Activity summary

The Renal Department guideline for referral to the multidisciplinary Predialysis Clinic is eGFR ≤ 15 or dialysis predicted in the following year. Generally, nephrologists will have considered these patients as suitable for dialysis. As of December 31st 2016, there were ***125 patients on the Predialysis Program with an active plan for renal replacement therapy***. This was a 3% increase from the previous year.

Since April 2002 there have been 894 people who have attended the clinic. 68 new patients attended clinic in 2016 compared to 61 new attendees in 2015. There were 69 follow up appointments compared to 86 follow up appointments in 2015. The reduced attendances over the past 2 years can be explained by the drop in referral eGFR.

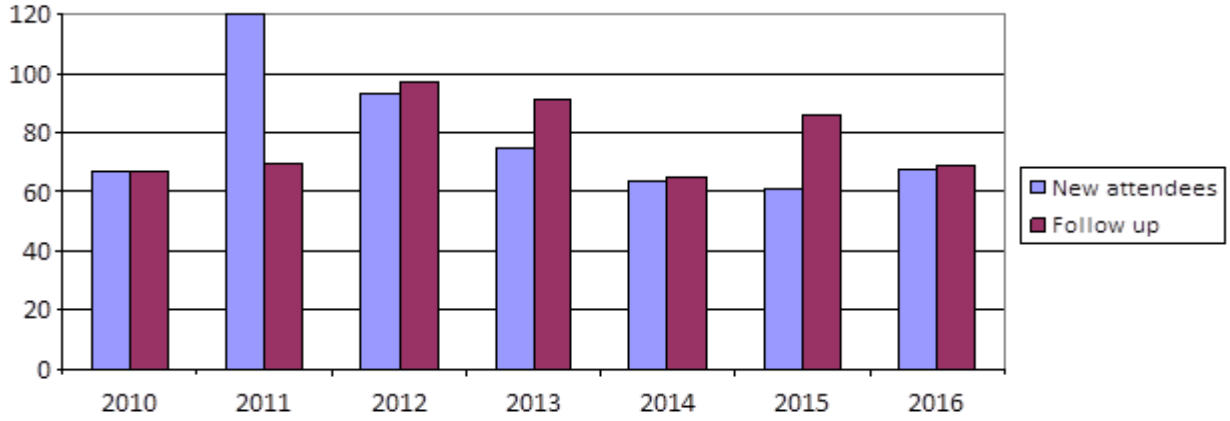


Figure 6. New attendees and follow up numbers for 2010-16

The age range of new patients seen in 2016 was 20 – 86 years. The average age was 64.9 years. Following the visit to the clinic, patients are asked to choose a tentative treatment option. The table below indicates the choice of patients 2013 -2016.

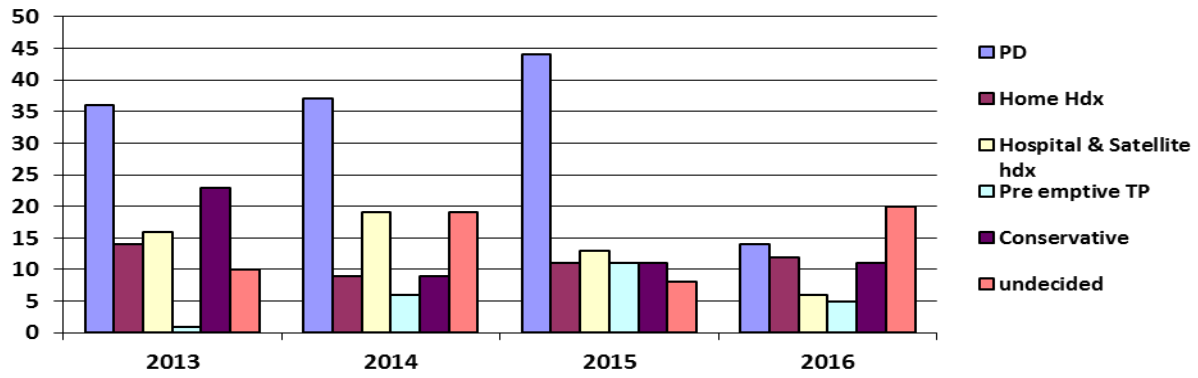


Figure 7. Percent of patients who opt for specific RRT therapies as a result of pre-dialysis education 2013-15

KPIs

The four benchmarks for predialysis have been established on historical Renal Department data.

1. Timely referral to Predialysis Program - 100% ≥eGFR 15.
2. 70% of patients who are known to the unit and have attended Predialysis Clinic commence planned dialysis choice.
3. At the commencement of RRT 80% of patients will have had a review in the pre-dialysis assessment and education program greater than 3 months previously and within 12 months.
4. Hepatitis B vaccination rates (to be presented in next report)

1. **Timely referral to Predialysis Program - 100% ≥ eGFR 15.**
   In 2016, 66% of patients were referred with an eGFR ≥ 15 (excludes patients who were late referral to nephrologist). This is fairly unchanged with 65% in 2015.

2. **70% of patients who are known to the unit and have attended Predialysis Clinic commence planned dialysis choice.**
   For patients commencing dialysis in 2016, 95% started the planned dialysis choice.
   100% of patients who chose PD commenced PD. One patient commenced haemodialysis post nephrectomy and pre live donor transplant, another patient commenced hospital haemodialysis post nephrectomy but will later t/f to home haemodialysis training.
3. **At the commencement of RRT 80% of patients will have had a review in the pre-dialysis assessment and education program greater than 3 months previously and within 12 months.**
   89% of new dialysis patients (excluding late referrals) had pre-dialysis education or review within 12 months before dialysis commencement. This result is a slight decrease from last year being at 94%.

Summary

The Pre-dialysis program works extremely well, capturing the vast majority of patients who commence dialysis, providing good education and allowing the department to plan its dialysis resources accordingly. It is a great achievement that over 81% had received this education prior to starting dialysis and that 89% started their planned dialysis modality.
In 2017 we will focus on:

- ensuring more timely referral of all patients;
- reviewing individual patients who are older and have more co-morbidities as to their real suitability for dialysis;
- referral to Renal supportive care clinic once patients have decided on a non dialysis pathway
- providing better written patient information to allow informed consent to dialysis.

4. Acceptance onto dialysis

Shelley Tranter/ Kylie Turner

Out of 43 new patients who started dialysis in 2016, 17 patients commenced peritoneal dialysis and 26 started haemodialysis. Patients are analysed according to their first mode of dialysis only.

- There were 4 (9%) late referrals which is below the National average (19%). Two late referrals received PD as first modality.
- Mean age at commencement in 2016 was 66 years for PD and 66 years for haemodialysis. The age of patients starting haemodialysis was younger than in previous years and is older than the National average age of 60 (ANZDATA 2015).

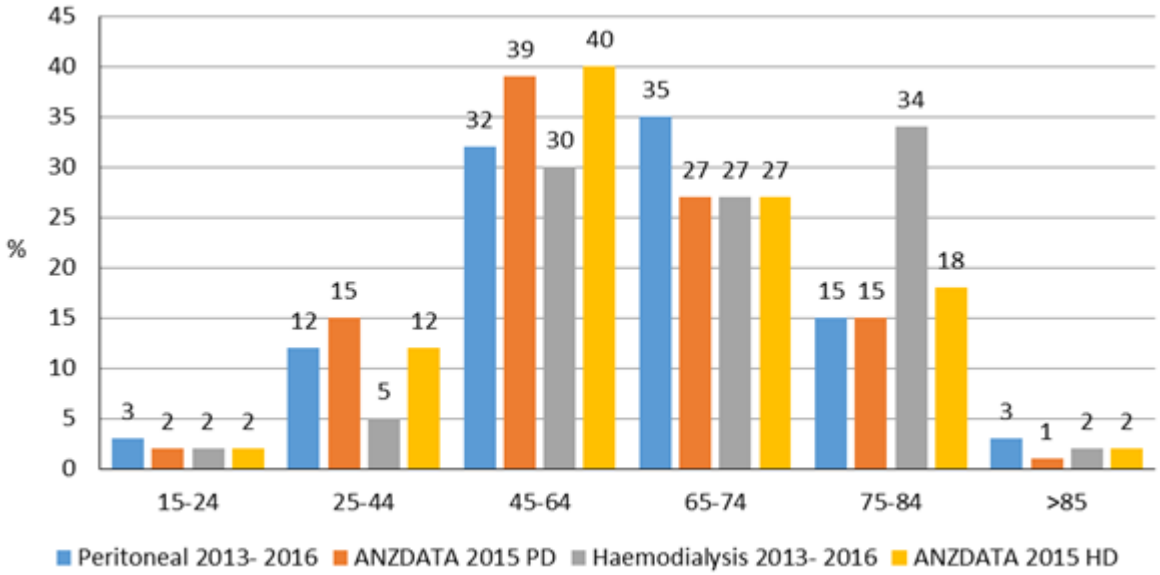


Figure 8. Age Groups of New Patients 2013-2016 compared to ANZDATA 2015

The major finding for acceptance to haemodialysis is that we continue to start more patients than nationally in the 75-84 age group.

<u>Glomerular filtration rate (GFR)</u>

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

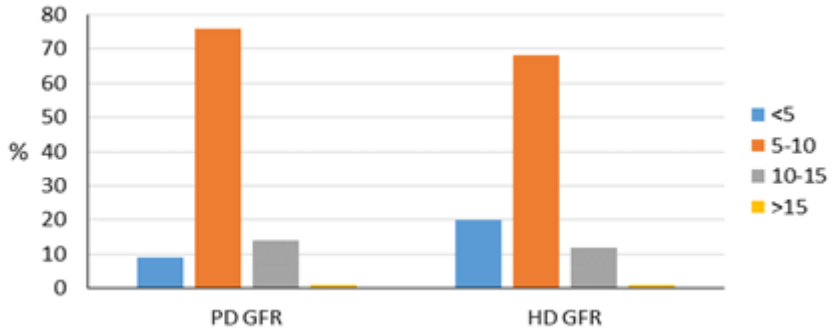


Figure 9. PD and Haemodialysis eGFR at commencement 2013-2016

Baseline characteristics of new patients

Body mass index

Body Mass Index (kg/m)	PD 2013 – 2016 (%) N=74	HD 2013 – 2016 (%) N=128
<20	7%	4%
20-24	28%	21%
25-30	30%	32%
>30	27%	24%
>35	8%	19%

Table 1. BMI for St George Hospital new patients

*According to ANZDATA (2004), BMI <20 indicates underweight, 20-25 normal, 26-30 overweight, >30 is obese and >35 morbidly obese. *Excludes patients who had haemodialysis prior to peritoneal dialysis.*

		St George HD 2013-16 (n=128*)	ANZDATA HD 2015 (n=2099)	St George PD 2013-16 (n=74*)	ANZDATA PD 2015 (n=958)
Age	Average age in years	68	60†	63	60†
Gender	Male	63%	63%	74%	62%
	Female	37%	37%	26%	38%
Late Referral	<3mths before 1st treatment	20%	21%	8%	8%
Co-morbidities	Smoking (Current and former)	45%	48%+	45%	48%+
	Chronic Lung Disease (yes and suspected)	19%	17%	19%	12%
	Cerebrovascular Disease	9%	12%	16%	12%
	Coronary Artery Disease	42%	38%	46%	29%
	Peripheral Vascular Disease	17%	20%	27%	18%
	Diabetes	48%	56%	51%	46%

Table 2. Baseline characteristics of new patients

*Excludes patients who had previous mode of dialysis. † Total dialysis population (Hd + PD) ANZDATA 2014, 2015 data not available

Action

We can conclude from these data that we are accepting patients for haemodialysis who are older than accepted nationally and possibly with more coronary artery disease. All cases are discussed bi-monthly at the pre-dialysis meeting with nephrologists to ensure suitability for dialysis.

5. Hypertension

George Mangos and Jennifer Beddoe

Twenty four hour BP monitoring

2016 has again been a very productive year for the Hypertension unit. Five hundred and ten 24 hour ABPM studies were performed, 34 of these were on pregnant women. In 2015, 546 ABPM studies were performed with 29 of those on pregnant women.

70 home monitor BP checks were also attended in 2016, which was an increase from 59 last year.

We have added new Welch Allyn 24hr ABPM devices to our existing stock of Spacelabs machines, which are proving to be successful.

The unit has successfully relocated to its new home in the Renal Care Centre.

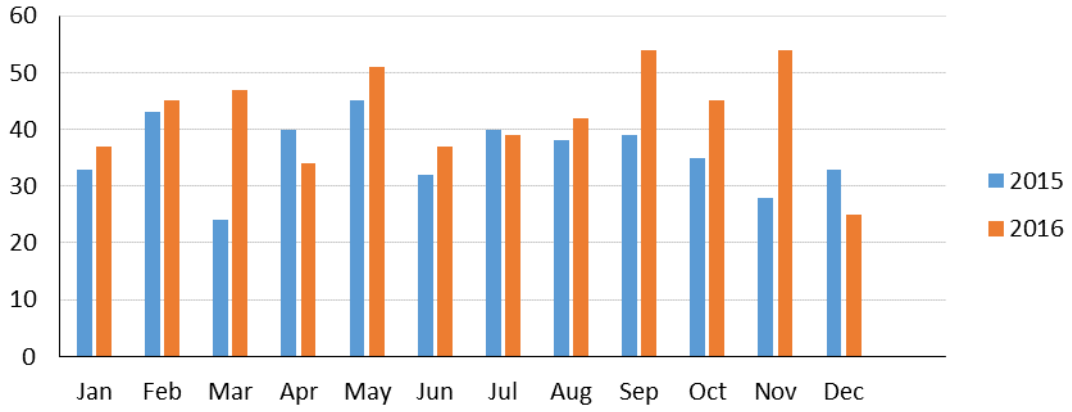


Figure 10. ABPM Activity 2015/16

52% of referrals were to assess hypertension, 25% were for research

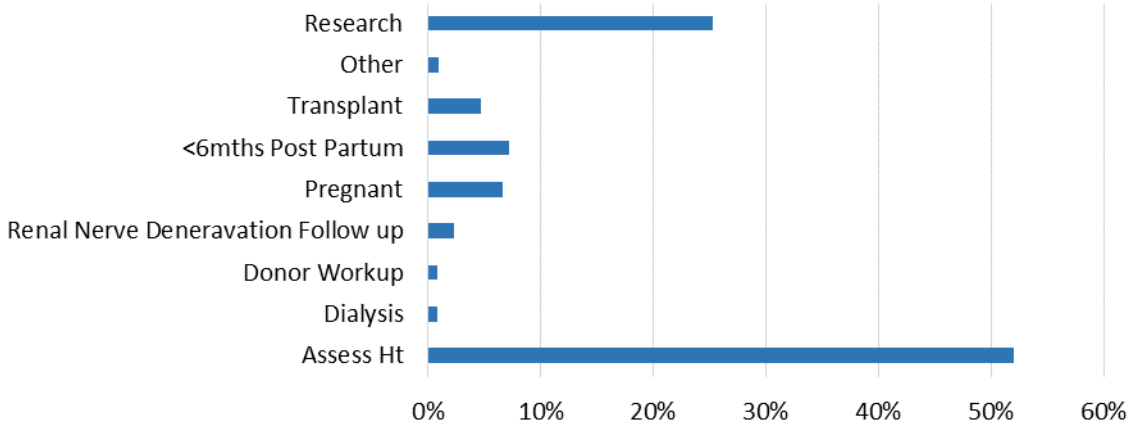


Figure 11. Reason for Referral in 2016

Resistant Hypertension - outcomes

Of the 381 patients who had a clinical ABPM (excluding research studies), 210 had uncontrolled hypertension by ABPM criteria (ie 44% of patients referred for ABPM had a significant white coat effect).

Seventy two of 210 patients (34%) who were uncontrolled were taking 3 or more agents, generally referred to as "treatment resistant" hypertensive patients.

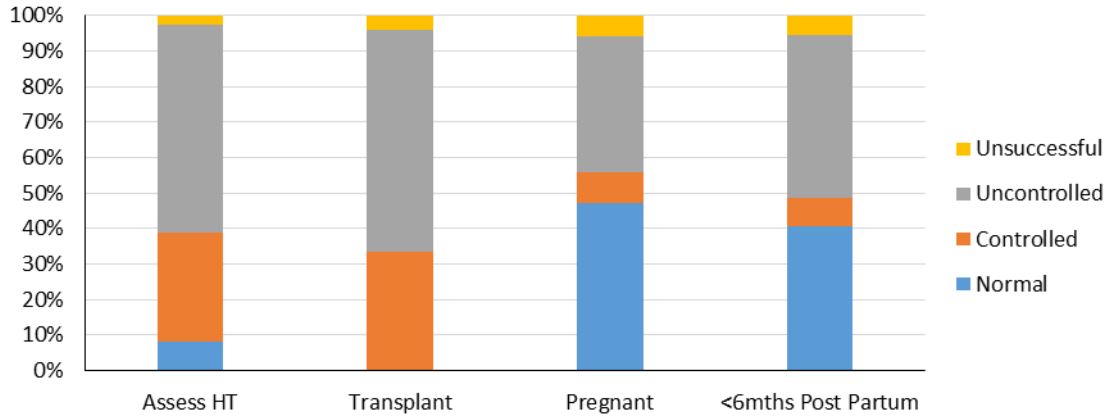


Figure 12. Resistant Hypertension Outcomes

Renal Sympathetic Nerve Ablation (RSNA) Program

This remains inactive until new studies demonstrate benefit. Patients with refractory hypertension (ie proven treatment resistant HT with thorough investigation for secondary causes) may be considered for denervation at present. We continue to follow the 13 patients who underwent renal sympathetic nerve ablation here at STGH in accordance with enrolment in the International Registry.

Fifteen patients underwent RSNA between 2012 and 2015. The pre-denervation 24 hour BP average was 150/77 mmHg in these patients, at 6 months 146/76 mmHg and at 2 years post RSNA 147/77 mmHg. We are still collecting 3 year outcome data but overall the results do not support a role for RSNA in highly selected treatment resistant hypertensive patients.

6. Haemodialysis

Tracey Blow, Yasko Takatori, Ivor Katz, Saiyini Pirabhahar and Louise Jordan

Activity

St George Hospital operates a 34 chair haemodialysis service providing high level care haemodialysis and home haemodialysis training. On average in 2016, 129 patients were dialysed each month and a total of 20,651 treatments completed, compared with 20,339 in 2015. Although growth was modest with only a 1.5% increase in activity, additional night chairs were opened to assist with activity spikes following winter, increasing the number of chairs from 8 to 16 between at the end of 2016. Patient numbers also dropped slightly at the end of December to 127.

The Satellite haemodialysis service at The Sutherland Hospital operates twelve chairs for low care patients. In 2016, 7387 treatments were performed, up from 7289 in 2015 and on average, 48 patients dialysed each month.

The Home haemodialysis Unit was quieter in 2016 with only ten patients commencing training of which six completed their training at the end of the year. The number of chairs increased to three from two in August in order to meet demand.

Of the home HD patients, seven dialysed 8 hours every other night with the remaining home patients dialysing on average a total of 19.7hrs per week i.e. alternate daily from 4-6 hours.

Activity for haemodialysis

Total activity increased across the two sites in 2016 with a total of *28,038* sessions performed (in-centre and satellite treatments). The graph below shows growth from 2012 with only a 2% increase in 2016, yet, since 2011 growth has exceeded 35% (18,330 session's v's 28,038).This includes haemodialysis for acute kidney injury and chronic kidney disease stage 5/end stage kidney disease (ESKD).

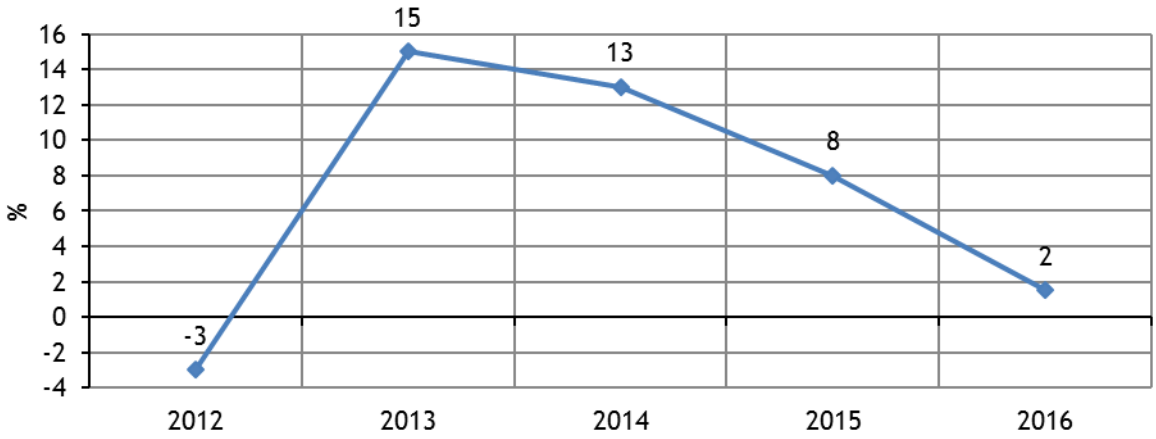


Figure 13. Growth Rates in Haemodialysis at St George and Sutherland Dialysis Units

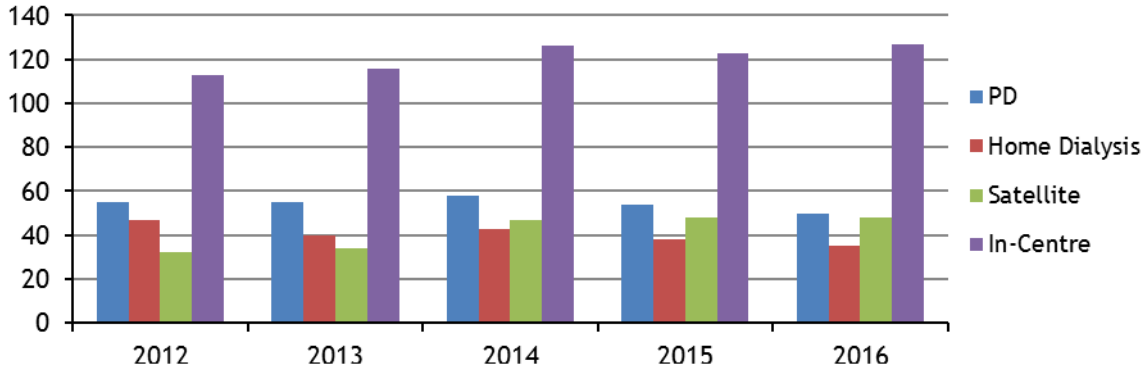


Figure 14. Distributions of dialysis modalities for 2012 through to 2016

	2012	2013	2014	2015	2016
In-centre haemodialysis patients at beginning of year	110	118	116	126	123
IN					
1. New Patients	22	36	36	27	29
2. Transfers from other units	2	1	1	11	2
3. Transfers from PD	7	10	14	7	10
4. Failed transplants	4	4	2	2	1
5. Transfers from Home Hdx/Satellite	0	7	1	4	5
6. Acute Kidney Injury*		19	29	27	24
7. Other				1	5
Subtotal	***35***	***77***	***82***	***79***	***76***
OUT					
7. Transplants	7	4	3	8	4
8. Transfers to other units/overseas	2	2	2	2	5
9. Transfers to Home Hdx	2	4	3	6	3
10. Transfers to PD	3	4	5	5	2
11. Transfers to Satellite	6	15	10	15	6
12. Regain Function	0	15	26	18	13
13. Deaths (medical)	8	19	11	12	11
14. Deaths (withdrawal)	7	16	12	16	20
Subtotal	***35***	***79***	***72***	***82***	***64***
NET GAIN/ LOSS	-	-2	10	-3	12
In-centre haemodialysis patients at end of year	110	116	126	123	135

Table 3. Patient Flow at St George Hospital from and to haemodialysis 2012- 2016

*Includes patients with acute kidney injury alone but also patients with co-existing chronic kidney disease whose renal failure worsened to the point of requiring temporary dialysis

	2012	2013	2014	2015	2016
Satellite haemodialysis patients at beginning of year	**33**	**34**	**39**	**47**	**48**
IN					
1. New Patients	1	1	1	2	0
2. Transfers from other units	1	0	1	1	1
3. Transfer from PD	0	0	1	0	0
4. Transfer from Incentre	14	8	10	12	7
Subtotal	***16***	***9***	***13***	***15***	***8***
OUT					
5. Transplants	1	1	0	2	1
6. Transfers to Home Hdx	0	1	2	1	1
7. Transfers to PD	0	2	0	0	1
8. Transfers to Incentre	1	3	0	5	3
9. Transfer to other units	0	0	1	1	1
10. Deaths (medical)	5	4	2	5	1
11. Deaths (withdrawal)	2	1	0	0	0
12. Regain Function	0	0	0	0	0
Subtotal	***9***	***12***	***5***	***14***	***8***
NET GAIN/ LOSS	**7**	**-3**	**8**	**1**	**0**
Satellite haemodialysis patients at end of year	**35**	**39**	**47**	**48**	**48**

Table 4. Patient Flow at The Sutherland Hospital from and to haemodialysis 2012- 2016

	2012	2013	2014	2015	2016
Home haemodialysis patients at beginning of year	**48**	**47**	**40**	**43**	**36**
IN					
1. New Patients	4	3	4	2	6
2. Transfer from PD	0	0	1	2	2
3. Transfers from other units	1	0	0	0	0
4. Transfer from Satellite	0	0	2	1	0
5. Failed transplants	0	0	0	0	0
6. Transfer from Incentre Hdx	3	4	3	0	2
Subtotal	***8***	***9***	***10***	***5***	***10***
OUT					
Transplants	7	10	4	7	5
Transfers to other units	1	1	0	1	0
Transfers to Incentre Hdx	0	2	1	2	3
Transfers to Satellite	0	0	1	0	0
Deaths	1	3	1	0	2
Subtotal	*9*	*16*	*7*	*10*	*10*
NET GAIN/ LOSS	-2	-7	3	-5	-1
Home haemodialysis patients at end of year	**47**	**40**	**43**	**36**	**37**

Table 5. Flow to and from Home Haemodialysis from 2012 to 2016

	STGH n=175	Australia n=9149	New Zealand n=1583
Age at First Treatment			
0-14		4 (0.0)	1 (0.1)
15-24	1 (0.6)	136 (1.5)	35 (2.2)
25-54	28 (16.0)	2513 (27.5)	577 (36.4)
55-74	84 (48.0)	4358 (47.6)	812 (51.3)
≥75	62 (35.4)	2138 (23.4)	158 (10.0)

Table 6. Demographics (n%) of HD patients

Data are for 175 patients dialysed from 2011 to Dec 31st 2015.
STGH commences more patients over 75 years than nationally
Co-morbidity rates similar to national average
Note low rates of commencement >75 yrs in NZ

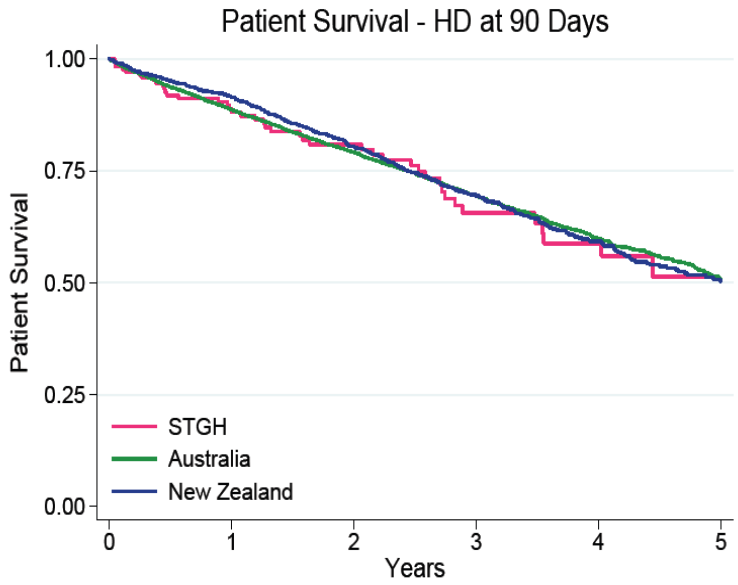


Figure 15. Patient Survival – HD at 90 days

Patient survival was at similar to the national average with one year survival of 88% and 5 year survival 51%. This is an excellent outcome for our cohort which is older than the national average. SMR for all St George dialysis (HD + PD) is 0.98 (i.e. expected rate).

Haemodialysis Clinical, Biochemical and Dialysis Adequacy Evaluation

Dialysis Duration (Hours on dialysis)

There is increasing evidence that time on dialysis is a key factor to improve outcomes.

Duration (hours)	St George Hospital	Sutherland Hospital
< 4	0	1
4	43	22
4.5	32	12
5-6	34	11
7-7.5	7	-
8	2	-

Table 7. Dialysis duration per individual dialysis session at St George and Sutherland Hospitals

- Twenty eight percent (28%) of in-centre or satellite haemodialysis achieve the KPI of >15 hours on dialysis per week.
- This is below the ANZDATA national average of 34% and lower than 2014 where the sites reached 34%. This presumably relates to pressure on dialysis bed availability.

Home Haemodialysis

Duration (hours)	Home haemo	Frequency of dialysis
<15 hrs week	1	3 x week = 16
15 hrs week	4	Alternate days = 17
17.5-18 hrs week	13	4 x week = 1
20-30 hrs week	14	
>30 hrs week	2	

Table 8. Home haemodialysis dose (hours on dialysis)

- Twenty nine (85%) are dialysing >17.5 hours week
- Seven patients (20%) are performing overnight dialysis
- Eighteen patients (52%) are dialysing on alternate days or more
- Twenty one patients (61%) are using an ESA.
- Nineteen patients (55%) are using Fe therapy

Dialysis Adequacy assessed by Kt/v and URR

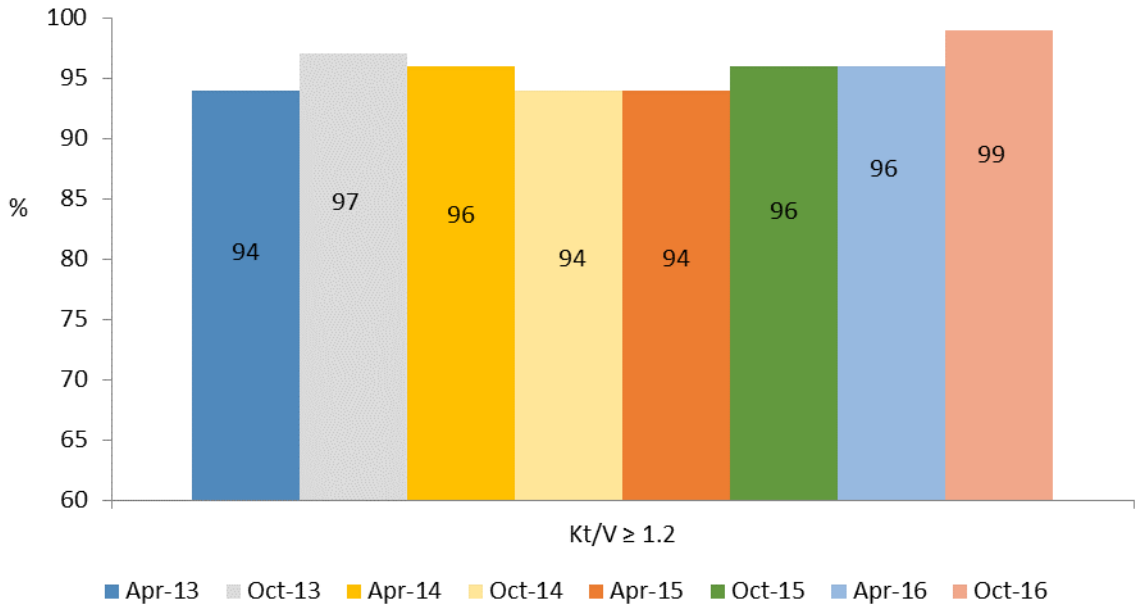


Figure 16. Dialysis Adequacy assessed by Kt/v from 2013 to 2016

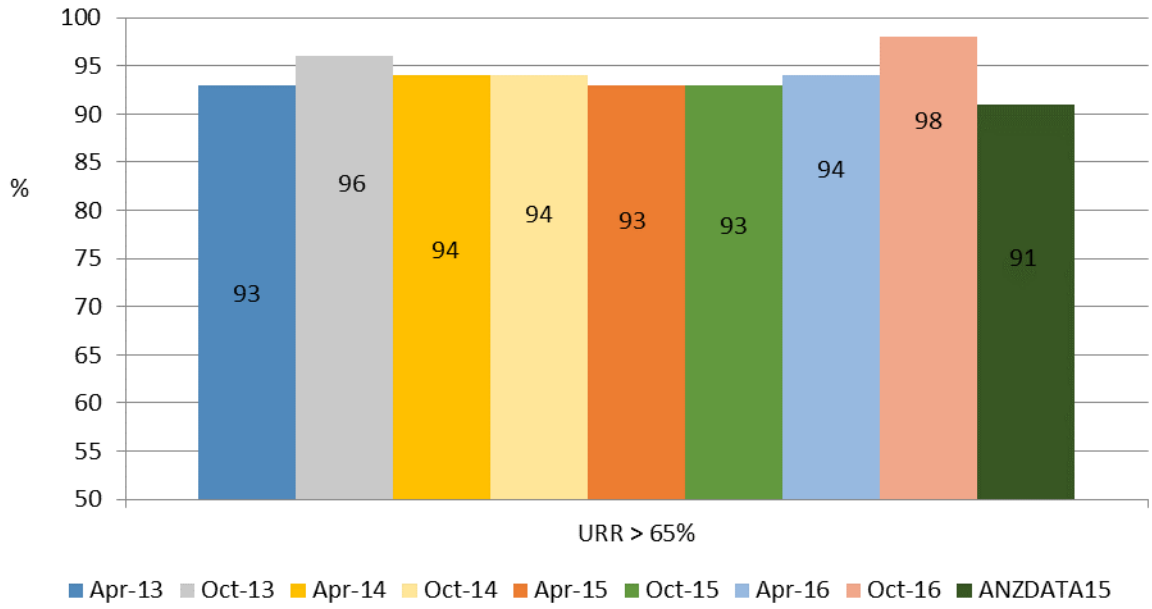


Figure 17. Figure 4. Urea Reduction Ratio (URR) >65% in patients on Haemodialysis by Year

Our data demonstrates that The St George and Sutherland rates for clearance using both Kt/v and Urea Reduction Ratio (URR) are better compared to national data from ANZDATA. This is a good achievement considering our patients older age and slightly higher co-morbidities.

Parameter	Target	Apr 14	Oct 14	Apr 15	Oct 15	Apr 16	Oct 16	ANZDATA 2015
Ca	2.25-2.58 mmol/L	70	60	62	62	67	71	
Corr Ca	2.1-2.4 mol/L	33	41	31	40	43	26	
PO4	0.8-1.6 mmol/L	63	54	58	49	48	48	**63**
$CaPO_4$ (Corrected Ca)	<4.0 mmol/L	71	62	61	58	50	53	
CaPO4	<4.0 mmol/L			64	64	57	57	**60**
Ferritin	200-800 ug/L	69	71	71	77	66	69	**-**
Fe Sats	20-40%	72	66	70	63	57	58	
Albumin	33-48 g/L	59	60	58	71	72	61	-
PCR	<1.0	55	51	61	50	51	51	-
KT/V	≥ 1.2	96	94	94	95	96	99	-
URR	>65%	94	94	93	91	94	98	**84**

Table 9. Blood biochemical targets and percentage of patients achieving target levels at St George Haemodialysis.

Of note is that our serum phosphate targets have been dropping over the past 4 years and currently we are below the national targets achieved in ANZDATA. This is something that we are tackling currently. Target levels for phosphate in most guidelines are <1.8mmol/L and the target we use may be too stringent. 29% of our patients are above 1.8 mmml/L.

Haemoglobin Targets

The current haemoglobin (Hb) target range is 100 to 120 g/dL. Hb levels >130 are associated with increased morbidity and mortality including blocking of the arteriovenous fistula. Levels below 100g/dL are associated with worsening symptoms and reduced QOL.

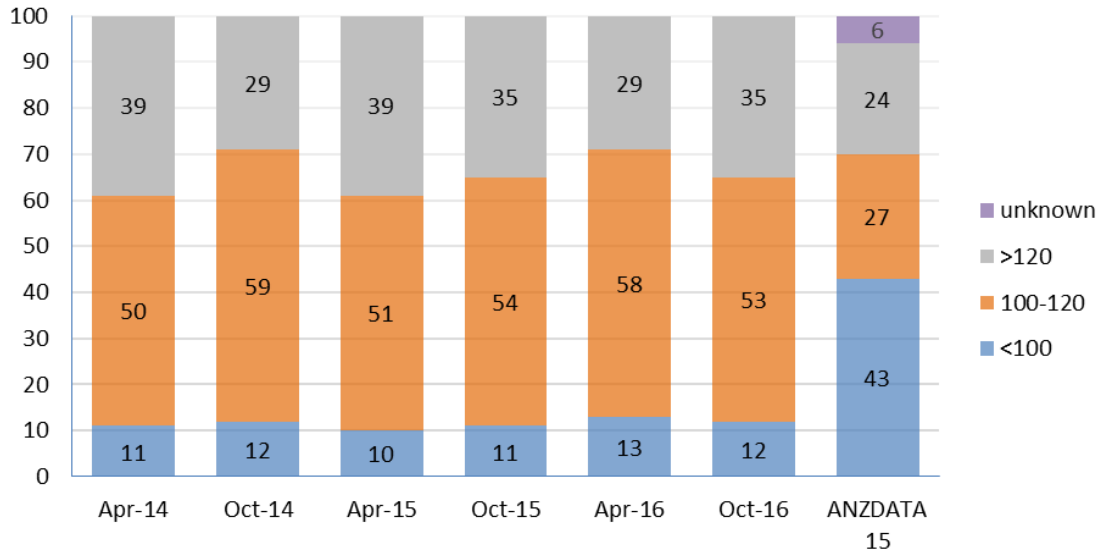


Figure 18. Serum Haemoglobin levels by target level

Overall we continue to keep about half of our patients within the target range, compared to 27% nationally (ANZDATA 15). Importantly very few (12%) are at levels below 100mg/dL. 13% of our patients had levels above 130, compared to the national average of 8.7%.

Anaemia Management Erythropoietin Use and Serum Iron Studies and

The management of anaemia for patients with end stage kidney disease (ESKD) continues to remain largely the responsibility of the primary dialysis nurse in our unit with the nephrologist determining ESA dose and being responsible for the prescription. In particular we have nurse-led initiation and management of intravenous iron for patients on haemodialysis. The program was commenced over 10 years ago and has resulted in excellent success. We continue to achieve targets above the national ANZDATA targets.

A total of 122 patients were audited for use of erythropoietin use. Eighty one percent (81%; n = 99) of patients were receiving an erythropoietin stimulating agent (ESA) at the time of the second audit in October 2016. Eleven percent (11% n = 13 were having their ESA withheld as their Hb was above target i.e. >120mg/dL. Three percent (3%; n = 4) were not on an ESA and no data was available for a further 5% (n = 6).

Approximately 82% of HD patients in Australia are on an ESA (ANZDATA 2015)

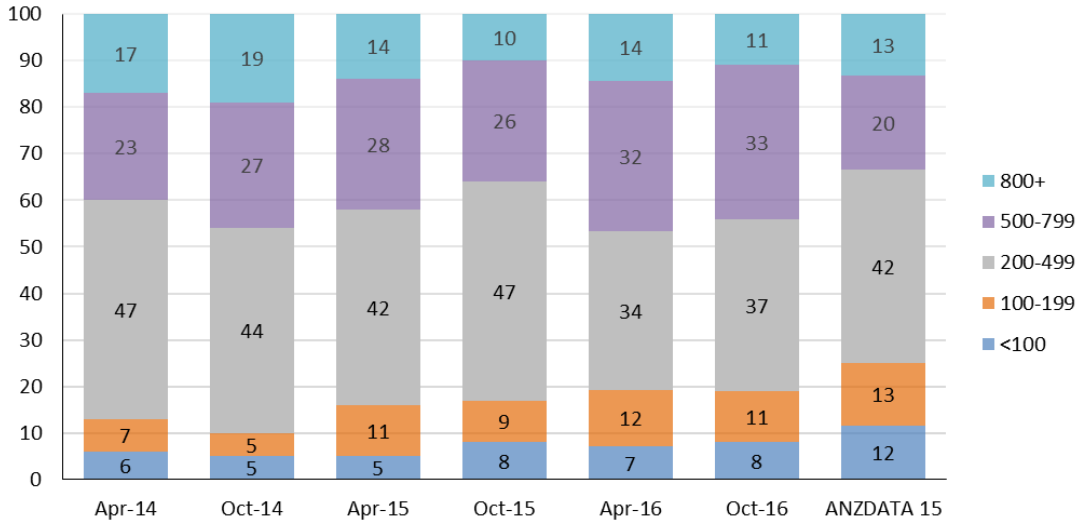


Figure 19. Serum Ferritin levels by target level

Mean Serum Ferritin for Oct 2016 was 490 with SD 287

In Australia and New Zealand ANZDATA 2015 demonstrates the proportions of haemodialysis patients with ferritin <200 mcg/L and those with ferritin ≥ 500 mcg/L have been relatively stable. Those with serum ferritin 200-500mcg/L at St George and Sutherland were 37% which was lower compared with 42% from the ANZDATA 2015 report.
Target levels for serum ferritin are from 200-400 with safe levels being levels being <800. Eleven percent of our patients had a serum ferritin >800% vs 13% from ANZDATA 2015.

Target levels for transferrin saturation are between 20-40% are targeted to ensure optimal iron stores. At St George and Sutherland hospital we had 59%, similar to the national average of 56% (ANZDATA 2015).

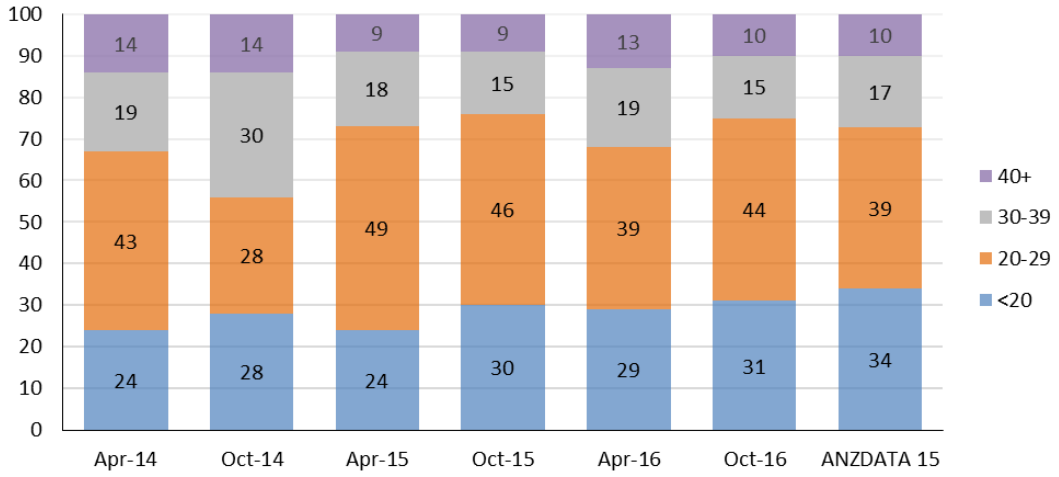


Figure 20. Serum Iron Transferrin Saturation by target Level

The St George and Sutherland haemodialysis results continue to achieve levels similar to the national ANZDATA averages for dialysis patients. This we believe is related to our 'primary haemodialysis nurse' policy which includes highly specialised nurses having more autonomy to control iron use and withdraw of erythropoietin.

Renal Bone and Mineral Disorder (MBD) Metabolism Management

Only a small number of our patients have iPTH levels at those associated with increased morbidity i.e. levels >7x normal. 45% have iPTH levels <20pmol/L, and 10% >95pmol/L. Parathyroid hormone levels are not reported in ANZDATA. Average iPTH levels <20pmol/L for April and Oct was 46%.

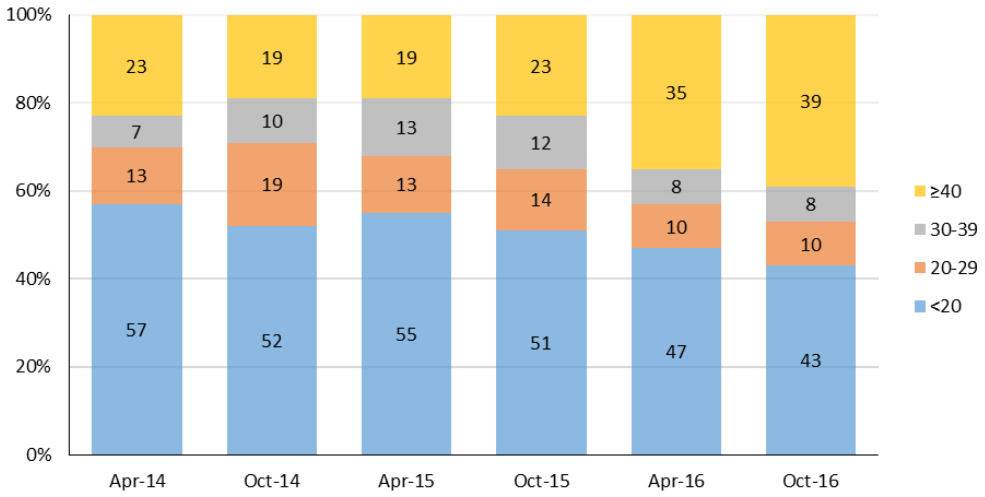


Figure 21. Serum PTH for Haemodialysis patients from 2014 to 2016

Serum Calcium

Compared with ANZDATA 2015 we had a larger number of patients within the target calcium level 2.2-2.5mmol/L, i.e. 80% versus 58%. We have a slightly higher number >2.6mmol/L. We also have fewer patients at the lower level i.e. serum Ca<2.2mmol/L. We have an aggressive focus to achieve lower serum calcium or calcium phosphate products and assisting us in achieving this were the high number of patients completing >4 hours of dialysis each dialysis session (see Tables 7 and 8).

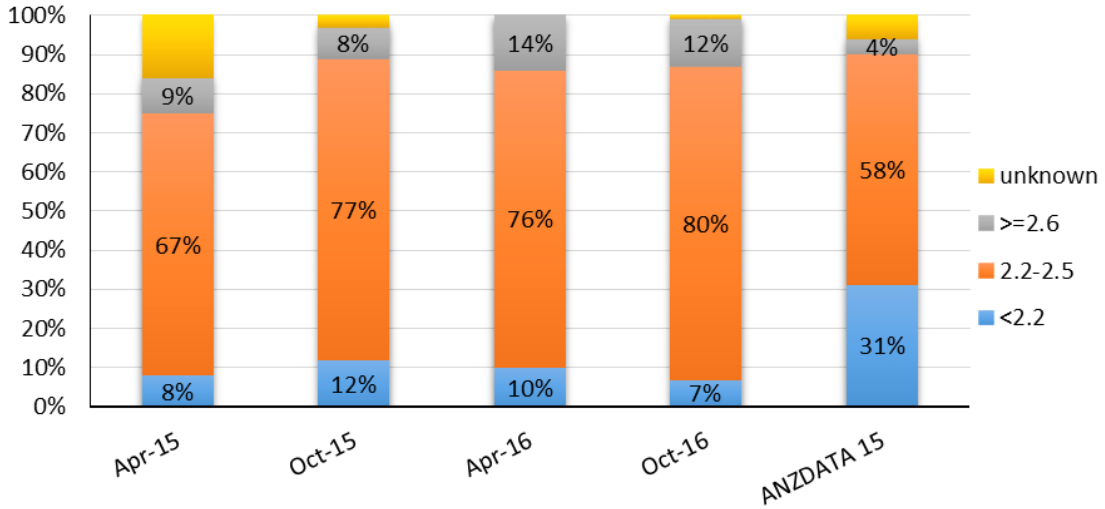


Figure 22. Serum Calcium (uncorrected) target levels 2014 to 2016 versus ANZDATA

Apr 2016: Mean 2.36, SD 0.17 and Oct 2016: Mean 2.32, SD 0.27

Serum Phosphate and Calcium Phosphate product targets

We had more patients within the target serum phosphate range 1.4-1.7mmol/L compared to ANZDATA (36% vs 29%) and a similar number with levels > 1.8mmol/L (both 31%). Higher levels make patients at higher risk for morbidity and mortality.

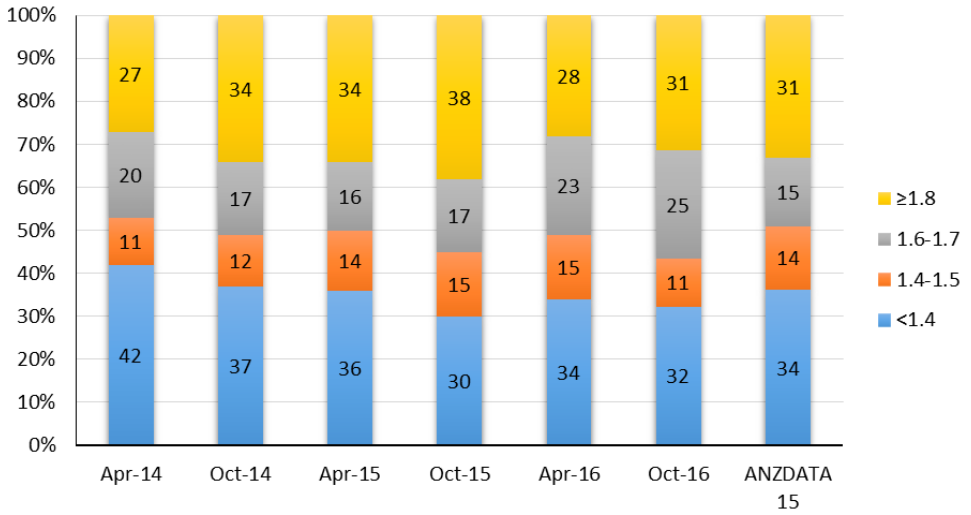


Figure 23. Serum Phosphate target levels from 2014 to 2016 versus ANZDATA

Apr 2016: Mean 1.6, SD 0.48 and Oct 2016: Mean 1.6, SD 0.41

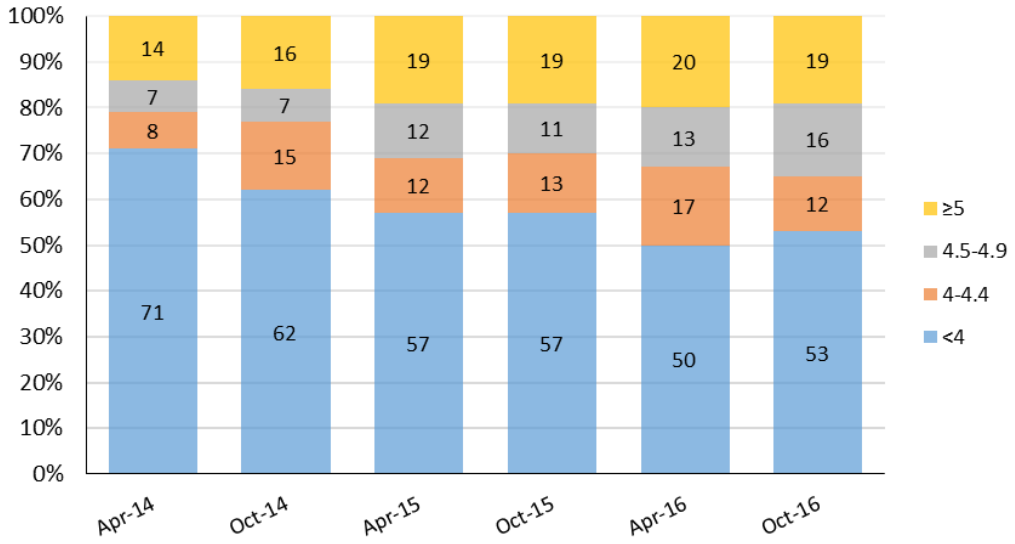


Figure 24. Corrected Calcium Phosphate Product by year.

It is important to recognise and this is acknowledged in the Australian CARI guidelines that ideal targets for bone mineral metabolism parameters are unlikely to be met with conventional dialysis methods and available phosphate binders in the majority of patients. The research evidence remains unclear as to whether using high doses of phosphate binders, using the newer phosphate binders and/or whether performing longer dialysis to improve the bone mineral metabolism status of patients will translate into improvement in the mortality of patients with chronic kidney disease.

Blood Lipid Targets

The most recent KDIGO guidelines have suggested that in adults with dialysis-dependent CKD or ESKD that statins or statin/ezetimibe combination should not be initiated in the absence of established vascular disease. Data are collected only on patients who started dialysis on a lipid reduction medication or with, or suspected of being high risk or having coronary artery disease, peripheral vascular disease, cerebrovascular disease or diabetes. We meet these targets in about half of these patients only. ANZDATA does not collect lipid levels.

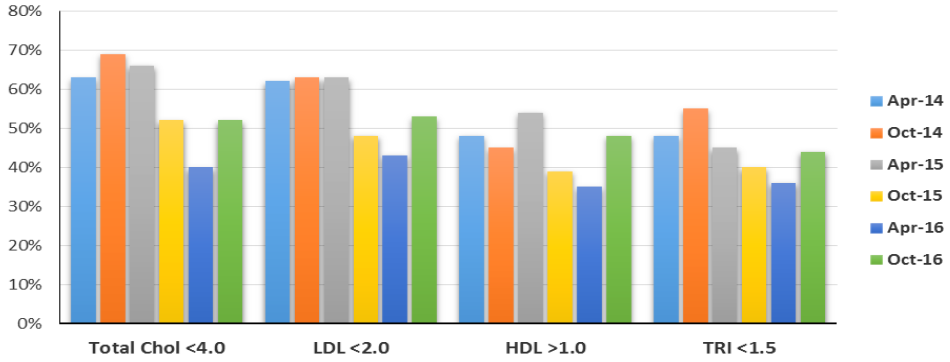


Figure 25. Lipid levels for high risk Haemodialysis patients

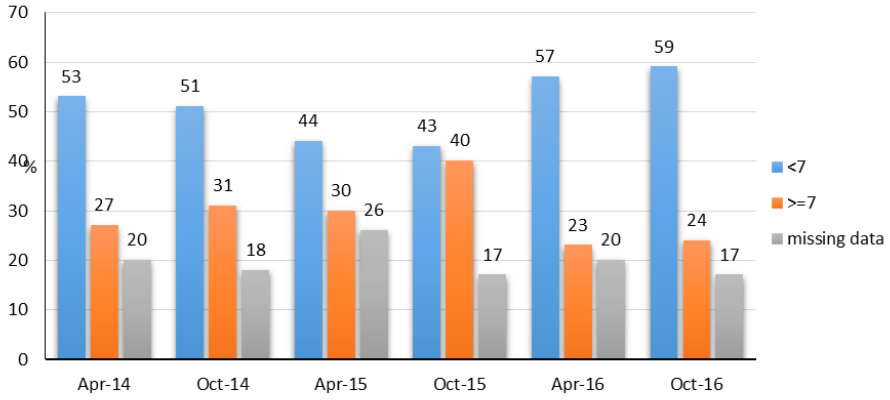


Figure 26. HbA1c for Diabetes patients on Haemodialysis

The level of HbA1c to assess control of diabetes on dialysis remains controversial. Based on an HbA1c level <7% more than half of the patients with diabetes have adequate control. 71% of diabetes patients had HbA1c <8.5%.

Summary

- Activity was steady in 2016 with an overall growth of 2% across the sites.
- On the 31st December 2016, 48 (18%) St George and Sutherland patients were dialysing at the Satellite unit.
- Thirty two percent (32%) of patients were dialysing on a home therapy (PD and HD) compared to **27% nationally** and 49% of patients were dialysing in the hospital based facility.
- Respite dialysis for home patients remained a valuable service in 2016 and 15% of patients were retrained on new machine technology.
- Both haemodialysis units (St George In-Centre and Sutherland Satellite) remained at capacity at the end of 2016. There was an increase in capacity created through the 'Night Shift' overnight dialysis in order to cope with the ongoing demand. As a result of the demand, the 'night chairs' were increased to 16 at St George Hospital from 12 which existed at the end of 2015. A new stand-alone satellite haemodialysis unit for the St George area is being planned to manage future service demands and remains a short term priority.

7. Vascular Access

Yanella Martinez-Smith and Chris Cowland

Background and Performance Indicators

- The preferred haemodialysis access is a native AV fistula (KDOQI 2006 & CARI 2012)
- The Vascular Access Nurse (VAN) aims to monitor all fistulas from creation until the commencement of dialysis to ensure maturity; monitor fistula maintenance after dialysis has commenced; and ensure a low level of fistula and vascath infection is maintained.

Data Benchmark

- Data is benchmarked against ANZDATA 2015 report, KDOQI 2006 and CARI 2012 guidelines.
- The key performance measures for vascular access are:
  1. > 40% patients commencing haemodialysis with a functioning access (ANZDATA 2015)
  2. > 78% of prevalent patients dialysing through a native fistula (ANZDATA 2015)
  3. < 10% of prevalent patients dialysing through a permanent catheter (KDOQI 2006)
  4. < 1% fistula infection rate during the useful life of the access (AVF) (KDOQI 2006)
  5. < 10% fistula infection rate during the useful life of the access (AVG) (KDOQI 2006)
  6. > 3.0 years AVF patency and 2.0 years AVG patency (KDOQI 2006)
  7. < 0.25 episodes/pt-year at risk for fistula thrombosis (KDOQI 2006)
  8. < 0.5 episodes/pt-year at risk for graft thrombosis (KDOQI 2006)
  9. < 1.5 episodes/1000 catheter days tunnelled catheter infection rate (KDOQI 2006)

Vascular Access at Commencement of Haemodialysis

The national average was 44% for patients having a functioning access at first dialysis (ANZDATA 2015).

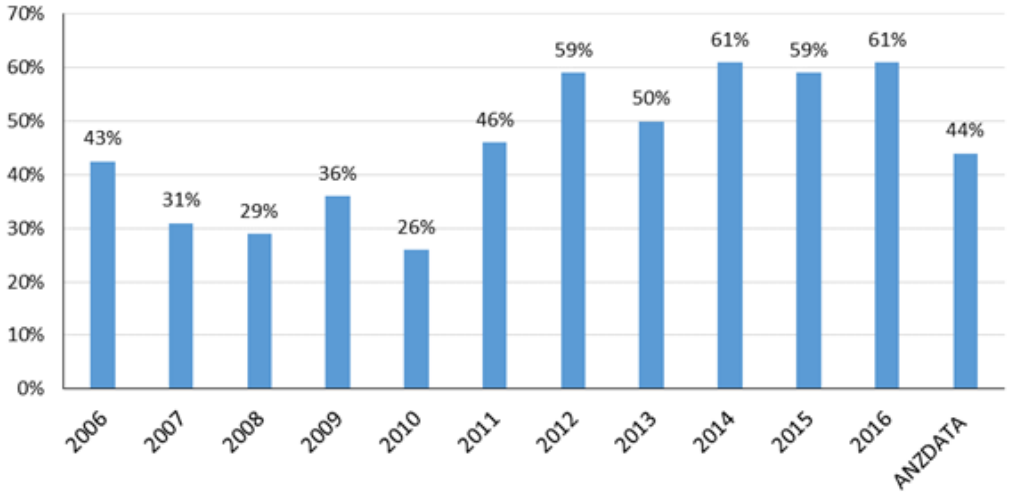
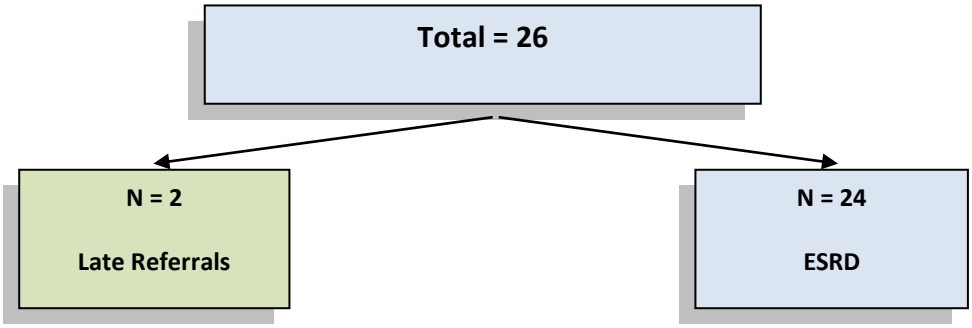


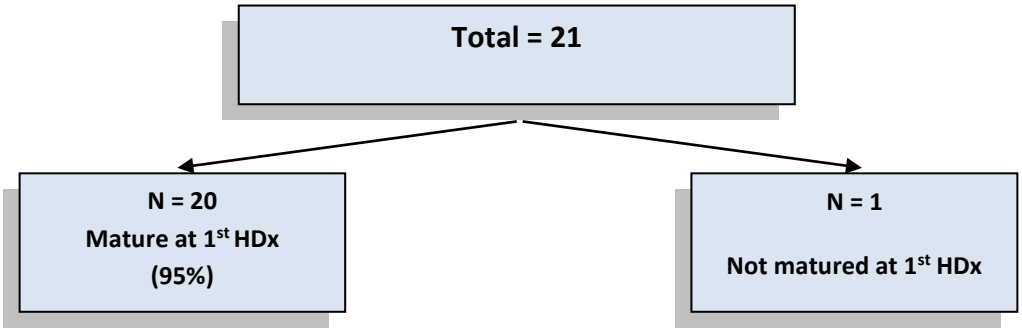
Figure 27. Functioning access at entry

- 61% of all St George Hospital Renal Department patients had a functioning access at first haemodialysis

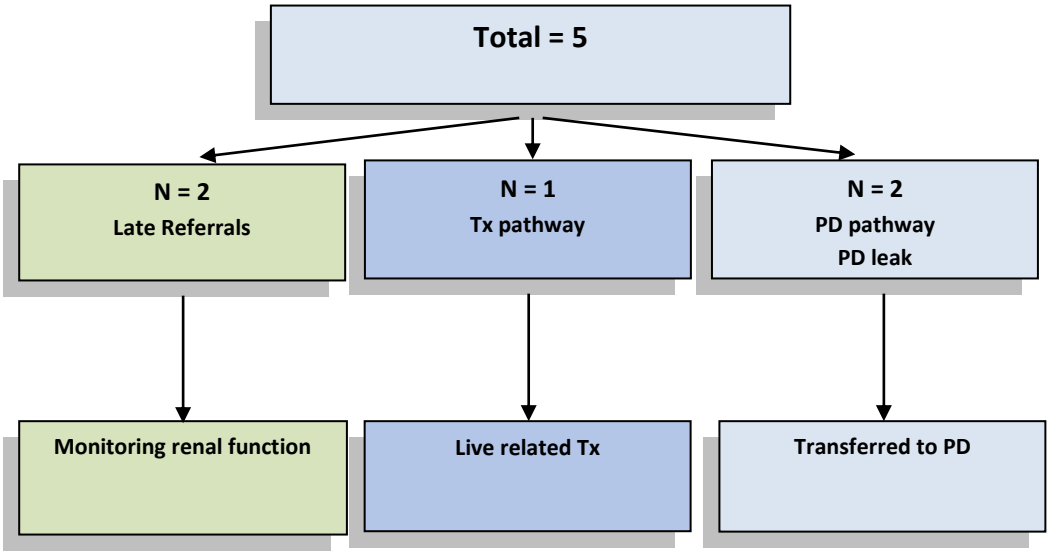
Patients new to haemodialysis in 2016



Access created before initial haemodialysis



No access created before initial haemodialysis



Comments:

- Excluding late referrals, 20 (95%) patients had a mature access at their first haemodialysis compared to 57% in the ANZDATA report.
- The late referral rate at St George Hospital Renal Department was 8% as compared to the ANZDATA Report (2015) at 17%
- Average time from initial referral to access creation was 52 days
- The aim is to have access created within 30 days of initial referral
- Average time to first cannulation in 2016 was 7.2 months

Vascular Access at first HDx

ANZDATA (2015) benchmark: 40% commenced with a native fistula (AVF) and 2% with a graft (AVG) equating to 42%.

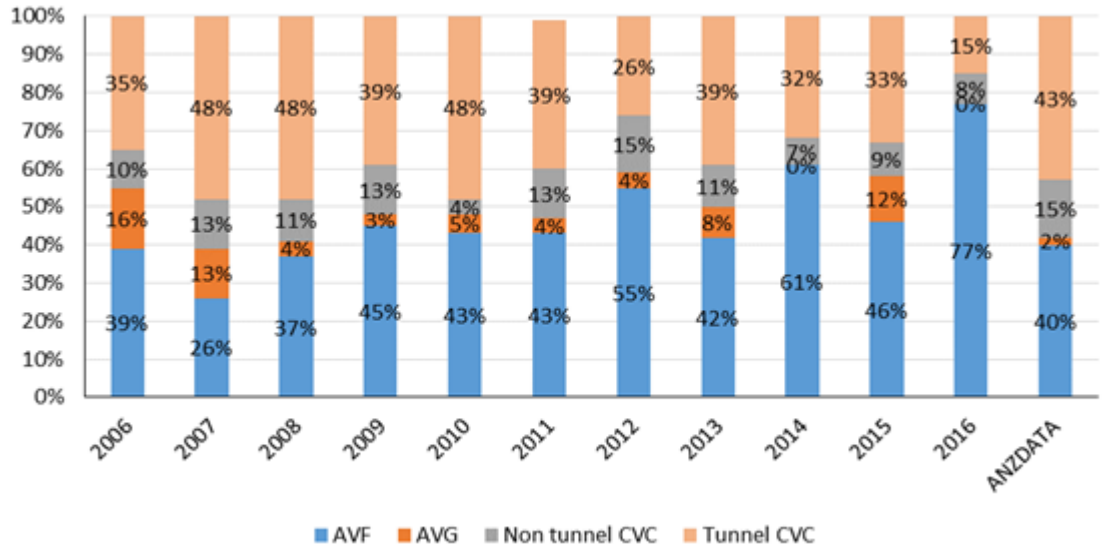


Figure 28. Vascular access at first HDx

Comments:

- St George Hospital Renal Department achieved 77% with a native fistula compared to the ANZDATA benchmark of 40%.
- 15% of St George Hospital Renal Department patients commenced their first haemodialysis via a tunnelled catheter compared to the ANZDATA benchmark of 43% (ANZDATA 2015)

Prevalent Data: (n = 214)

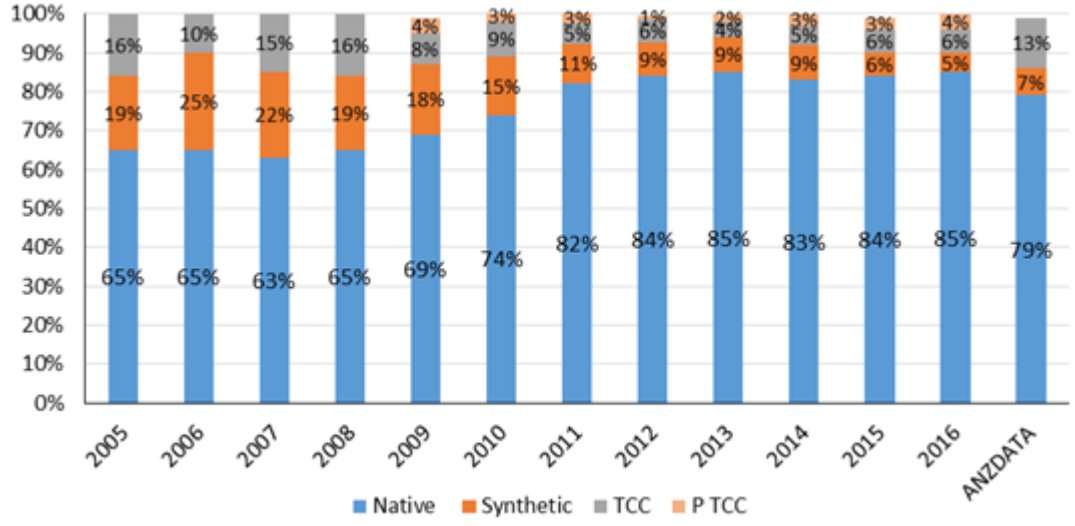


Figure 29. Prevalent access

Comments:

- 90% of St George Hospital Renal Department patients were using a fistula/graft for haemodialysis, compared to the ANZDATA benchmark of 86% and KDOQI benchmark of 40%
- 4% of St George Hospital Renal Department were using a permanent catheter which is less than the KDOQI benchmark of < 10%

Access Infection Rates

KDQOI (2006) recommends infection rate for fistula < 1% and graft < 10% during the useful life of the access.

	Blood stream infection (BSI) range AVF/SVG	Blood stream infection (BSI) range AVG
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)
2009	4 BSI (0-0.76 BSI/100 pt months)	3 BSI (0-1.15 BSI/100 pt months)
2008	1 BSI (0-1.3 BSI/100 pt months)	3 BSI (0-0.8 BSI/100 pt months)
2007	3 BSI (0-1.32 BSI/100 pt months)	10 BSI (0-4.97 BSI/100 pt months)

Table 10. Access infection rates

Comments:

- St George Hospital Renal Department patients' infection rate for fistulas was 0.5% and 0% for grafts. This data does not include home haemodialysis patients

Thrombosis events

The KDOQI (2006) guidelines:

- fistula thrombosis rate of < 0.25 episodes/pt-year at risk
- graft thrombosis rate of < 0.5 episodes/pt-year at risk

Thrombosis events			
	AVF	AVG	Ave/month
2016	15 (14pt)	3 (3pt)	1.5
2015	20 (17pt)	16 (5pt)	2.5
e2014	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
2009	10	24	2.8
2008	14	25	3.3

Table 11. Thrombosis events

Comments:

- Thrombosis rate for St George Hospital Renal Department is above target for AVF = 1.25 episodes/ pt-year
- Thrombosis rate for St George Hospital Renal Department is below target for AVG/SVG = 0.25 episodes/ pt-year
- The average thrombosis rate per month across all fistula types is 1.5
- The number of patients with AVG continues to reduce which has impacted on the thrombosis rates

Access survival

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

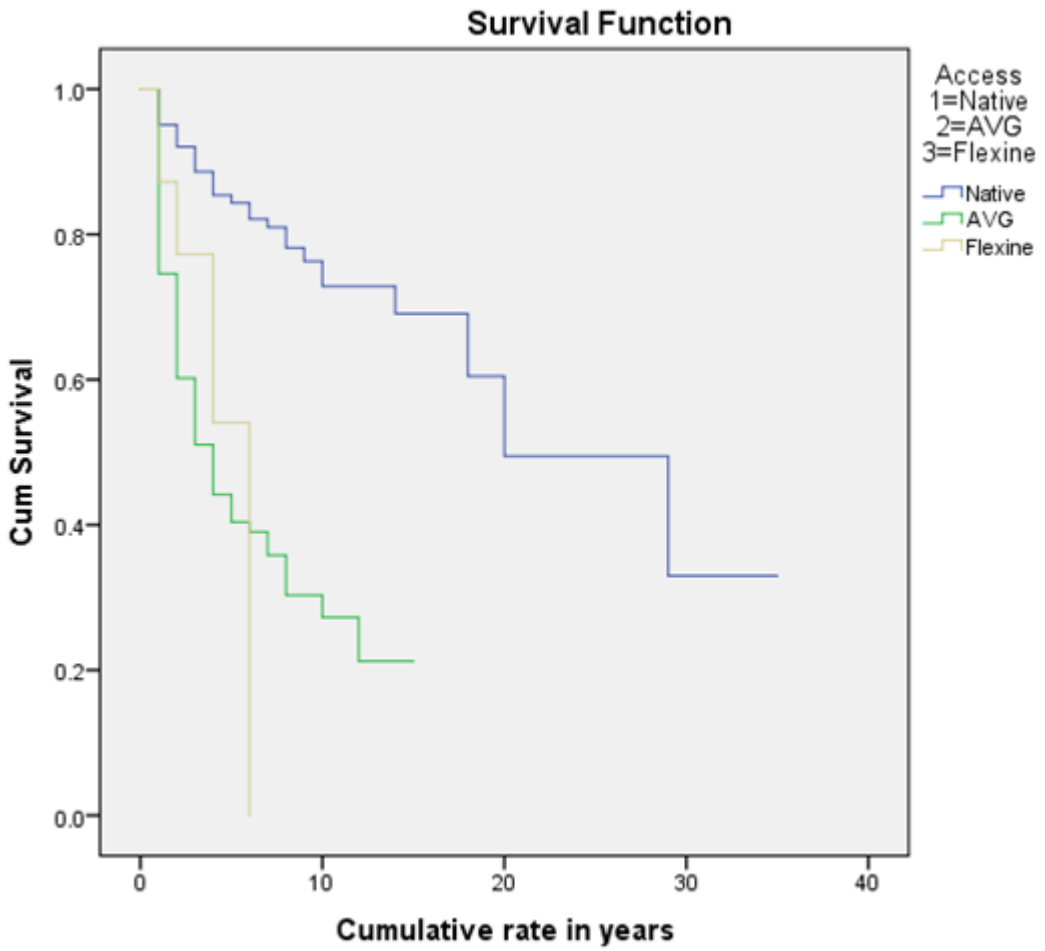


Figure 30. Survival Function

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; 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
    - AVF at 5 years (82%), at 10 years (73%)
    - AVG at 1 year (60%), 2 years (51%), 3 years (44%)
    - Flexine at 1 year (87%), 3 years (54%)
- Access survival is similar to previous year's results

Central Venous Catheters

Background

- Tunnelled cuffed catheters (CVC) are used to provide temporary access for both acute and chronic haemodialysis patients, including those with a primary AVF still to mature (KDOQI, 2006).

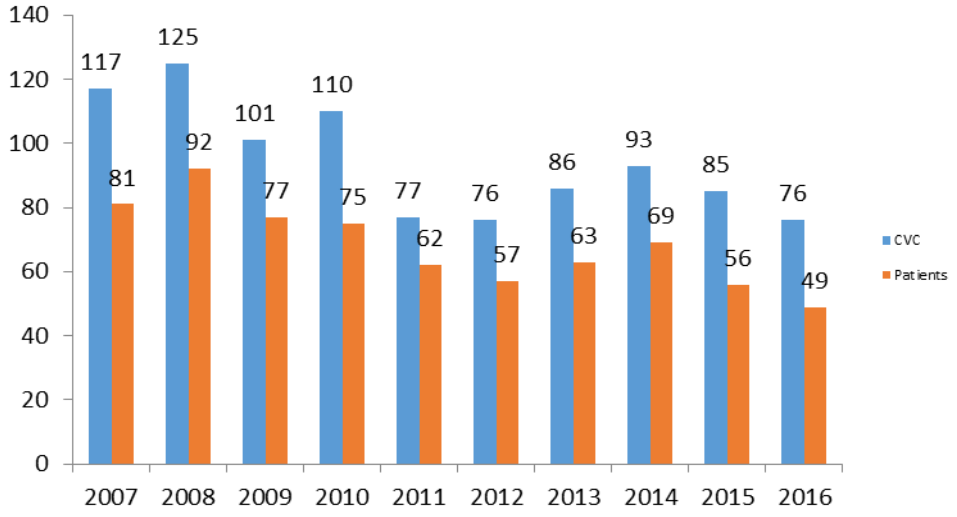


Figure 31. Figure 14: Activity Level

Comments:

- Total days all catheters in-situ 4831 days (2016) compared to 5182 days (2015)
- Average days al catheters in situ 63 days (2016) compared to 61 days (2015) and 49 days (2014)

Reason for insertion of catheters

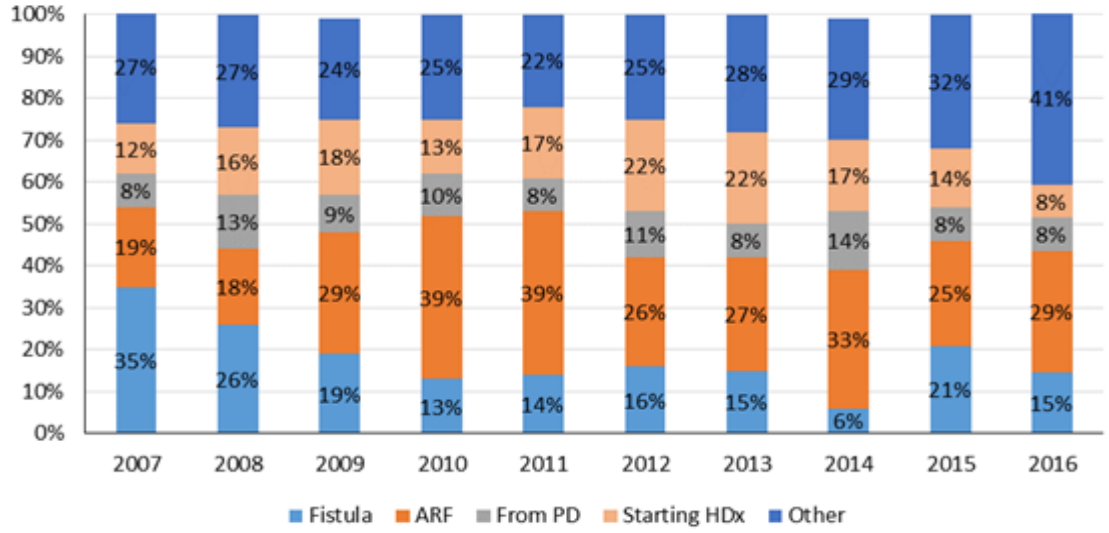


Figure 32. Figure 15: Reason for insertion of catheters

Comments:

- Fistula group includes immature, revision or thrombosed
- Other includes replacing a non-tunneled catheter with a tunneled catheter; malfunction; occlusive thrombus; cuff extrusion or infection
- There were no catheter complications related to insertion

Catheter infection rates

KDOQI (2006) recommends a catheter related bacteraemia rate < 1.5 episodes/1000 catheter days.

	Catheter related bacteraemia (CRB) rate	Exit site infections (ESI) rate
2016	**4% (0.62 episodes/1000 catheter days)**	**1.3% (0.21 episodes/1000 catheter days)**
2015	1.2% (0.19 episodes/1000 catheter days)	4.7% (0.47 episodes/1000 catheter days)
2014	2.1% (0.26 episodes/1000 catheter days)	4.3% (0.64 episodes/1000 catheter days)
2013	1.2% (0.15 episodes/1000 catheter days)	2.3% (0.31 episodes/1000 catheter days)
2012	3.9% (0.62 episodes/1000 catheter days)	6.5% (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)
2009	7% (0.57 episodes/1000catheter days)	13% (1.1 episodes/1000catheter days)
2008	10% (0.74episodes/1000catheter days)	10% (0.8 episodes/1000catheter days)
2007	6% (0.72 episodes/1000catheter days)	10% (1.24 episodes/1000catheter days)
2006	13% (1.05 episodes/1000catheter days)	11% (0.88 episodes/1000catheter days)
2005	28% (3.0 episodes/1000catheter days)	17% (1.7 episodes/1000catheter days)

Table 12. Catheter Infection rates

Comments:

- The benchmark for CRB is being met (CRB 0.62 episodes/1000 catheter days)
- For 2016, 3 catheter-related and 1 exit-site infections for a total of 76 catheters in situ
- The gentamicin/heparin lock continued to be utilised as a recommended means to reduce CRB and exit site infections rates (KDOQI, 2006)
- A gentamicin/normal saline lock used for the first week post insertion has reduced the risk of bleeding with minimal impact on lumen patency
- Potential for emergence of antimicrobial resistance (CARI, 2012) - random gentamicin levels of <0.5 mg/L indicates toxicity is unlikely

Future plans

- A 0.2 fulltime CNS grade 2 has been appointed to assisted the vascular access team
- Vascular Access Clinic has increased to twice weekly
- The combined Nephrologist/Vascular Surgeon meeting will continue quarterly
- VA PD group will continue to produce the quarterly newsletter for staff
- All vascular access protocols have been revised to be in line with best practice

Summary

- Almost all performance measures are met with vascular access; primary AVF & AVG rates are above national average. Infection rates for fistulae, grafts & catheters are low, and access survival is excellent.
- Thrombosis rates have improved compared to 2015

8. Peritoneal Dialysis

Claire Cuesta and Franziska Pettit

Activity

Peritoneal dialysis was used to treat 19% of all dialysis patients in St George compared to 20% reported in the 38th Annual ANZDATA report (2015). A total of 73 patients were on PD in 2016 compared to 75 in 2015. In December 2016, the proportion of patients receiving automated peritoneal dialysis (APD) was 92% and 8% for continuous ambulatory peritoneal dialysis (CAPD). Our APD population continues to be above the proportion reported by ANZDATA of 65%.

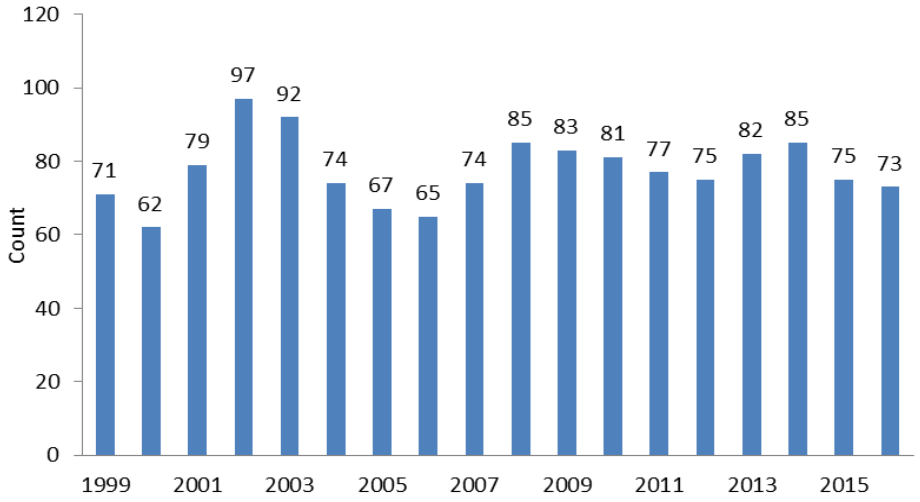


Figure 33. Total persons (prevalent and incident) on peritoneal dialysis

APD	*ANZDATA 65% (1596/2472)*	*St George 92% (47/51)*
CAPD	*ANZDATA 35% (876/2472)*	*St George 8% (4/51)*

PD patient flow

	PD patients December 31st 2015		**54**
In	New Patients	16	
	Transfer from another hospital	1	
	Returns from HD	1	
	On hospital IPD	0	
	Returns from dialysis break	1	
	In Subtotal		**19**
Out	Transplants	2	
	Transfer to other units/overseas	3	
	Transfer to Home Haemodialysis	1	
	Temporary Transfers to Haemodialysis	0	
	Permanent Transfers to Haemodialysis	10	
	Return of renal function	0	
	Withdrawal from dialysis	5	
	Deaths on PD	6	
	Out Subtotal		**22**
	Net loss	**3**	
	PD patients December 31st 2016		**51**

Table 13. PD Patient Flow

KPIs

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

1. **Biochemical targets**

Parameter	Target	Apr 15	Oct 15	Apr 16	Oct 16	ANZDATA15
Corr Ca	2.1-2.4 mmol/L	56	49	53	46	-
PO4	0.8-1.6 mmol/L	43	46	63	50	42
CaPO4	<4.0 mmol/L	46	43	51	42	
Uncorrected CaPO4	<4.0 mmol/L	60	42	63	56	56
Albumin	33-48 g/L	35	35	29	36	-
PTH	7-45 mmol/L	69	74	67	69	-

Table 14. Biochemical targets

- Serum Calcium
  - 46% of patients achieved the target for serum corrected calcium in October 2016. The ANZDATA benchmark is for uncorrected calcium only.
  - 69% of patients have serum Ca level 2.2-2.4 in October 2016, an improvement from 54% last year. The mean calcium result is 2.3 (SD 0.202) and our profile for serum Ca is better than ANZDATA 2015.

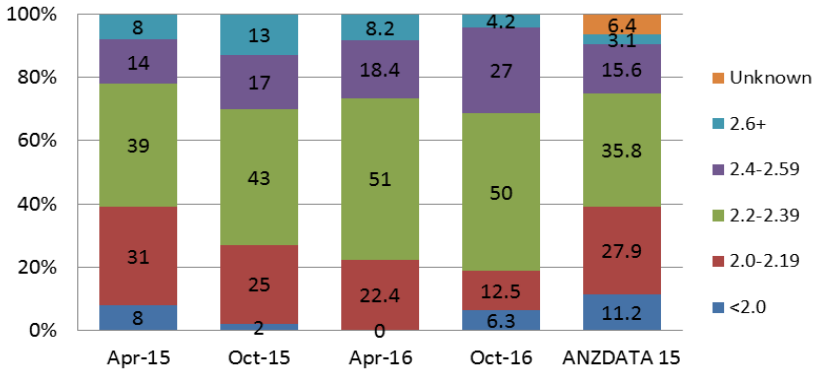


Figure 34. Serum Calcium (mmol/L)

- Phosphate
  - In October 2016, 50% of patients were within the target for serum phosphate of 0.8-1.6 mmol/L, an improvement from last year and better than ANZDATA. Our profile for serum phosphate did not match the national data (ANZDATA). The mean phosphate result was 1.74 mmol/L (SD 0.47).

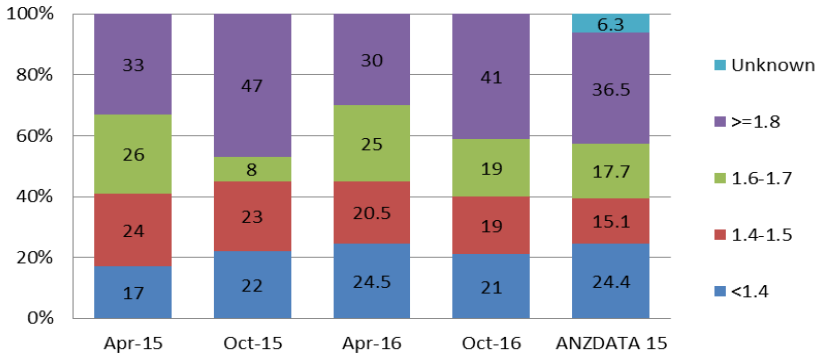


Figure 35. Serum Phosphate (mmol/L)

- Calcium Phosphate Product
  - ANZDATA calculated the Calcium phosphate product with uncorrected calcium. Our profile for uncorrected calcium x phosphate product in October 2016 is comparable to the national data. The mean uncorrected calcium x phosphate product is 3.99 (SD 1.12)
  - We also calculate Calcium phosphate product with corrected calcium, the median for our corrected Calcium phosphate product is 4.54 (CI 3.66, 4.4)

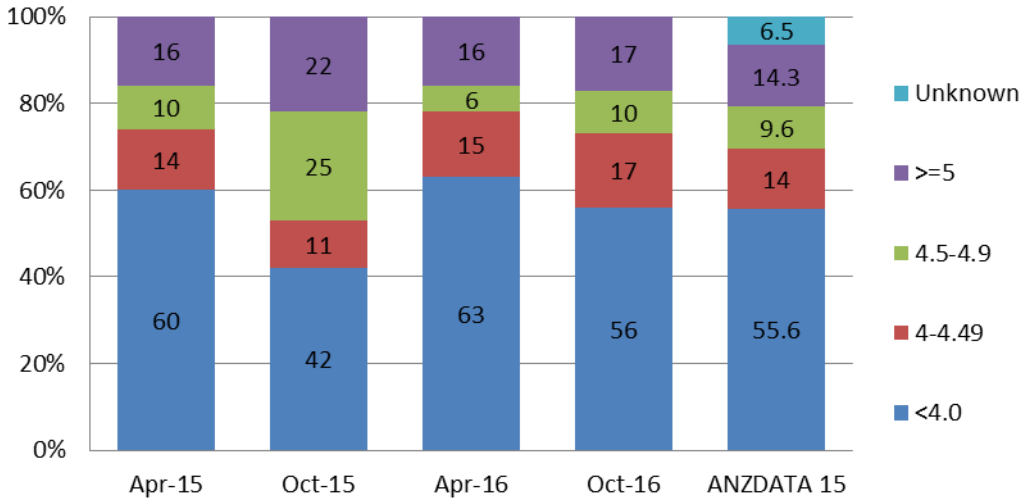


Figure 36. Uncorrected Calcium x Phosphate Product

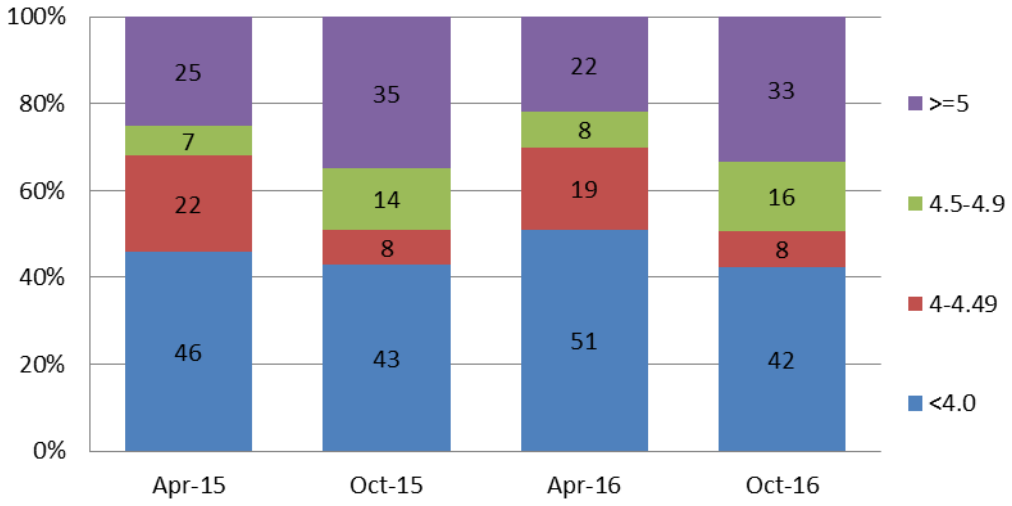


Figure 37. Corrected Calcium x Phosphate Product

- Albumin
  - 36% of PD patients had albumin level within 33-48 g/L in 2016, similar to previous year's result. 17% of PD patients had albumin level 30-32 g/L and mean albumin level was 29.3 g/L (SD 5.8).

- PTH
  - In October 2016, 69% of PD patients had PTH 7-45 mmol/L. The median PTH result in 2016 was 35.2 mmol/L (CI 32, 48). More patients have higher PTH in 2016 compared to last year.

2. **Haematological targets**

- Haemoglobin
  - 57% achieved our target of 100-120 g/L in October 2016, an improvement from last year and better than ANZDATA 2015
  - In October 2016, 91% of PD patients with Hb <100 were receiving erythropoiesis stimulating agents (ESA). 50% of the patients with high Hb (>120) were also receiving ESA. These patients had reduced ESA dose or frequency. 18% 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.

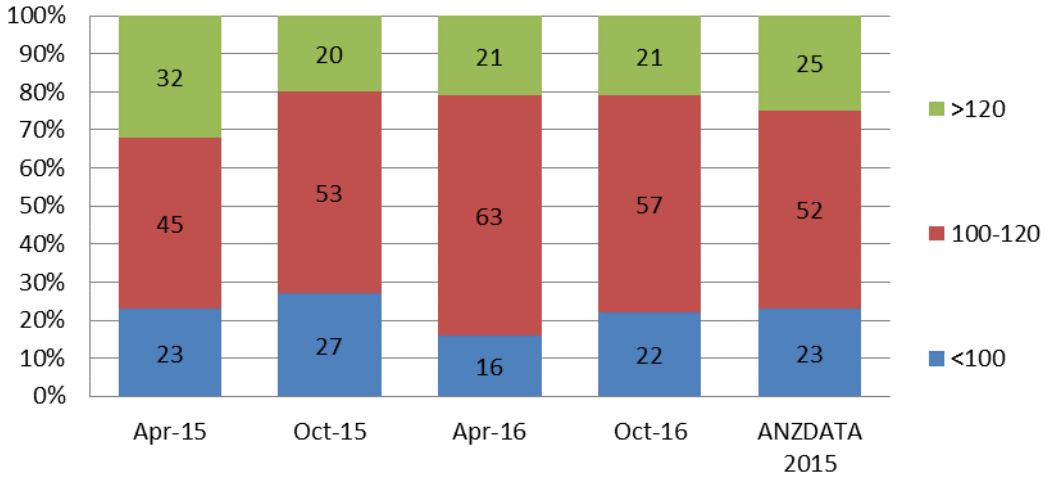


Figure 38. Haemoglobin in Peritoneal Dialysis patients

- HbA1c (Glycosylated Haemoglobin)
  - 50% of peritoneal dialysis patients had diabetes in October 2016.
  - 68% diabetics were screened for HbA1C with the median HbA1C result of 7.3% (CI 6.84, 8.34, minimum 5.7%, maximum 10.5%). Only 36% of screened diabetic patients had results below 7.
  - If HbA1c target is adjusted to recent 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), 71% of screened diabetic patients are within ISPD target in 2016.

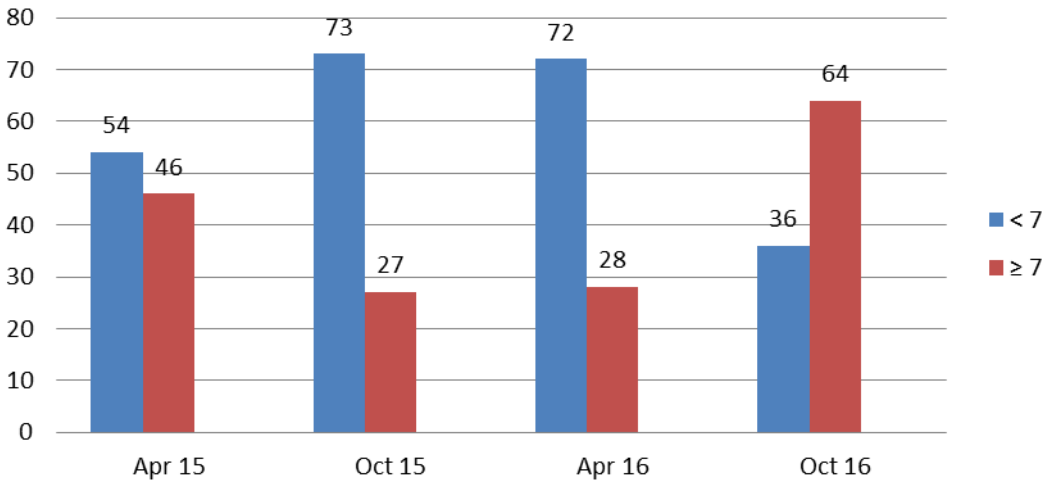


Figure 39. HbA1c results in PD patients

- Lipids
  - 76% of PD patients (N=38) in October 2016 were considered high-risk, these include patients having or suspected of having diabetes, coronary artery disease, cerebrovascular disease and peripheral vascular disease. Lipid studies were collected for 71% of high-risk PD patient and all results improved in 2016.

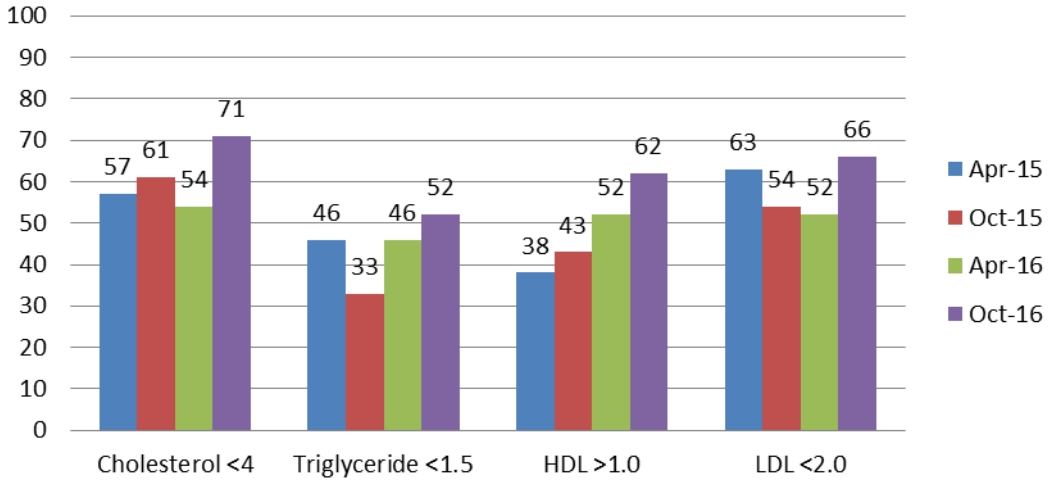


Figure 40. Lipids within normal limits in high risk patients only

- Iron
  - Iron replete refers to ferritin levels between 200-800ng/mL as well as iron saturation between 20-50%. 57% of PD patients were iron replete in October 2016 and median ferritin was 384 ug/L (CI 372, 601), mean transferrin was 24.4% (SD 8.42). Our iron studies profile in 2016 is better than the national data (ANZDATA 2015).

Parameter	Target	Apr 15	Oct 15	Apr 16	Oct 16	ANZDATA 15
Ferritin	200-800 ug/L	61	52	63	62	52
Transferrin	20-50%	75	73	80	64	65

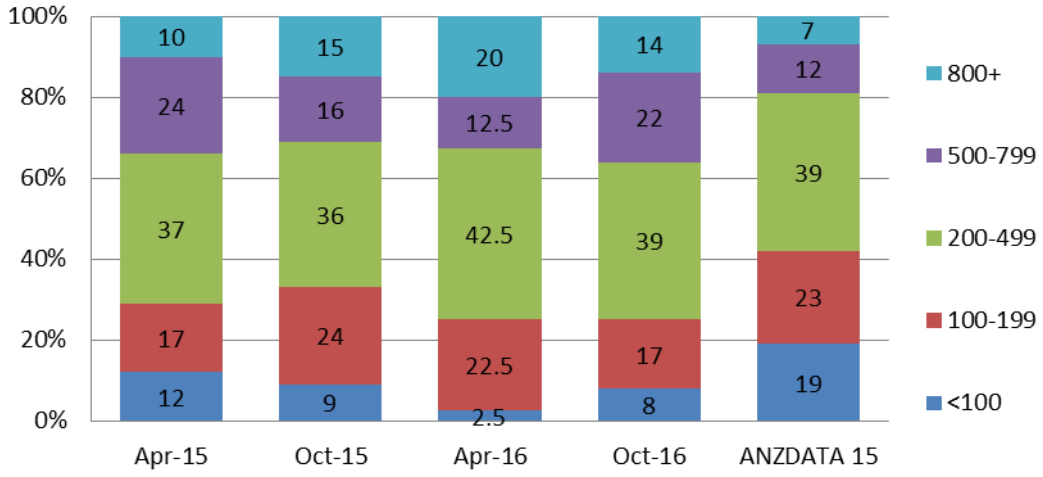


Figure 41. Ferritin

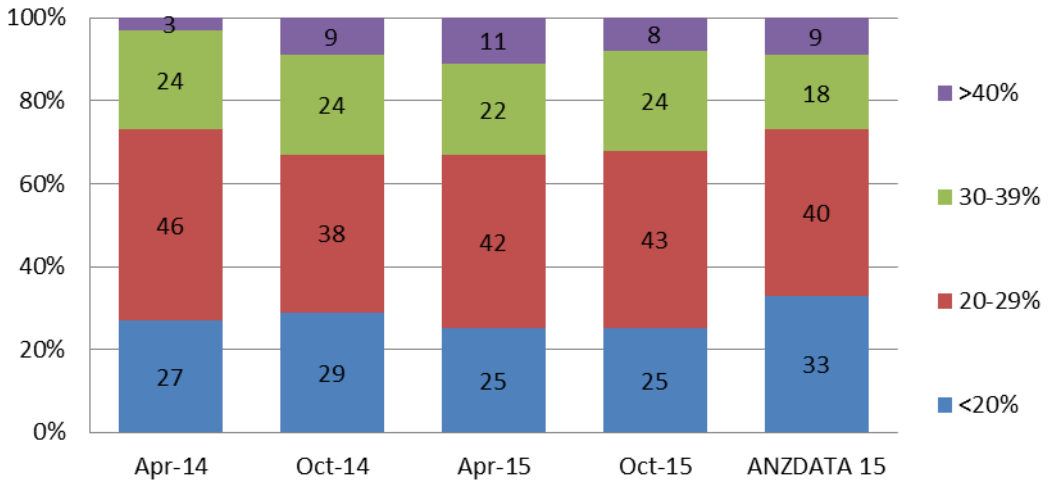


Figure 42. Iron Saturation (Transferrin)

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 2016, the median Kt/V was 2.0 (CI 1.93, 2.31, min 1.2, max 4.4)
  - Creatinine clearance – Benchmarked against the CARI target of 60 L/week/1.73 m^2 in high and high-average peritoneal transporters and 50 L/week/1.73 m^2 in low-average and low peritoneal transporters. In October 2016, mean creatinine clearance was 77.3 L/week/1.73 m^2 (SD 30.9, min 32, max 154) and 85% of APD patients had creatinine clearance of ≥ 45 L/week/1.73m^2 (ISPD target for patients on APD), an improvement from last year.

Parameter	Target	Apr 15	Oct 15	Apr 16	Oct 16
KT/V	≥ 1.7	85	84	74	82
CCL	>50L (L & LA) or >60L (H & HA)	77	70	72	77
CCL (ISPD)	>45L (for APD patients)	79	73	80	85

Table 15. Dialysis adequacy

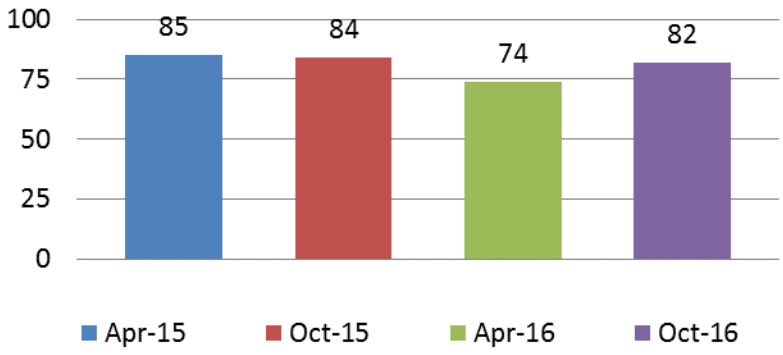


Figure 43. Kt/V ≥1.7

4. Patient and Technique Survival

The 5-year PD patient and technique survival data from 2010-2015 were provided by the ANZDATA registry. The 5-year patient survival rates of those on PD for more than a year were significantly better than the national rates for both Australia and New Zealand.

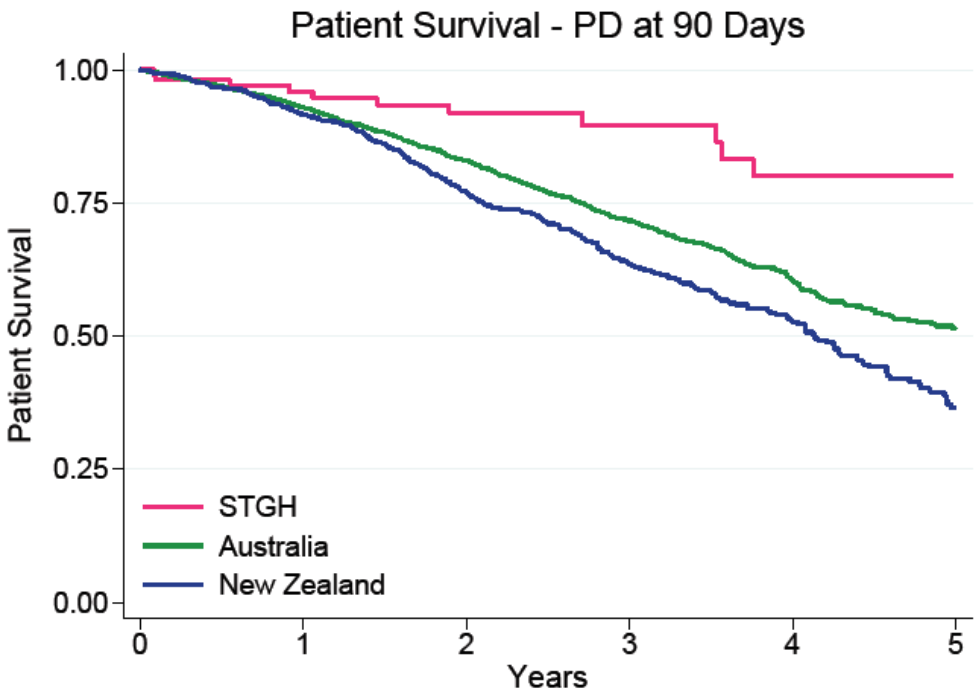


Figure 44. Patient survival – PD at 90 days

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	109	100.0	3970	100.0	1195	100.0
3 months	98	98.1 (92.8-99.5)	3626	98.4 (97.9-98.7)	1109	98.8 (98.0-99.3)
6 months	92	98.1 (92.8-99.5)	3283	96.9 (96.3-97.4)	1018	96.7 (95.5-97.6)
1 year	81	95.9 (89.4-98.4)	2600	93.0 (92.1-93.8)	847	91.6 (89.7-93.1)
2 years	58	91.8 (83.4-96.1)	1562	83.0 (81.5-84.4)	526	77.1 (74.1-79.8)
3 years	33	89.5 (79.3-94.8)	847	71.7 (69.6-73.7)	294	63.6 (59.8-67.1)
4 years	21	80.0 (64.5-89.3)	373	60.5 (57.7-63.1)	148	52.6 (48.2-56.8)
5 years	8	80.0 (64.5-89.3)	122	51.5 (47.9-55.0)	46	36.5 (30.8-42.2)

Table 16. PD Patient survival – PD at 90 days. ANZDATA individual hospital report 2010-2015 (Table 23)

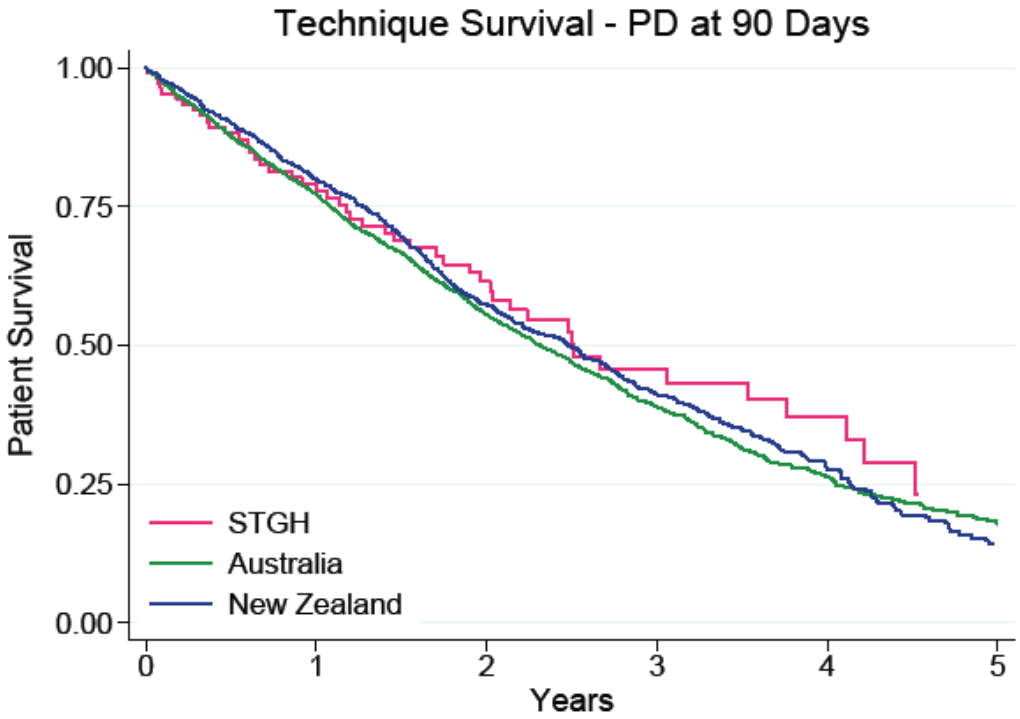


Figure 45. Technique survival – PD at 90 days

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	109	100.0	3970	100.0	1195	100.0
3 months	93	93.4 (86.7-96.8)	3456	93.8 (92.9-94.5)	1066	95.0 (93.6-96.1)
6 months	82	88.2 (80.1-93.1)	2965	87.7 (86.6-88.7)	946	90.0 (88.1-91.7)
1 year	66	79.1 (69.4-86.0)	2149	77.3 (75.8-78.7)	742	79.9 (77.4-82.3)
2 years	38	61.5 (49.9-71.1)	1030	55.6 (53.6-57.5)	399	57.3 (53.9-60.5)
3 years	18	45.6 (32.8-57.4)	442	38.9 (36.7-41.2)	191	41.1 (37.3-44.7)
4 years	10	37.1 (24.0-50.2)	159	26.3 (23.8-28.8)	83	27.7 (23.8-31.7)
5 years	3	23.1 (9.9-39.4)	42	17.8 (15.0-20.9)	23	14.1 (10.4-18.5)

Table 17. PD Technique Survival – PD at 90 days. ANZDATA individual hospital report 2009-2014 (Table 19)

5. Technique Failure

ANZDATA reported the commonest primary cause of technique failure (ceasing peritoneal dialysis apart from deaths and transplant) was "total dialysis/technical failure" at 37%, followed by infection at 33% in 2015. At St George Hospital, the primary cause of technique failure in 2016 was similar to ANZDATA (2015) with "total dialysis/technical failure" being the main cause at 64%. These were due to abdominal surgery, hernia, pleuro-peritoneal leak, blocked catheters and inadequate solute clearance due to peritoneal membrane failure.

- Eleven patients were transferred to haemodialysis permanently in 2016. Two of these patients transferred due to poor compliance to PD. Mean age of patients at time of transfer to haemodialysis was 61 years (min 43, max 76) and mean time on PD at time of transfer to haemodialysis was 35.7 months (min 5.7, max 74.7).

Primary reason for technique failure	2012 n=9	2013 n=12	2014 n=17	2015 n=9	2016 n=14	ANZDATA 2015
Infective	22%	30%	23%	0%	18%	33%
Total Dialysis/Technical Failure (catheter block, hernia, inadequate dialysis, leaks, surgery)	78%	60%	60%	89%	64%	37%
Social (poor compliance to PD)	0%	10%	17%	11%	18%	15%
Other causes or unreported cases	0%	0%	0%	0%	0%	15%

Table 18. Primary reason for technique failure

6. PD-related Infection rates

- Peritonitis episodes and rates
  - 2016 peritonitis rate results continue to surpass the national benchmark, however results are worse than in 2015. The St George peritonitis rate over a 3 year period from 2014–2016 is 1/86.2 months.
  - 82% (42/51) of patients on peritoneal dialysis in 2016 were peritonitis-free
  - The average time on dialysis for current patients who have had peritonitis was 39.3 months, and for those who are peritonitis free was 25.8 months indicating that the longer patients stay on PD, the higher the risk of developing peritonitis
  - In 2016, 6% of our patients could expect peritonitis in any one year compared to 46% 10 years ago.
  - The number of episodes of peritonitis and the number of patients who had peritonitis in 2016 increased from last year. However, the proportion of peritoneal dialysis patients who were 3 years peritonitis-free in 2016 was 77%, a slight improvement from last year of 64% and better than ANZDATA 2015 at 41%.

	STGH			Australia		
Year	Episodes	Years	Rate (95% CI)	Episodes	Years	Rate(95% CI)
2010	16	56.22	0.28 (0.16-0.46)	1073	2059.92	0.52 (0.49-0.55)
2011	13	55.75	0.23 (0.12-0.40)	798	1967.87	0.41 (0.38-0.43)
2012	6	58.39	0.10 (0.04-0.22)	775	2078.63	0.37 (0.35-0.40)
2013	10	56.76	0.18 (0.08-0.32)	830	2177.70	0.38 (0.36-0.41)
2014	8	64.32	0.12 (0.05-0.25)	845	2295.57	0.37 (0.34-0.39)
2015	5	55.05	0.09 (0.03-0.21)	904	2412.37	0.37 (0.35-0.40)
Overall	58	346.49	0.17 (0.13-0.22)	5225	12992.06	0.40 (0.39-0.41)

Table 19. Rates of peritonitis (per patient-year) ANZDATA Individual Hospital Report 2010-2015 (Table 20)

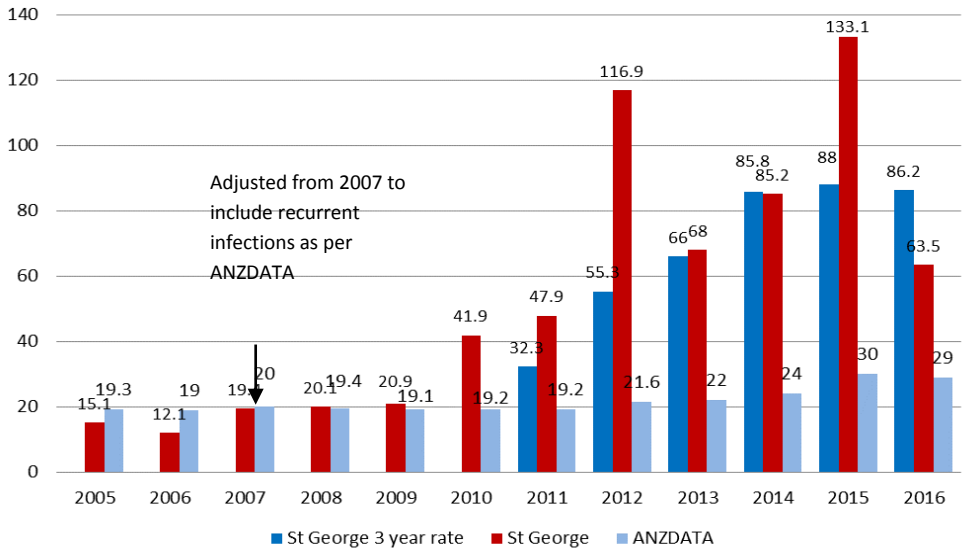


Figure 46. Patient months per episode of peritonitis

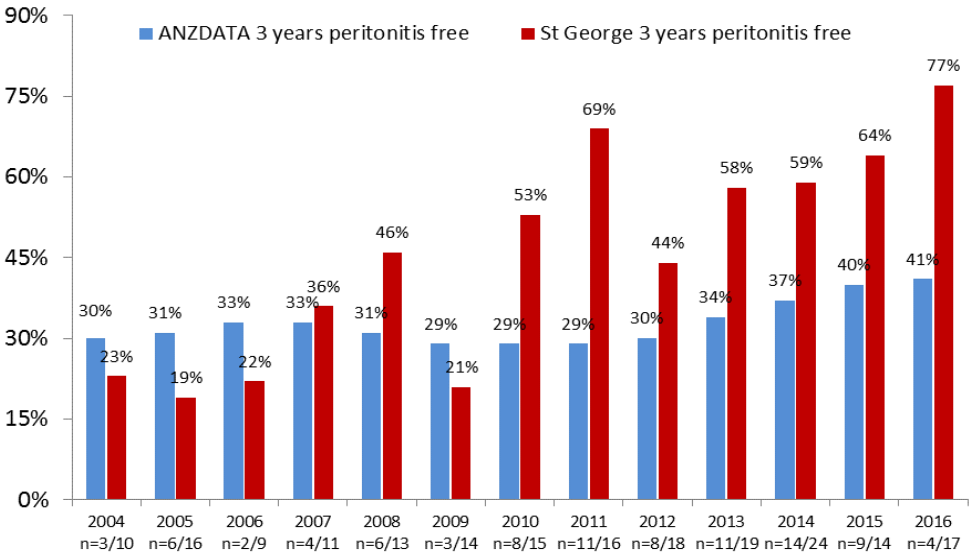


Figure 47. Proportion of patients 3 years peritonitis free

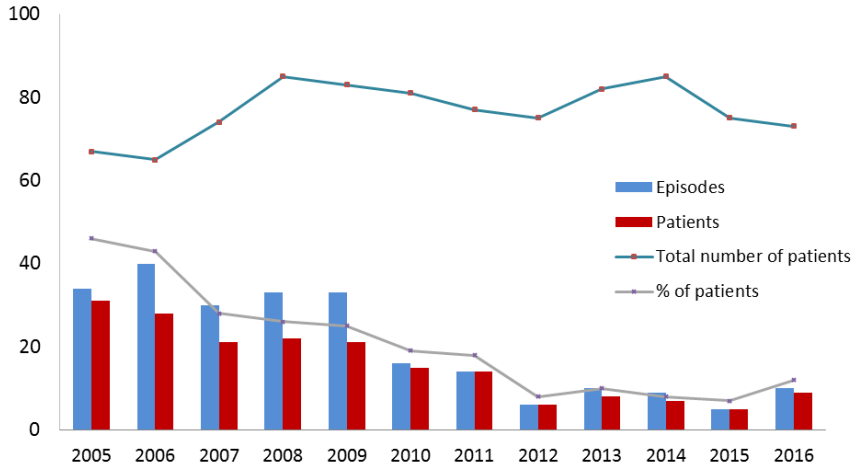


Figure 48. Peritonitis Episodes

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total patients	67	65	74	85	83	81	77	75	82	85	75	73
Peritonitis episodes	34	40	30	33	33	16	14	6	10	9	5	10
Patients with at least 1 episode of peritonitis	n=31 46%	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%
Patients with at least 1 episode of Exit site infection	n=16 24%	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%

Table 20. 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 2016:

Change in treatment as a direct result of peritonitis (%)	2007	2008	2009*	2010*	2011*	2012*	2013*	2014*	2015	2016
Interim Haemodialysis	10	6	0	6	0	0	0	0	0	0
Permanent Haemodialysis	13	18	15 (5/33)	24 (4/17)	14 (2/14)	16 (1/6)	30 (3/10)	33 (3/9)	0	10 (1/10)
Catheter removed	20	24	15 (5/33)	41 (7/17)	14 (2/14)	16 (1/6)	30 (3/10)	33 (3/9)	0	10 (1/10)

Table 21. Change of treatment as a result of peritonitis

- Gram negative organisms was the commonest organism of peritonitis episodes in 2016.
  - There were no MRSA or fungal peritonitis infections since 2014.

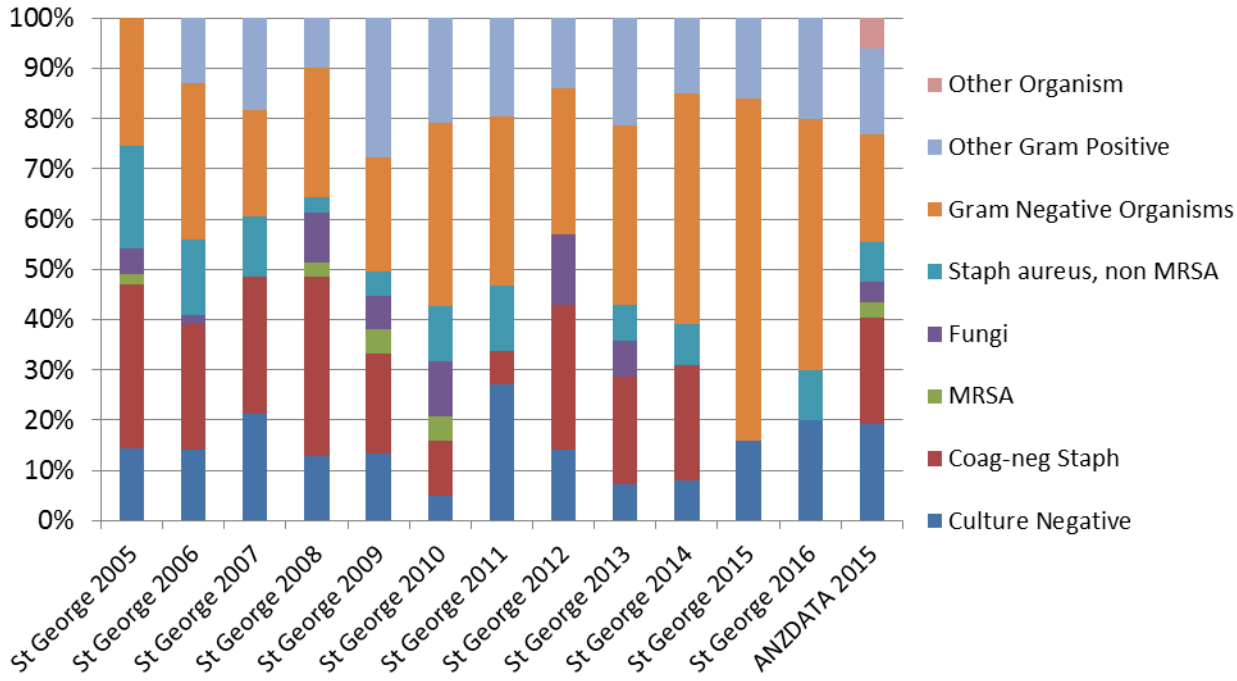


Figure 49. Peritonitis Causative Organism

- Exit Site Infections (ESI)
  - ANZDATA does not collect data on exit site infections, we can only compare to previous year's result.
  - 2016 exit site infection rate is 1/106 months. Exit site infection rate over a 3 year period from 2014–2016 is 1/109 months. Last year's results were better.
  - There were no fungal or culture negative exit site infection since 2015.
  - 5% of PD patients had exit site infection in 2016, similar to last year.

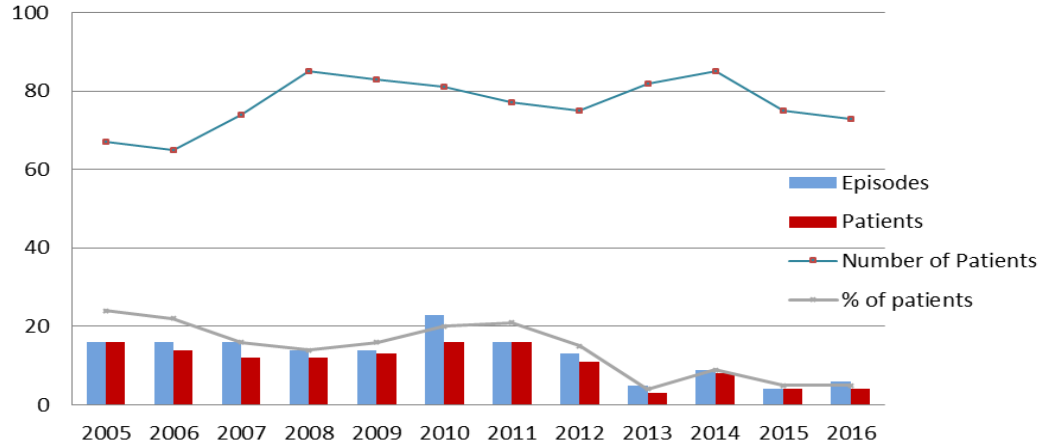


Figure 50. Exit Site Infection Episodes

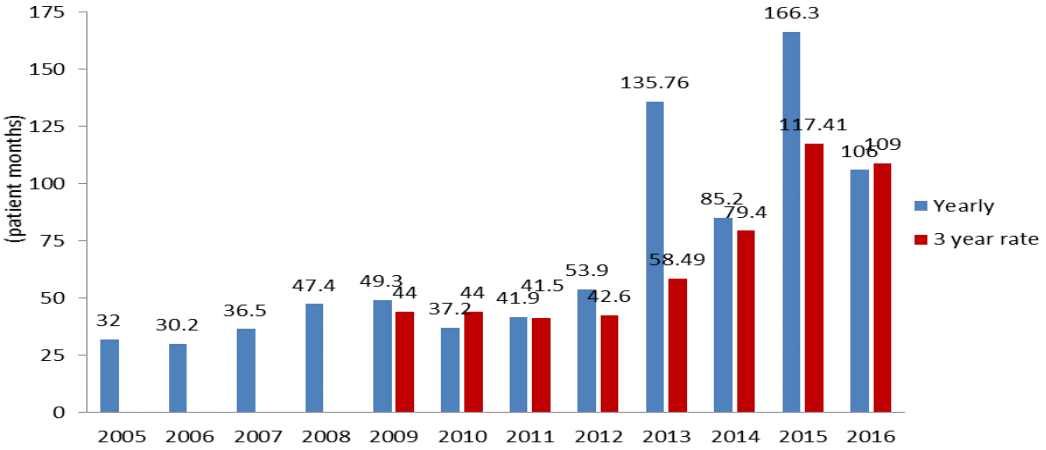


Figure 51. Exit site infection rate per patient months

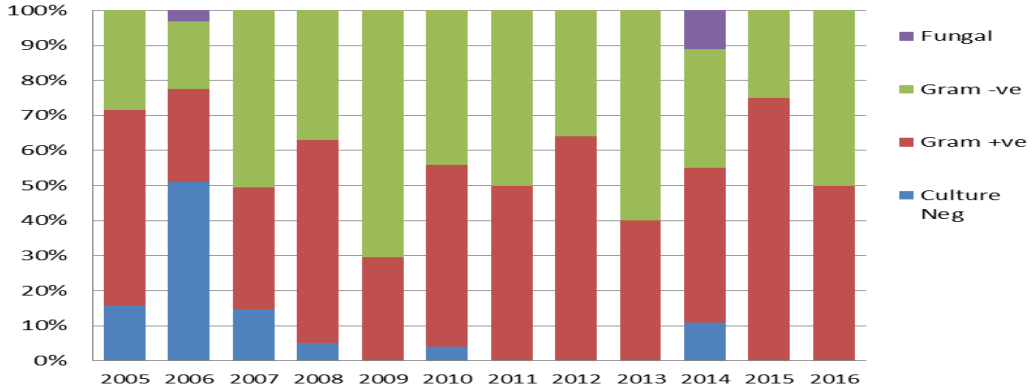


Figure 52. Exit site infection causative organisms

7. **Change of Modality and Deaths**

- We have fewer transplants than the national average.

	St George 2012 (%)	St George 2013 (%)	St George 2014 (%)	St George 2015 (%)	St George 2016 (%)	ANZDATA 2014 (%)
Transplants	5	4	11	17	4	9
Changed to haemodialysis	16	15	26	17	19	18
Deaths	9	8	5	4	12	11

Table 22. Change of Modality and deaths

Note: The rates are calculated using the total number of patients on peritoneal dialysis at 31.12.2016 (n=51), 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 is the preferred PD therapy.
3. Some improvements with anaemia, lipid and phosphate management in 2016 though HbA1c may be running too high.
4. More patients have PTH above target (7-45 mmol/L) this year.
5. Patient survival and peritonitis rates are better than the national outcomes.
6. The percentage of patients who are peritonitis-free at 3 years was 77% in 2016. This is higher than the ANZDATA result at 41%.
7. Despite the decline in our combined peritonitis and exit site infection rates in 2016, it remained better since data collection in 2005, while the total numbers of patients were stable.
8. Changed to haemodialysis and death rate in 2016 is comparable to the national rate. Also similar to national data is "total dialysis and technical failure" as the primary reason for PD technique failure in 2016.

Research activities

- St George PD unit is participating in PDOPPS (Peritoneal Dialysis Outcomes and Practice Pattern Study) since 2014, an international study to identify practice patterns that lead to better care and improved clinical outcomes for PD patients. This study was originally set-up for 3 years, it was officially extended to 2017 last year with plans for further extension until 2019 pending NHMRC funding approval. In 2016, St George PD unit consent rate of 67% is in top 5 Australia-wide. There are 36 PD patients who consented and 22 active patients to the study at present. 14 consented patients were withdrawn from the study due to kidney transplantation, transfer to HD or death. Data entry and recruitment of new and prevalent replacement patients for the study are ongoing.

- The "Transition from PD" project is to support a planned patient transition to haemodialysis or conservative care from peritoneal dialysis. A protocol with a structured risk assessment and management pathway for all PD patients is completed in 2016 to identify potential PD failure early and initiate timely implementation of processes i.e. vascular access creation or renal supportive care referral and patient education/support.

Management: Clinical and QA activities

- In the aim to improve HbA1c screening in 2017, pre-filled blood request forms with reminders will be mailed to PD patients every 6 months. ISPD recommended a new HbA1c target ≤7% for

diabetic PD patients and added a separate HbA1c target of ≤8.5% for older PD patients with diabetes to reduce the risk of hypoglycaemia, however, age group for elderly was not defined by ISPD. This will be discussed within the renal department.

- To improve patient compliance for blood testing, PD patients will be set-up for SMS reminders.
- Anaemia, phosphate and PTH management remain challenging. In 2017, we will include ad hoc flagging of patients with poor biochemistry and haematology results through electronic communication to their nephrologists. This approach is in addition to the current practice of flagging these patients through the renal clinic and monthly multi-disciplinary team (MDT) patient review.
- Given the increased peritonitis and exit site infection episodes in 2016, a methodical review will be undertaken that involves root-cause analysis and patient demographic review of all PD related infective episodes in 2016 with relevant findings to be compared to previous years. It will also include a progressive review of our PD practices and literature search on recent infection control guidelines aimed to advance our infection prevention education, practices and strategies.
- In view of providing ongoing PD support to predialysis patients choosing PD and in the aim to retain them on the PD pathway until PD commencement, prePD assessment and education program was formatted to 3 sessions in 2016:
  - First session is group education on "Introduction to PD" and an opportunity to meet and greet the PD nurses for predialysis patients with eGFR 13-15.
  - Second session for predialysis patients with eGFR 10-12 is the individualised assessment and education session with a focus on the practical and technical aspects of PD.
  - Third session is for predialysis patients with eGFR <10 booked for a catheter insertion, a short 1:1 education on pre and post catheter insertion care and follow-up.
  - Additionally, "Freedom on PD" coloured patient brochure was developed featuring the St George Hospital PD team and outlining the benefits of home therapies and PD. Pre PD assessment and education program will continue and group education sessions will run quarterly in 2017.
- All effective initiatives and projects will continue i.e. clinic review checklist project, nurse-facilitated iron management, bi-annual patient newsletters, monthly MDT patient review, 1:1 comprehensive training and retraining program and outpatient follow-up and support.
- There is an increasing need for nursing home placements and assisted PD for our elderly PD patients in the past 2 years. A structured PD support and training program tailored to nursing home nurses was developed in 2016 aimed to streamline the uptake of PD patients into aged care facilities. Currently there are 6 nursing homes within the SGH catchment area prepared and willing to accommodate PD patients pending bed availability.
- Ongoing collaboration with the dietitian to improve patient nutrition i.e. 6-monthly dietitian review referrals for high-risk PD patients, regular clinical meetings and shared patient tracking database.
- Continue the 3-yearly review of PD policies to keep in line with national (CARI) and international (ISPD) clinical practice guidelines.

9. Transplant

Tania Burns and Kylie Turner

Aim

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 also provides data about patients who are currently on the National Organ Matching Service (NOMS) transplant waiting list, renal donors and the transplant assessment clinic.

2016 Overview

- A total of 211 kidney transplant recipients and 53 living kidney donors were under the care of SGH nephrologists during 2016.
- Fourteen people received a kidney transplant: six were from live donors and three of those were through the paired kidney exchange.
- Four people died with functioning grafts.
- Two people had graft failure and returned to dialysis.
- Two people transferred out and 3 transferred in
- Five people donated a kidney
- A total of 60 people were reviewed at the SGH transplant assessment clinic by a nephrologist from Prince of Wales hospital, the transplanting unit.
- At 31/12/16 30 SGH dialysis patients were listed with NOMS, comprising 50% of the ECRS list.
- Eleven patients with CKD completed work up pre-emptively and have been assessed as suitable for transplant.

Transplant patient flow

1/1/16 SGH transplant patients registered with ANZDATA	**194**
In	
Transplanted	14
Transferred care in	3
In Subtotal	**17**
Out	
Transferred care out	3
Died	4
Graft failure transferred back to dialysis	2
Out Subtotal	**9**
Net Gain	**+8**
31/12/16 SGH transplant patients	**202**

Post-transplant follow up

Of the 211 kidney transplant recipients seen at SGH in 2016:

- 195 are primary grafts, 15 are second grafts and 1 is a third graft
- 56 of these patients received grafts from live donors
- 16 were pre-emptive transplants

Benchmarks to 12 months post-transplant:

- Rates of biopsy proven acute rejection in first 6 months <25%
  Due to the large number people diagnosed and treated for borderline rejection within the first month, the rates of biopsy proven rejection are above the benchmark. 43% of SGH transplant patients this year were diagnosed with acute rejection within the first 12 months, but only 2 cases (14%) were clear cut rejection. All the cases were diagnosed at POWH; four during the first week post op, one at day seven and one at day 15. Management of borderline rejection will be discussed with the POW transplant team.
- Rates of new onset diabetes after transplant (NODAT) <15%
  This target was met for 2016 but overall the cumulative rate remains high (22%).
- Rates of BK nephropathy <5%
  The rate of 7% is close to benchmark given the small numbers
- Rates of BK viraemia <15% (where BK viraemia defined as >850copies per ml)
  The rate of 16% is close to benchmark given the small numbers
- Rates of CMV viraemia <15% (CMV viraemia defined as PCR CMV measurement > 500 copies/mL)
  CMV viraemia rates stable at 17% and close to the benchmark given the small numbers
- Rates of CMV infection <5%
  Very low CMV infection rates 5%
- Rates of post-transplant surgical complications < 5% (urological, vascular and wound)
  Cumulative rates of urological & vascular and wound complications are above benchmark at 10% but there were none of either in 2016. The cumulative rate of wound complications is higher at 15%. The rate for 2016 was 14% and related to 2 patients with wound dehiscence.

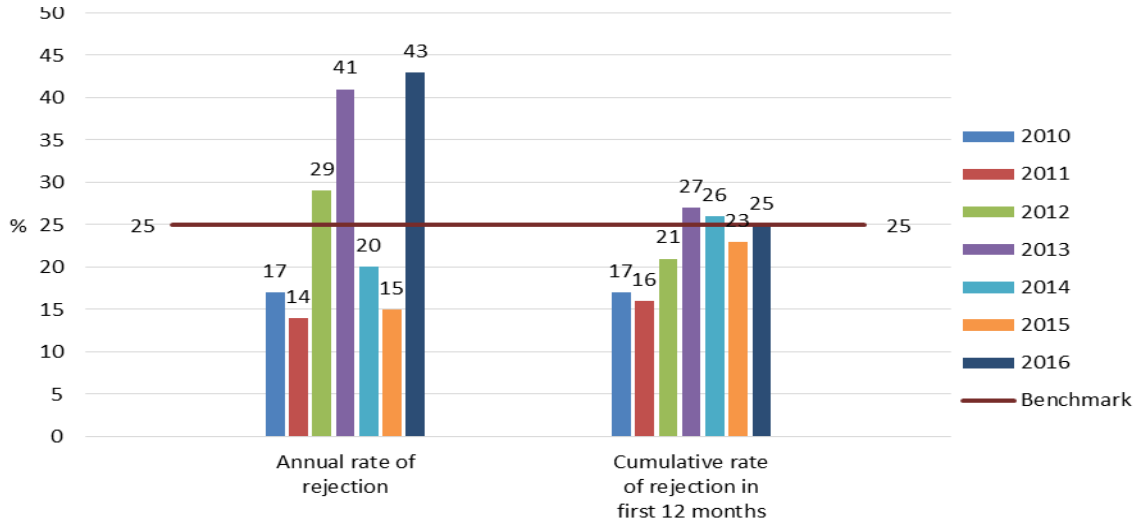


Figure 53. Rate of biopsy proven acute rejection in first 12 months

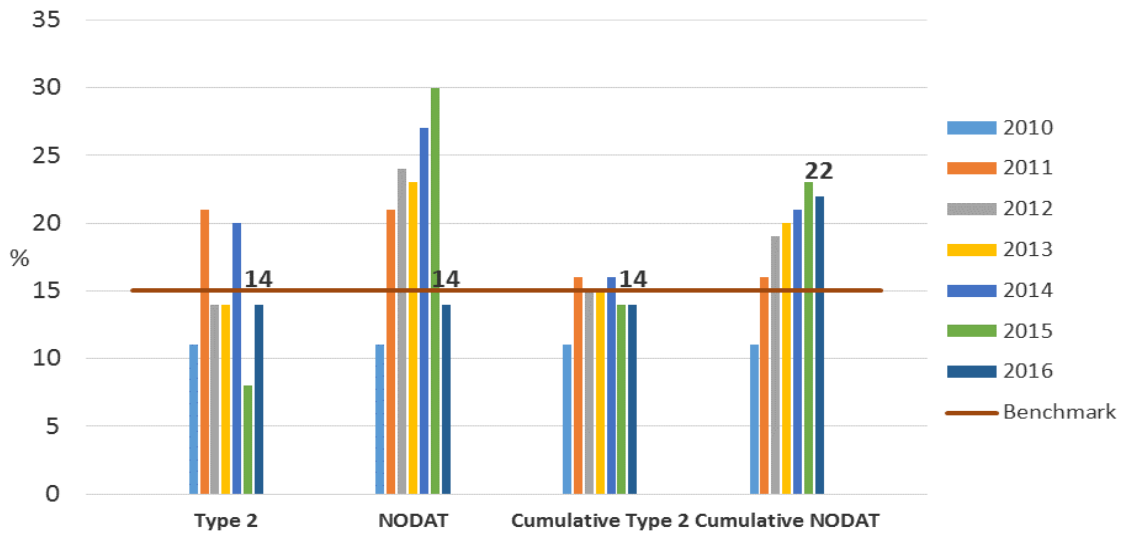


Figure 54. Rate of diabetes in first 12 months

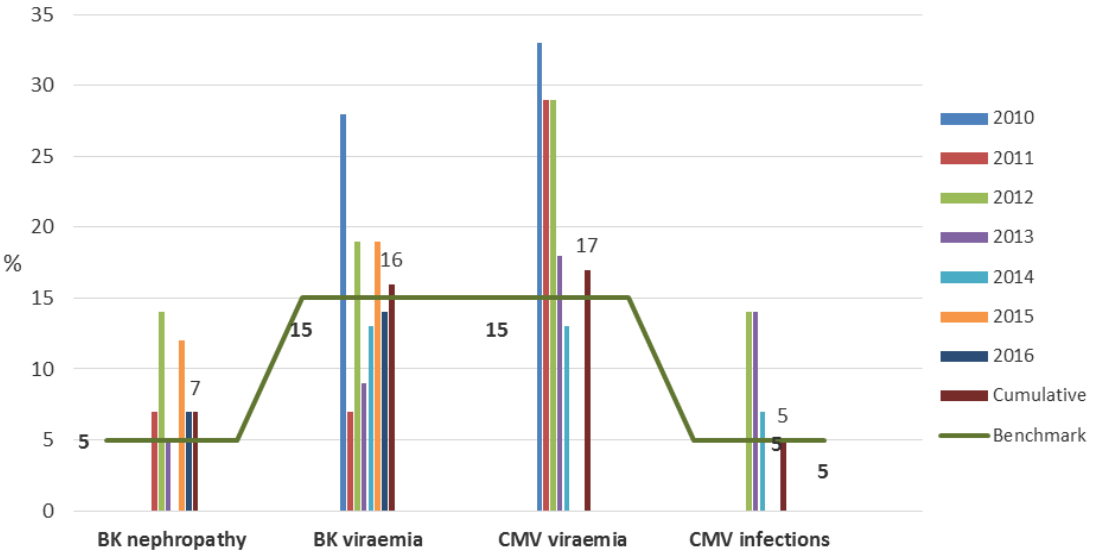


Figure 55. Infection in first 12 months

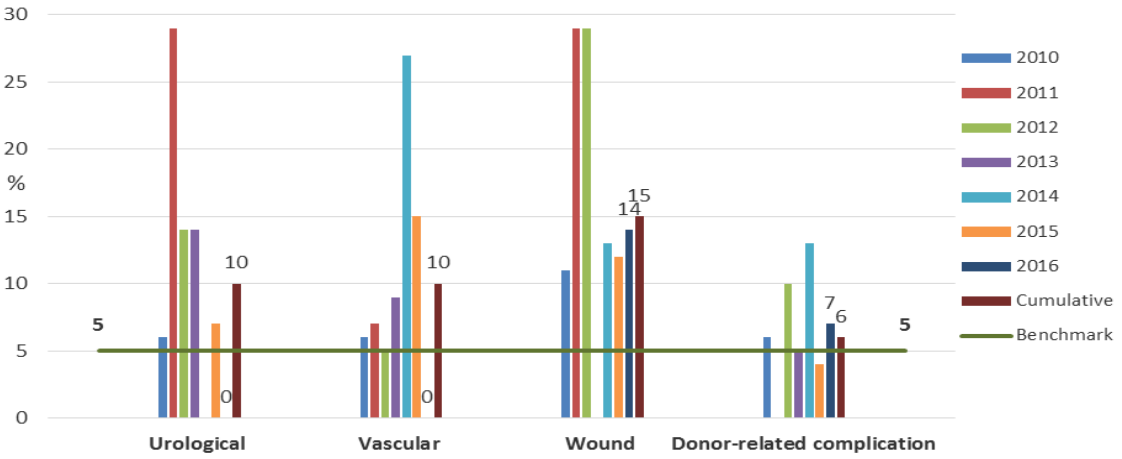


Figure 56. Surgical Complications

Donor-related surgical complications are those associated with procurement of the kidney:
1x septic donor, 1x skeletonised ureter, 2x sub-capsular tears, 1x veins damaged at procurement, 1x 3 renal veins, 1 sacrificed. Also 2 renal arteries

Graft and Patient Survival ANZDATA report for transplants 2010-2015; n=109

Benchmarks are against the national average

1. **Deceased Donors**

- Compared with national data:
  - Recipients are of similar ages, sex (2/3 male), primary diagnosis (15% diabetes), diabetes (22%) and co-morbidities, primary grafts (87%); more Asian recipients (28 vs. 13%); longer time on dialysis (89 vs. 73%)
  - Donor factors: more over age 60 (36 vs. 29%); more CVA (56 vs. 49%); similar HLA mismatch, ischemic time, peak PRA

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	76	100.0	2860	100.0	306	100.0
3 months	70	98.6 (90.8-99.8)	2668	98.9 (98.4-99.2)	294	99.7 (97.7-100.0)
6 months	65	98.6 (90.8-99.8)	2492	98.2 (97.7-98.7)	275	99.3 (97.4-99.8)
1 year	52	95.5 (86.5-98.5)	2255	97.5 (96.9-98.1)	240	97.8 (95.2-99.0)
2 years	45	95.5 (86.5-98.5)	1746	96.0 (95.1-96.7)	183	96.4 (93.2-98.1)
3 years	28	91.0 (79.3-96.2)	1248	93.9 (92.8-94.9)	126	92.8 (88.2-95.7)
4 years	18	91.0 (79.3-96.2)	787	92.0 (90.6-93.2)	85	90.9 (85.4-94.4)
5 years	13	91.0 (79.3-96.2)	371	90.3 (88.6-91.8)	36	87.4 (79.3-92.5)

Table 23. Patient survival for primary deceased donor grafts (ANZDATA Individual Hospital Report 2010-2015 (Table 11))

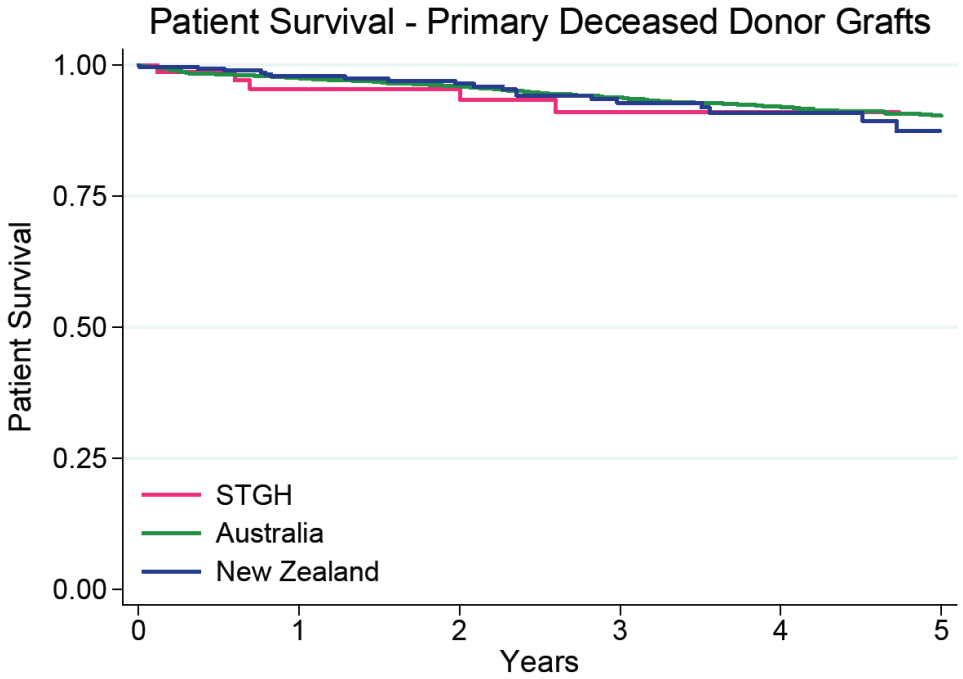


Figure 57. Patient survival – Primary deceased donor grafts

Patient survival slightly lower at 12 months than national average, 95.5 vs 97.5%; equivalent patient survival at 5 years, 91 vs. 90.3%

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	87	100.0	3258	100.0	335	100.0
3 months	77	94.2 (86.5-97.5)	2992	97.2 (96.6-97.7)	313	97.9 (95.6-99.0)
6 months	72	92.9 (84.9-96.7)	2777	96.1 (95.3-96.7)	293	97.3 (94.8-98.6)
1 year	59	90.2 (81.2-95.0)	2491	94.5 (93.6-95.2)	254	95.5 (92.6-97.3)
2 years	51	90.2 (81.2-95.0)	1904	92.0 (91.0-93.0)	193	93.8 (90.4-96.1)
3 years	30	79.1 (65.7-87.8)	1340	88.6 (87.3-89.8)	134	91.1 (86.8-94.1)
4 years	20	79.1 (65.7-87.8)	824	85.5 (83.9-87.0)	87	85.7 (79.6-90.1)
5 years	12	79.1 (65.7-87.8)	389	82.7 (80.7-84.6)	39	82.5 (74.6-88.1)

Table 24. Graft survival for deceased donor grafts (ANZDATA Individual Hospital Report 2010-2015 (Table 17))

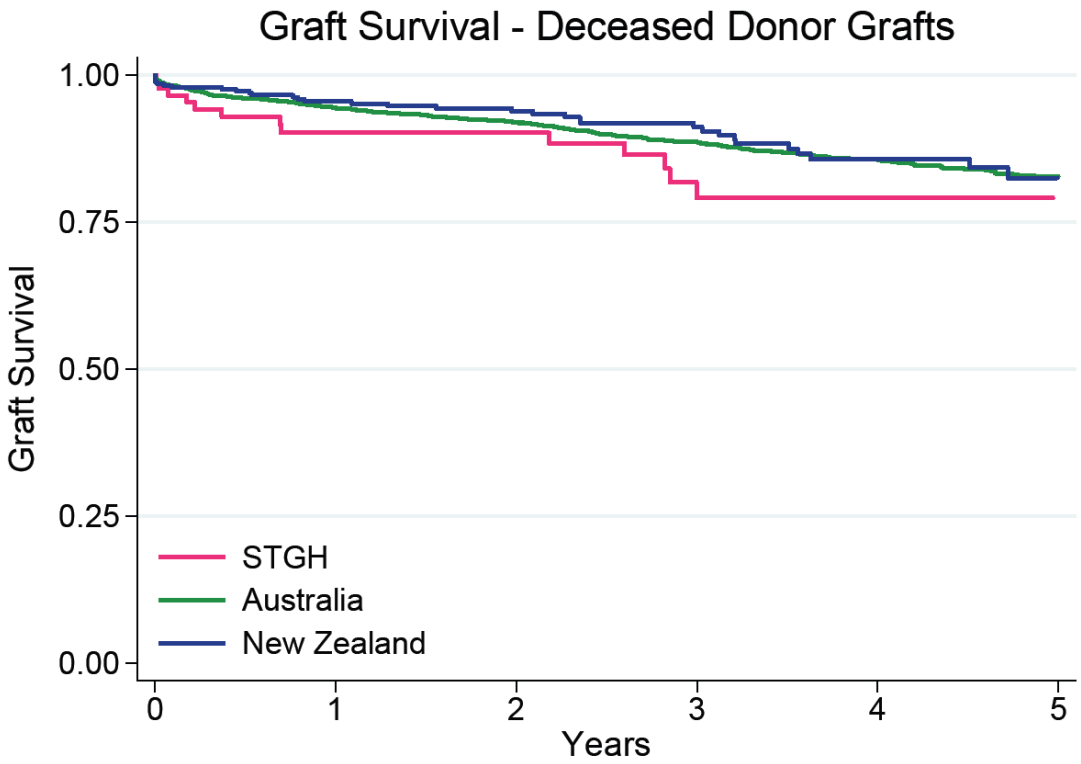


Figure 58. Graft survival – deceased donor grafts

DD graft survival is less than expected at 12 months (90.2 vs 94.5%) and this difference carries over in subsequent years, with some slight improvement. This is probably influenced by our small number of patients but emphasises the need for us to monitor every patient even more carefully in the first 12 months. We plan an external patient review at 3 and 12 months by the POW transplant team to provide objective reassurance that management is appropriate.

2. Live Donors

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	22	100.0	1223	100.0	325	100.0
3 months	21	100.0	1168	99.8 (99.2-99.9)	305	99.4 (97.5-99.8)
6 months	20	100.0	1108	99.6 (99.0-99.8)	290	99.4 (97.5-99.8)
1 year	20	100.0	1021	99.4 (98.7-99.7)	257	98.2 (95.8-99.3)
2 years	16	100.0	809	98.8 (97.9-99.3)	190	96.9 (93.8-98.4)
3 years	11	100.0	611	97.7 (96.4-98.5)	134	93.6 (89.0-96.3)
4 years	6	100.0	433	96.4 (94.7-97.6)	93	92.9 (88.0-95.8)
5 years	3	100.0	223	95.1 (92.9-96.7)	47	91.8 (86.3-95.2)

Table 25. Patient survival for primary living donor grafts (ANZDATA Individual Hospital Report 2010-2015 (Table 12))

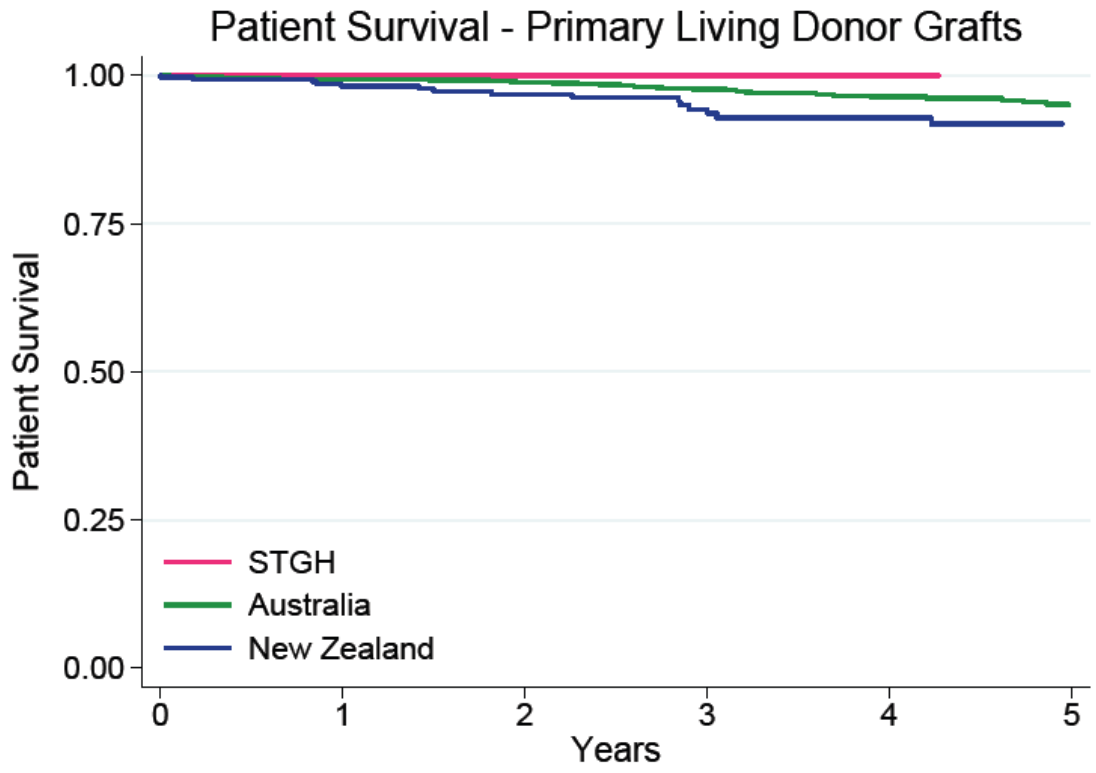


Figure 59. Patient survival - primary living donor grafts

	STGH		Australia		New Zealand	
Time	n	% Survival (95% CI)	n	% Survival (95% CI)	n	% Survival (95% CI)
0	22	100.0	1381	100.0	349	100.0
3 months	21	100.0	1302	98.3 (97.5-98.9)	321	98.0 (95.8-99.0)
6 months	20	100.0	1231	98.1 (97.2-98.7)	305	97.7 (95.4-98.8)
1 year	20	100.0	1128	97.8 (96.9-98.5)	269	96.3 (93.5-97.9)
2 years	16	100.0	883	96.6 (95.3-97.4)	194	93.1 (89.4-95.6)
3 years	11	100.0	652	94.0 (92.3-95.3)	139	90.7 (86.1-93.9)
4 years	6	100.0	454	90.8 (88.6-92.7)	91	87.1 (81.3-91.1)
5 years	3	100.0	227	88.7 (85.9-90.9)	43	84.1 (77.3-88.9)

Table 26. Graft survival for living donor grafts (ANZDATA Individual Hospital Report 2010-2015 (Table 18))

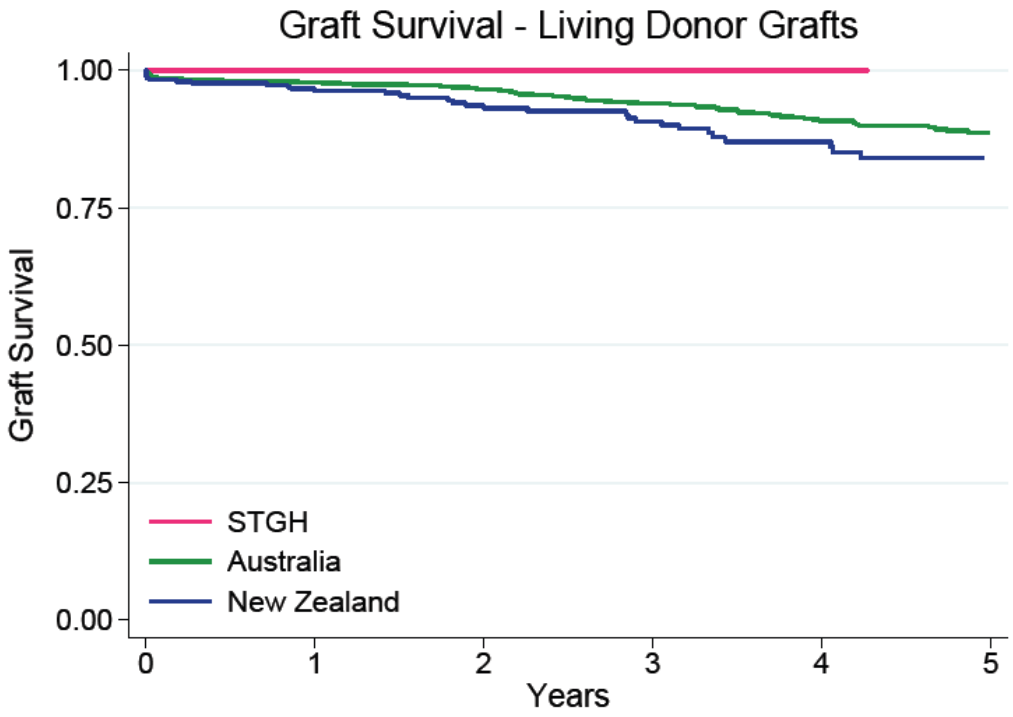


Figure 60. Graft survival for living donor grafts

Patient and graft 1 and 5 year survival is 100%.

3. Waiting list data

A full review of all SGH patients on dialysis and aged 69 years and under is carried out biannually.

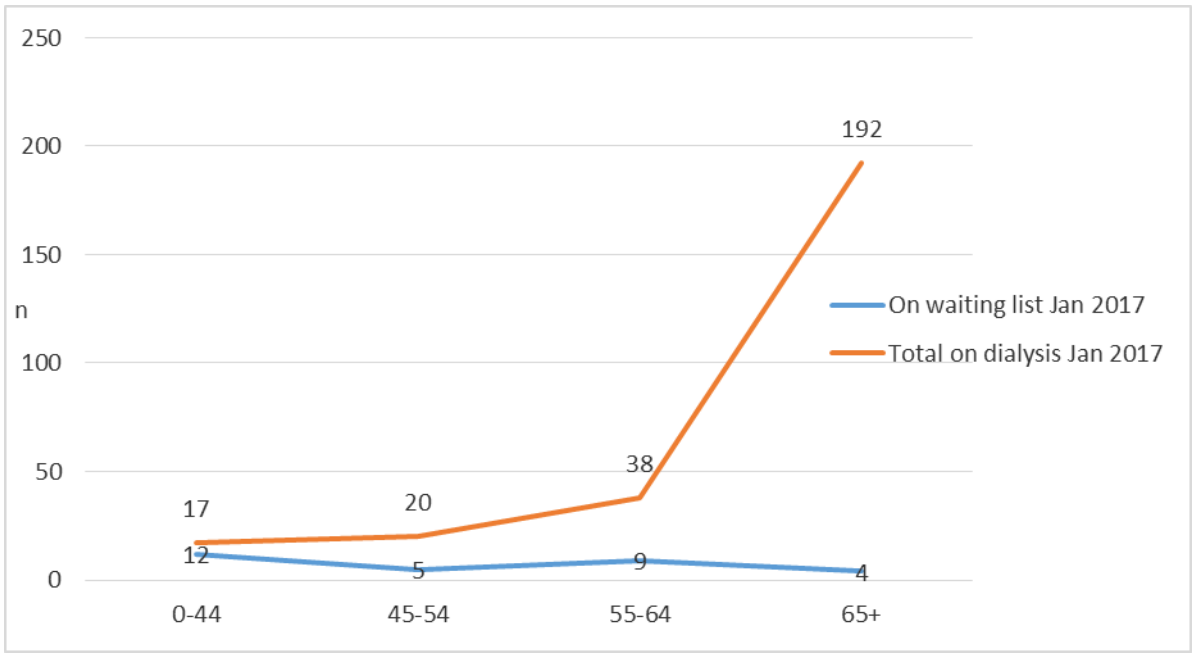


Figure 61. Number of people on dialysis and on the transplant waiting list 31/12/16

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

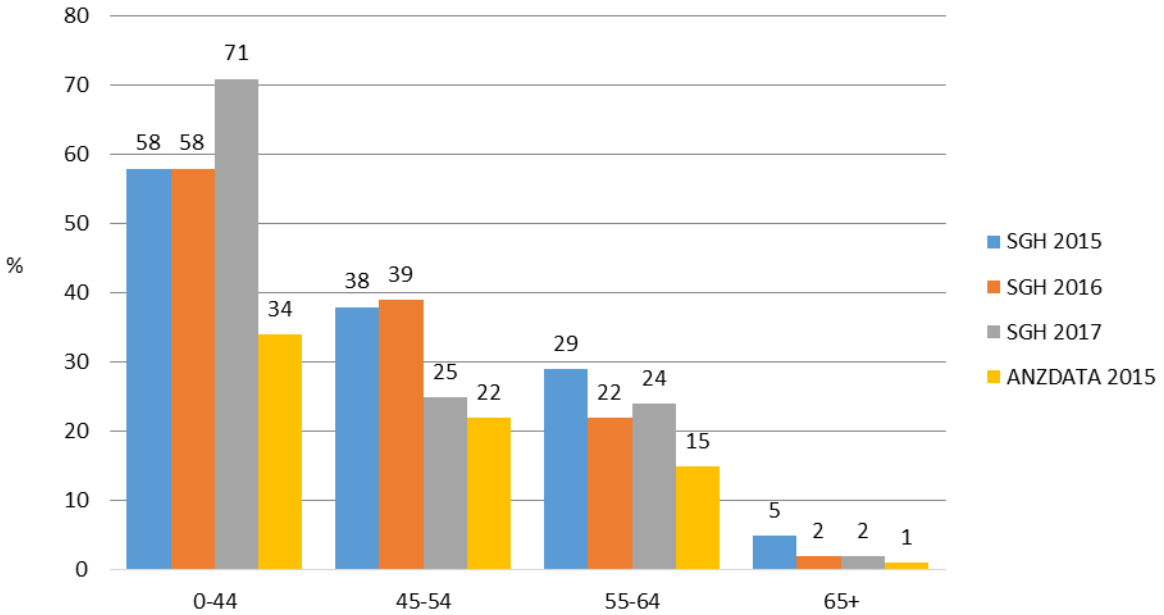


Figure 62. Percentage of SGH dialysis patients listed for transplant compared to ANZDATA 2015

- The length of time it takes for a person to complete work up and be activated on the waiting list has been reviewed. For the 30 people currently listed, the median length of time from referral to the transplant coordinator to activation on the list is 45 weeks, with workup ranging from 16 – 566 weeks.

- Five patients took over 100 weeks to complete their work up and each had significant comorbidities including cancer, obesity, cardiovascular disease and mental health issues.

- Eleven people have completed the work up pre-emptively. The length of time from referral to the coordinator to final review at the transplant assessment clinic for these people was an average of 30 weeks, with workup ranging from 12-52 weeks. Seven of these people have potential live donors and two have dates scheduled for transplant in 2017.

4. Donor Data

At 31/12/16 there were 53 living kidney donors under the care of SGH nephrologists. During 2016 48 donors had attended for an annual review with the remaining 5 to be followed up by letter.

- Among the donors there were no deaths and no one on dialysis
- Nine (19%) had hypertension requiring treatment, with eight requiring one agent and one person requiring three agents.
- Creatinine ranged from 61 – 143umol/L, eGFR from 45 – 90mL/min/1.73m^2. 32% had eGFR <60. Albumin creatinine ratio ranged from <0.2 – 12.1 with 4% (2 patients) having ACR >3.

Five people under the care of SGH proceeded to donate a kidney during 2016.

- The median length of time from the first appointment with the SGH nephrologist until approval to donate by the transplanting unit was 14 weeks.
- The median length of time from referral to the coordinator to donation for people donating in 2016 was 38 weeks, although workup times ranged from 35 – 97 weeks. Delays were due to waiting for a match in the paired kidney exchange, and in one case the donor being worked up well before the recipient needed a transplant.

Eighteen new donors presented to SGH for work up during 2016.

- Two were for recipients at other units.
- Six did not proceed, 2 due to the recipient getting a kidney from NOMS and 4 (22%) due to medical or psychosocial contraindications. One of these requested a second opinion at another unit which was arranged.

5. Summary

Transplant activity remains constant and the number of chronic transplant patients continues to grow, now over 200.

SGH patients in the first 12 months post-transplant demonstrate most benchmarks, though surgical complications may be still above the benchmark and rejection rates and NODAT rates may be high. Rejection will be discussed with POW transplant Unit as all cases were found there, in the early post transplant phase. Most were 'borderline rejection', a diagnosis to be discussed. Diabetes will be managed by referral to a single endocrinologist and ongoing nutritional support.

Patient outcomes are good for deceased donors but we can still do slightly better for graft survival; live donor patient and graft survival is excellent.

Compared to ANZDATA there are more St George dialysis patients listed for transplant in every age group and those not listed for transplant have an established medical contraindication to transplantation.

91% of living donors attended an annual review in 2016 and their ongoing medical problems are as expected and are well managed.

10. Renal Supportive Care Service

Elizabeth Josland, Alison Smyth, Jessica Stevenson, Hannah Burgess and Anna Hoffman

Aim

The aim of this report is to provide data concerning the activity and outcomes of the Renal Supportive Care (RSC) service.

Overview

The renal department has been working closely since 2009 to integrate a palliative care chronic disease model of care to benefit our end stage renal disease patients.

Renal Supportive Care Team

Nephrology	Professor Mark Brown
Palliative Care	Dr Frank Brennan
RSC CNCs	Elizabeth Josland and Alison Smyth
Social Worker	Hannah Burgess
Dietitian	Jessica Stevenson
Clinical Manager	Anna Hoffman

1. The St George Hospital **Renal Supportive Care Clinic** commenced in March 2009, adding a weekly Sutherland Hospital clinic in January 2014. The St George RSC clinic is staffed by Dr Frank Brennan, renal AT, RSC CNCs, dietitian, social worker and clinical manager.
2. The 7th **Renal Supportive Care Symposium** was held in July 2016. Doctors, nurses and allied health attended from around Australia and New Zealand.
3. An inaugural '**Pain Management in Patients with ESKD; An Evidence Based Approach'** Education Day was held on the 30th July 2016 in conjunction with the Department of Pain Medicine at St George Hospital and the Michael J Cousins Pain Management and Research Centre, Sydney. Doctors, nurses, pharmacists and allied health from around Australia and New Zealand were attended. There were 125 attendees.
4. The implementation of a state-wide RSC service through the NSW Agency for Clinical Innovation (ACI) began its roll out in late 2015. As one of the three Hub training hospitals around NSW, we have conducted three Hub education days and mentored over 30 visitors. We also provide regular ongoing mentoring and education support on a needs basis with our network, national and overseas interested parties.
5. The renal department website has a palliative care section which includes details of current research, guidelines, patient information, education and presentations, and a forum.

The sixth annual **Renal Memorial Service** was held on May 5th 2016 and was attended by approximately 30 people, consistent with previous years' attendances. This service aims to provide families and friends of past renal replacement therapy patients with a supportive environment to commemorate their loved ones and is a unique service in NSW that is coordinated by Hannah.

Patient Demographics and Outcomes

There are 3 main categories of patients who use the services of the RSC clinic:

1. Conservative care support (patients who are not for dialysis)
2. Dialysis (or pre dialysis) and transplant patients for symptom support
3. Support for those who may be withdrawing from dialysis following a major sentinel event or by choice.

Demographics of patients on their first visit to the clinic are tabled below (Table 27). The age of newly referred patients ranges from 23-99 years with the overall mean age 77 years. Non-dialysis patients are on average older (83yrs) than the other patients seen by the service. Occasions of service by the Medical and Nursing staff for both inpatients and outpatients since the commencement of the service is shown in Table 28. While outpatient clinic services have generally remained steady over the last 5 years, there has been an increasing demand in acute inpatient services for people with ESKD requiring pain and symptom management and end of life care.

	Non-dialysis patients	Dialysis Patients	Transplant	Pre-Dialysis/ Undecided
No. of Patients (count)	**305**	**202**	**10**	**26**
Age (average, years)	83	70	58	73
Age (range, years)	30-99	23-89	33-76	53-85
eGFR (average)	16	-	40	28
Diabetes (%)	51	47	40	46
IHD (%)	17	44	3	19
Dementia (%)	11	7	0	0
2 or more co-morbidities* (%)	90	82	70	77
Current or former smokers (%)	22	33	15	10

Table 27. Patient demographics on first clinic visit 2009-2016
**Using co-morbidities included in the Charlson –morbidity Score*

	St George Clinic OOS	Sutherland Clinic OOS	TOTAL Outpatient OOS	Inpatient OOS	Home Visits	Phone consults	Dialysis consults
Mar - Dec 09	110		**110**	N/A	0	0	
2010	218		**218**	30*	0	0	
2011	403		**403**	351	0	15	
2012	498		**498**	322	2	64	102
2013	378		**378**	511	14	69	207
2014	300	109	**409**	415	54	131	225
2015	264	81	**345**	692	49	136	405
2016	308	137	**445**	1002	27	250	344

Table 28. Occasions of Service (OOS)* *data collection commenced Nov 2010*

Inpatient services

- Inpatients are predominantly seen by the CNCs. The majority of new inpatient referrals continue to be for pain and symptom management.
- Inpatient consultations continue to increase with a 31% increase since last year with an average of 83 inpatient consultations per month in 2016 and an average of 5.9 new inpatient referrals per month (similar to 2015 of 5.4 new referrals per month).
- There were an average of 28 consults per month for patients on dialysis.

Outpatient services

- Outpatient clinic occasions of service increased in 2016 for both St George and Sutherland hospitals.
- There were 250 phone consultations in 2016. Telephone consultations commenced in 2012 to assist patients who are too frail to physically attend the clinic and to manage patients who require frequent follow up.
- Home visits by the RSC CNC commenced December, 2012. The CNCs attended 27 home visits in 2016. A number of patients were referred to a Community Palliative Care Team for complex symptom management or if they were approaching end of life.

Palliative Care Outcome Scale Clinic outcome

Symptom Surveys are conducted at each RSC Clinic visit. The most prevalent symptoms were pain, lack of energy, poor mobility, itch and difficulty sleeping. 61% of patients had a reduction in total symptom score by the 3rd clinic visit, while the proportion of patients reporting each of these symptoms as severe or overwhelming decreased. 24% of patients reported severe/ overwhelming itch at their first visit, compared to only 13% at visit 3.

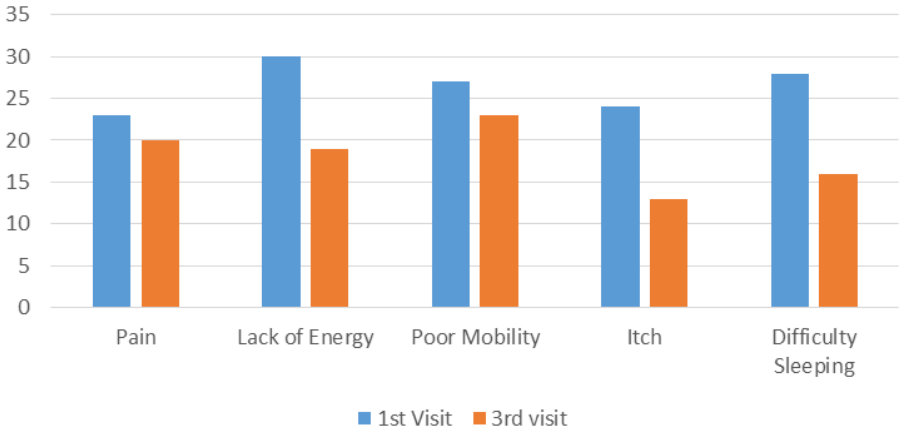
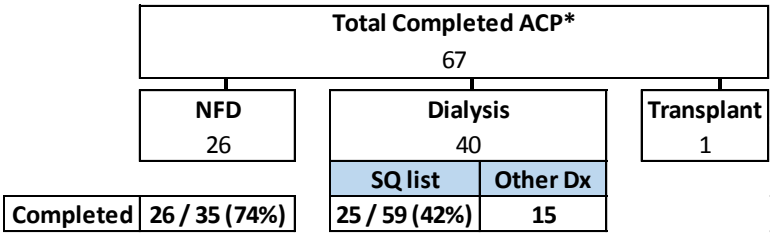


Figure 63. Top 5 Symptoms reported as Severe to Overwhelming (POS 3 or 4) at first and third RSC Clinic Visit

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 2016 (*excluding deceased patients).

- 74% of non-dialysis patients attending the RSC clinic have an advance care plan



Research, Publications, Teaching and Presentations

Research

- Experiences of patients and carers (HREC: 15/044 LNR/15/POW/131). A qualitative study was conducted to gain a greater understanding of the experiences of patients and their carers within the RSC service.
- 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.
- Predictive tool for conservative patients. This project aims to design a prognostic tool for ESKD patients on a non-dialysis pathway.

Publications

- Brown MA. **Planning Dialysis Care: You might be "Surprised"**. Am J Kid Dis 2016; 68(1):8-10.
- Brennan, F (2016) **The pathophysiology of pruritus – A review for clinicians**, Progress in Palliative Care, 24:3, 133-146, DOI: 10.1179/1743291X14Y.
- Lim CED, Ng RWC, Cheng NCL, Cigolini M, Kwok C, Brennan F. **Advance care planning for haemodialysis patients.** Cochrane Database of Systematic Reviews 2016, Issue 7. Art. No.: CD010737. DOI: 10.1002/14651858.CD010737.pub2.
- Meade A, Stevenson J, Notaras S. **Nutrition in Renal Supportive Care: Is it time to bend the rules?** Nephrology, *accepted for publication Nov 2016.*

Education Days and Teaching

- The 7th Renal Supportive Care Symposium took place on July 29th 2016 with sponsorship provided by Amgen, CKD Queensland and Roche.
- An inaugural '**Pain Management in Patients with ESKD; An Evidence Based Approach'** day was held on the 30th July 2016 in conjunction with the Department of Pain Medicine at St George Hospital and the Michael J Cousins Pain Management and Research Centre, Sydney.
- Assistance was provided to the inaugural Brisbane Renal Supportive Care Masterclass who kindly sponsored Elizabeth and Anna to attend.
- Three formal RSC Education Days have been held to support other RSC clinicians across the St George Hub catchment.

Presentations

- Prof Brown gave multiple presentations on RSC at the RSC Symposium, the Brisbane Masterclass and Hub mentoring sessions.
- Dr Frank Brennan gave 55 presentations over 2016, including national and international conferences, lectures, panel discussions, teaching sessions and education days.
- Dr Brennan gave a series of half-hour tutorials on all aspects of RSC to the junior doctors in the Renal Department. This series of tutorials was repeated during the year to each new group of doctors. In addition, Dr Brennan gave a one hour tutorial summarising RSC four times during the year to each new group of junior doctors at Calvary Hospital, Kogarah.
- Elizabeth and Alison participated in 12 presentations, throughout 2016 including two conferences, mentored multiple visitors and were part of the coordinating committee for the RSC symposium and pain day in 2016.
- Hannah gave one presentation for Wolper Jewish Hospital, one workshop on 'difficult conversations', two on communication in advance care planning, the RSC Hub Education Day, and the St George RSC Symposium. Hannah facilitated the renal memorial service, educated and mentored multiple visitors.
- Jessica presented at the St George RSC Symposium and education days for Hub members, as well as providing education and mentoring to the RSC dietitians across NSW.

Networks

- Jessica has developed and led a state-wide RSC dietitians' network to streamline education and training across the state, provide professional development opportunities and collaborate on state-wide research and quality improvement activities.
- Jessica has established a local St George Hub network to provide more personalised and targeted education and training for dietitians working on units attached to the St George Hub.
- Hannah has created and oversees similar networks for the RSC social workers, the Hub social workers, and our specific St George network. Hannah continues to co-coordinate the renal social workers of NSW special interest group, feeding back information about the interests of social workers in RSC, the National Renal Social workers' network, the NSW Palliative Care Social Workers' Special Interest Group, the SESLHD Advance Care Planning Working Party, and the STGH social work department' Bereavement Working Party.

Achievements for 2016

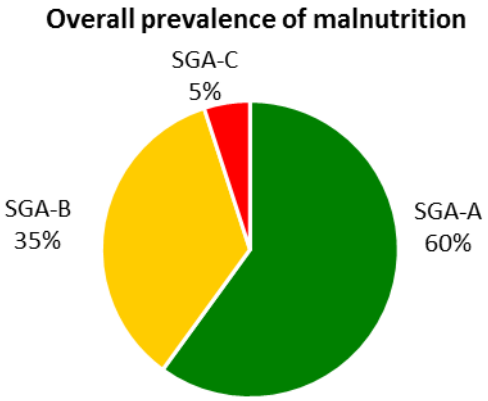
- Hosted doctors, nurses and allied health from across Australia, New Zealand and overseas visiting our clinic throughout 2016.
- Since the publication of ACI position paper in 2015: "Development and implementation of a State-wide Renal Supportive Care Service", permanent state wide funding has been provided to roll out RSC services across the state. St George Hospital RSC service is one of three Hub hospitals providing training and mentoring to RSC services in NSW.
- Final recruitment of RSC positions occurred during 2016.
- Dr Brennan has spoken at many conferences around Australia and overseas and continues to revise our local symptom management guidelines using the latest evidence based literature.
- Hannah Burgess coordinated another successful Renal Memorial Service and has orientated two new renal social workers who assist with the RSC client load.
- Jessica Stevenson initiated and is leading the multi-disciplinary working group to develop practice recommendations for RSC nutritional management. Jess is also undertaking her PhD.

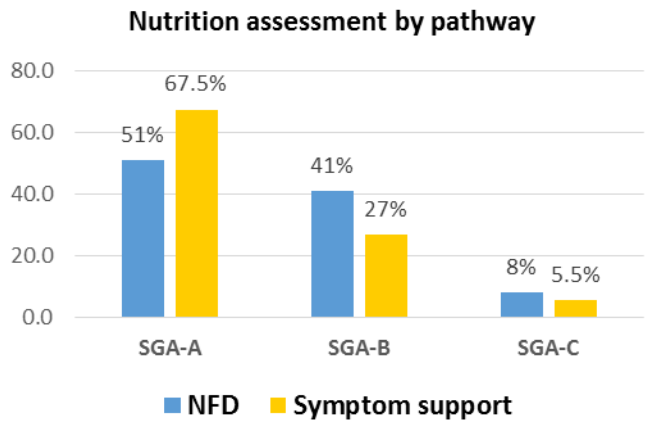
Performance indicators and outcomes for 2016

1. **Symptom control**: *A reduction in total symptom scores within 3 clinic visits.*
    - 61% of RSC clinic patients had a reduction in total symptom scores within 3 clinic visits.
    - The RSC service continues to pursue reduction in symptom burden for each patient.
2. **Symptom and functional state assessment**: *100% of patients have a POS-S (renal) symptom survey and Karnofsky performance scale measured in the RSC clinic on each visit.*
    - This is achieved and is used in each clinic visit to identify individual issues and monitor change.
3. **Symptom assessment in dialysis**: *All dialysis patients have a iPOS (renal) symptom survey and Karnofsky performance scale measured every 6 months.*
    - These clinical tools will be used twice a year for each patient to monitor progress and identify issues.
4. **Advance Care Plans**: *100% of competent and consenting ESKD patients who are not for dialysis and are seen in the RSC clinic, or for those who are currently on dialysis but their treating physician has identified that they would "not be surprised if they died in the next 6 -12 months", or have a predicted <50% 12 month survival, have an advance care plan competed and reviewed every year.*
    - 74% of competent NFD patients who are seen in the RSC clinic have an ACP. ACP discussions have been held with an additional 3% who are currently waiting or not keen to proceed.
    - 42% of dialysis patients identified as requiring an ACP in 2016 (n=57) had one completed (another 7% had one discussed). All nephrologists have been sent a list of their current dialysis patients (Dec 2016) to identify those requiring an ACP or a review of current ACPs.

5. **Nutritional management:** *Nutritional assessment conducted using 7-point Subjective Global Assessment (SGA).*

- 80% of patients attending RSC clinics have been reviewed by a dietitian in the past year
- 65% had an SGA recorded.
- In RSC clinics priority is given to those patients on a conservative pathway with 75% being reviewed by RSC dietitian.





SGA-A (6-7) Well nourished: Patients present with stable weight, no or infrequent nutrition-impact symptoms, adequate dietary intake and adequate muscle and fat stores (relative to age).

SGA-B (3-5) Mild-moderately malnourished: Patients present with moderate (5-10%) weight loss over the past 6 months, often suffer from frequent nutrition-impact symptoms, suboptimal dietary intake and have mild-moderate muscle and fat wasting (relative to age).

SGA-C (1-2) Severely malnourished: Patients present with significant (>10%) weight loss over the past 6 months, suffer from multiple, frequent nutrition-impact symptoms, significantly suboptimal dietary intake and often an associated functional decline and have significant muscle and fat wasting (relative to age).

6. **Research and publications – evidence of ongoing research and presentations**.
   - Listed on previous pages.

Summary

The RSC service offers a holistic service to mainly end stage renal failure patients and their families with an aim to reduce symptom burden, improve quality of life and provide support towards end of life care where required. Measurements of symptom burden, quality of life and patient satisfaction are collected routinely with ethics approval to monitor clinic outcomes over time. The RSC service is being well utilized by the renal patients and has an ever increasing role in inpatient management evident by the growth in occasions of service. RSC is growing in Australasia, the UK, America and Canada and there is a growing demand for education on the topic noted by the growing requests to visit the clinic or provide outside education. All requests for clinic visits and mentoring must follow an approval process.

11. Quality of Life Report

Elizabeth Josland

Background

Research has shown that the quality of life (QOL) experienced by the dialysis population to be well below the QOL experienced by the general Australian population (Australian Bureau of Statistics, 1995) and a South Australian (SA) population (Population Research and Outcome Studies Unit, 2004). Ten audits conducted by our unit since 2001 show similar results.

Aim

The aim of this investigation is to determine the QOL of Renal Replacement Therapy (RRT) patients and to determine if there is a relationship between QOL, specific biochemical markers (albumin and haemoglobin), dialysis adequacy (Kt/V, a measure of urea clearance), age, and diabetic status.

Method

- Home haemodialysis, peritoneal dialysis (PD) and transplant patients were sent a SF-36 questionnaire via the mail with a reply paid envelope attached. Hospital and satellite haemodialysis patients were handed their questionnaires in person.
- Patients excluded from the survey were non-English speaking where there was no translation available, or suffering from dementia or a psychological condition.
- All returned surveys were entered into the QualityMetric Health Outcomes™ Scoring software 4.5 (QualityMetric, 2004-2011) and IBM SPSS 23(IBM Corp, 2013) for statistical analysis.
- Data was also collected on patient's age, sex, diabetic status, haemoglobin, albumin and Kt/V from data already available from routine audits.
- SF-36 scores were compared with dialysis mode, diabetic status, albumin results below 30g/L and haemoglobin <100g/L using the appropriate parametric or non-parametric unrelated two sample statistical tests; correlation and regression analysis was also carried out to determine if there were any significant linear relationships.
- Transplant patients are analysed separately from dialysis patients.

SF 36 Questionnaire

The SF-36 version 2 is a 36-item questionnaire that measures the following eight dimensions of health (Ware et al, 2000).

Parameters	*Description*
Physical Functioning (PF)	Limitations in physical activities because of health problems
Role Physical (RP)	Limitations in usual role activities because of physical health problems
Bodily Pain (BP)	Bodily pain
General Health (GH)	General health perception
Vitality (VT)	Vitality (energy level and fatigue)
Social Functioning (SF)	Limitations in social activities due to physical or emotional problems
Role Emotional (RE)	Limitations in usual role activities because of emotional problems
Mental Health (MH)	Mental health (psychological distress and well-being)

- The SF-36 is a universal tool for the measurement of health status. Data exists for population groups (including Australian populations samples, the most recent being from South Australia) allowing for age and gender matched comparisons.

Benchmark Data

Data was compared to the results of the previous surveys.
Data was also compared to the South Australian normative data from the 2004 Population research and outcome studies unit in South Australia (Population Research and Outcome Studies Unit, 2004).

Ethics

Ethics approval was granted by South Eastern Sydney and Illawarra Area Health Service Human Research Ethics Committee - Southern Section (HREC) for the project named 'Quality of life measurement in patients with end stage renal disease' and was incorporated as part of normal quality practice in the unit with HREC approval once the study was closed.

How did we record, store & analyse the data?

- All returned surveys were entered into the QualityMetric Health Outcomes™ Scoring software and a statistical program (SPSS 23) for analysis.
- Data was also collected on patient's age in years, gender, diabetic status, haemoglobin, albumin and dialysis adequacy measured through Kt/V from routine audits and entered into an Excel database for analysis in SPSS.
- SF-36 scores were compared with these variables using the appropriate parametric or non-parametric unrelated two sample statistical tests.
- Regression analysis determined if there was any significant relationship between SF-36 scores and haemoglobin, albumin, Kt/V and age.

Data Evaluation Report

Data Quality indicators for the SF-36 suggest one particular problem with the data, that of consistent responses. This may be related to patients not interpreting questions properly. See this report below. Overall the data quality in 2016 was satisfactory and within range.

Data Quality Indicators:		Satisfactory	Norms
1. Completeness of Data..... Items with 5% or more missing values: NONE	98.3%	YES	90
2. Responses within Range..... Items with 5% or more out-of-range values: NONE	100.0%	YES	100
3. Consistent Responses.....	83.1%	NO	90
4. Estimable Scale Scores.....			
Estimable without MDE	94.2%	YES	90
Estimable with Half-Scale MDE	97.1%		
Estimable with Full MDE	98.7%		
5. Item Internal Consistency Items that failed internal consistency test: NONE	100.0%	YES	90
6. Discriminant Validity Items that failed discriminant validity test: PF10 GH01	99.2%	YES	80
7. Reliable Scales Scales that failed reliability criteria: NONE	100.0%	YES	100

Results

Responders

The total return rate in 2016 was 54% (237/437), a decrease from 2015 60% (254/420). This is broken down into the different modes of renal replacement therapy (RRT) in table 29 and analysis was undertaken to determine if there was any statistical difference between responders and non responders. There were a small number of returned surveys excluded due to high number of

unanswered questions. Where possible these surveys were followed up which did reduce the number of exclusions. Night time dialysis had very poor returns and were included into the hospital haemodialysis numbers.

Mode of RRT	Survey Returns 2016 n (%)
Hospital Haemodialysis	62/96 (65)
Satellite	46/49 (94)
Home Haemodialysis	21/42 (50)
Peritoneal Dialysis (PD)	24/52 (46)
Transplant	84/197 (43)

Table 29. Survey return rates

	2001	2003	2004	2006	2008	2010	2012	2014	2015	2016
Age *mean (±SD)*	60 (14)	65 (13)	63 (13.6)	63 (14)	63.5 (14)	68 (13)**	67 (13)	70 (14)	67 (14)***	67 (13)***
Male %	58	64	61	61.2	70.5	68	61	62	63	59
Diabetes %	26	24	32	26	31	30	47	42	52	46
Haemoglobin g/L *mean (±SD)*	116 (14)	115 (17)	120.5 (16)	118.7 (19)	117.1 (15)	114.7 (14)	115.2 (15)	115 (15)	117 (11)**	121 (19)
Albumin g/L *mean (±SD)*	32 (14)	32 (4.5)	32.31 (4.5)	33 (4.5)	34.2 (4)	34.0 (4)	33.3 (5)	32.5 (4)	32.7 (5)	34.5 (4)
Kt/V Peritoneal Dialysis *mean (±SD)*	1.8 (0.3)	2.1 (0.4)	2.03 (0.5)	2.1 (0.5)	2.16 (0.7)	2.2 (0.7)	2.2 (0.8)	2.5 (1)	2.2 (0.6)	2.07 (0.57)
Kt/V Haemodialysis *mean (±SD)*	1.4 (0.3)	1.66 (0.4)	1.75 (0.4)	1.63 (0.4)	1.51 (0.3)	1.6 (0.3)	1.6 (0.4)	1.6 (0.3)	1.6 (0.3)	1.9 (0.4)

Table 30. Demographics of responders
*Significance between responders and non-responders ** p<0.01, ***p<0.001*

In 2016 there was a significant difference between responders and non-responders in age ($Z = -6.7$, $p = 0.000$), this is similar to previous reports. Responders (median 69 years) are older than non-responders (median 58 years). Crosstab analysis revealed a difference in age groups (<45 years, 45-64 years, ≥65 years) using Pearson Chi-Square (x^2=40.2, df=2, p<0.000). Serum albumin, haemoglobin, gender or diabetic status revealed no difference between responders and non-responders.

QOL score results

Figure 64 demonstrates the QOL scores for RRT excluding transplant since 2001. There is a consistent trend over time towards a better 'role physical' score and a plateau in 'role emotional'. There is little change over time in all other variables, mental health has always remained close to the general South Australian population. There is no clear answer to the reasoning behind improvements in 'role physical' other than possible improved access to symptom management, better choice of dialysis or non-dialysis pathways for patients, advances in dialysis technology and growing the body of international evidence for renal care.

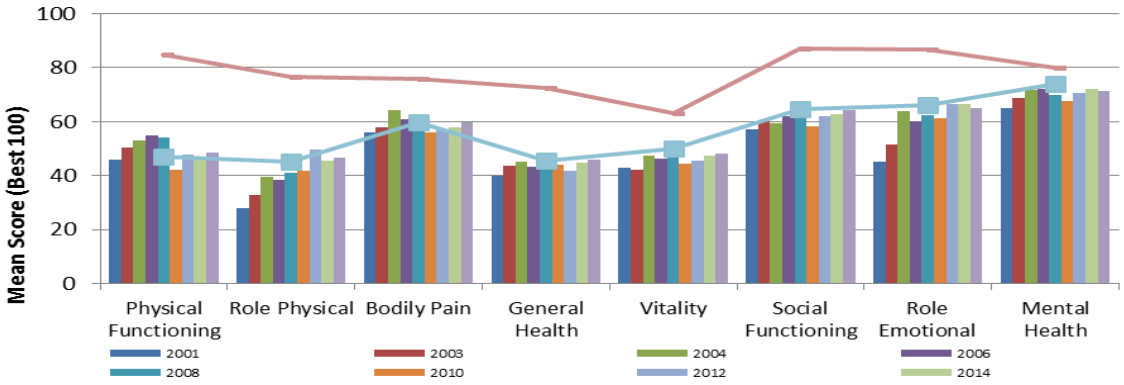


Figure 64. QOL scores excluding Transplant in 2016

Parameters	Hospital (n=62)	Satellite (n=46)	Home (n=21)	Peritoneal dialysis (n=24)	Transplant (n=83)	Test Statistic[a]	df	p-value
Physical Functioning	44.2 ± 31.7	43.7 ± 26	63 ± 22	46.5 ± 22.9	70.1 ± 30.5	X^2=38.9	4	<.001
Role Physical	44.2 ± 36.2	45.2 ± 28.9	57.2 ± 20	38 ± 26.7	67.1 ± 33.3	X^2=25.9	4	<.001
Bodily Pain	58.1 ± 26.6	58.8 ± 27	65.7 ± 26.2	61 ± 25	72.8 ± 26.7	X^2=14.3	4	<.01
General Health	46.3 ± 22.7	45.8 ± 21.1	50.3 ± 18.7	39.8 ± 18	55.1 ± 24	X^2= 12	4	<.05
Vitality	51 ± 23.4	49.6 ± 18.7	55 ± 16.8	44.6 ± 19.8	59.4 ± 23.5	X^2=13	4	<.05
Social Functioning	61.4 ± 30.3	70 ± 23.6	76.3 ± 20.6	53.1 ± 28.8	78.9 ± 26	X^2=23.2	4	<.001
Role Emotional	62.9 ± 38	70.2 ± 29.8	71.7 ± 28	61.8 ± 36.4	84.7 ± 25.5	X^2=19.2	4	<.01
Mental Health	71.1 ± 22.6	73.6 ± 21	80 ± 13	75.9 ± 17.3	78 ± 17.6	X^2=3.4	4	0.49
Age	72.5 ± 11.2	74.9 ± 9.1	65.6 ± 10.7	70 ± 15	59.2 ± 11.8	X^2=64.1	4	<.001
Albumin g/L	33.9 ± 3.3	33.9 ± 3.1	34.4 ± 4.2	29.7 ± 5.7	36.4 ± 3.9	X^2=36.1	4	<.001
Haemoglobin g/L	113.5 ± 10.3	115 ± 15.6	106.5 ± 22.9	112.9 ± 15.9	131.8 ± 18.9	*F*=14.7	4	<0.001
Kt/V[b]	1.9 ± .42	1.8 ± .4	-	2.02 ± .55	-	*F*=0.95	2	0.39

Table 31. 2016 QOL Results

Data reported as mean ± standard deviation

[a] X^2=Chi Square, F= ANOVA

[b] Kt/V expected to differ due to differing benchmarks between the modalities (haemodialysis aim is >1.4 while PD is >1.6)

Table 31 indicates the statistically significant difference in QOL scores between the modalities of RRT in nearly all variables except mental health and dialysis adequacy (Kt/V). Age definitely has an impact here, with home dialysis and transplant being much younger groups. On closer review of the independent dialysis modalities compared to transplant using the Mann-Whitney Test, 'mental health' showed no statistically significant difference to home or satellite haemodialysis, or to PD. Home haemodialysis versus transplant shows no statistically significant difference in most QOL variables, except for 'role emotional' ($p<0.05$). Home haemodialysis is the best QOL option for a dialysis modality, but these results are not age matched.

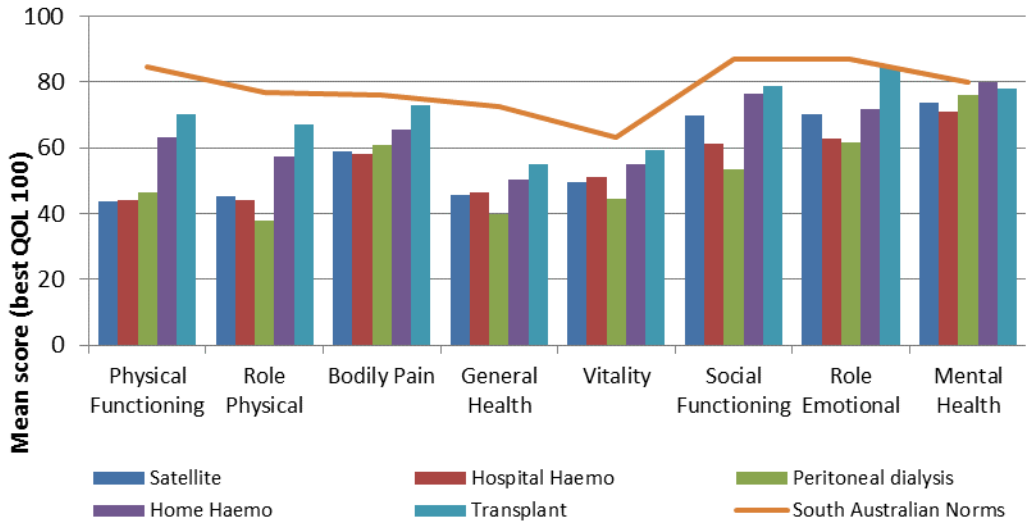


Figure 65. Quality of Life scores by dialysis modality

The graph above clearly indicates home haemodialysis and transplantation having an advantage in self-reported QOL, but peritoneal dialysis results in the variables of ' role physical', 'general health', 'vitality' and 'social functioning' are worse than hospital haemodialysis. Peritoneal dialysis results have deteriorated from 2015, as a result of this figure 66 demonstrates the differences. General Health and social functioning are clearly worse in peritoneal dialysis, but bodily pain has consistently been better than haemodialysis, but is deteriorating. Bodily pain, physical functioning and vitality in haemodialysis show improvements since 2010. Figure 67 demonstrates the summary score changes with haemodialysis and peritoneal dialysis since 2010. Home haemodialysis shows improvements with mental health summary scores and hospital haemodialysis shows steady improvements in physical summary scores despite the rising age of respondents.

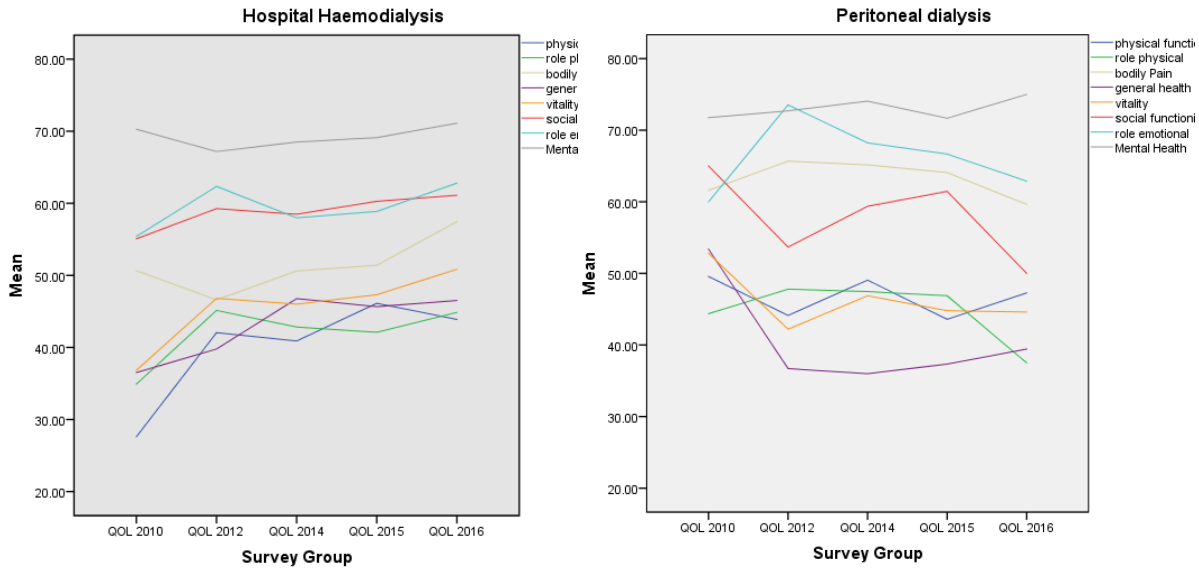


Figure 66. Dialysis modality comparison

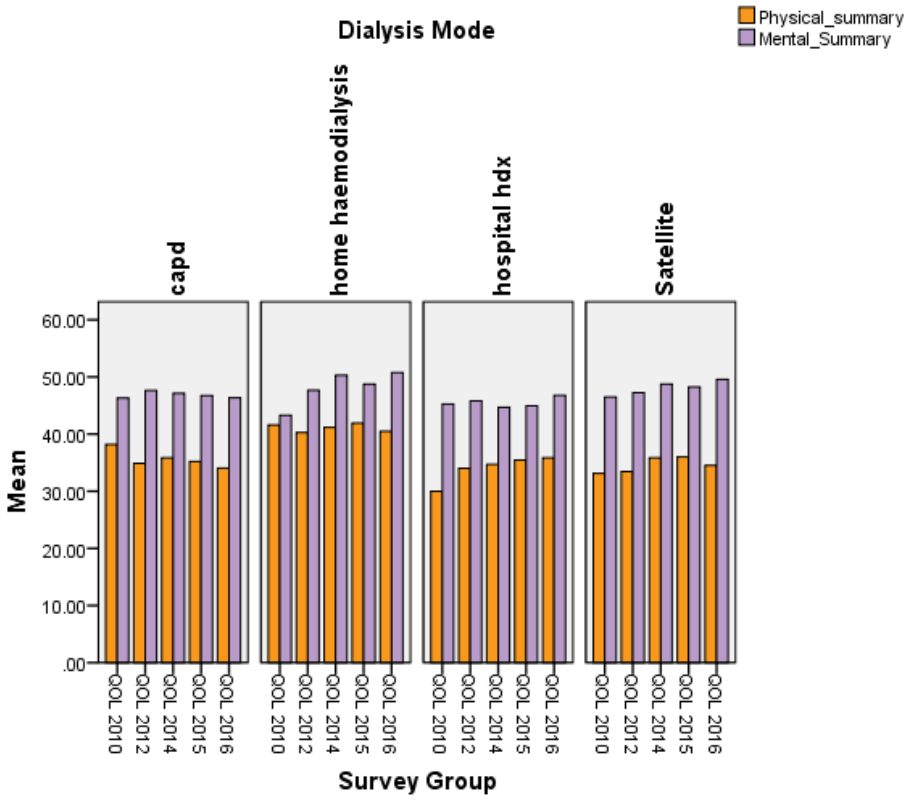
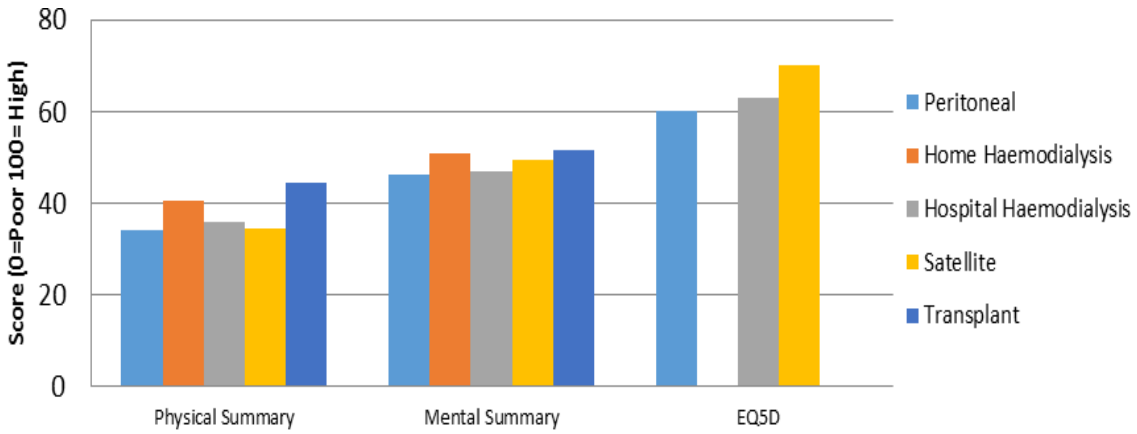


Figure 67. Change in SF36 summary scores 2010 - 2016

EuroQol-5 Dimensions (EQ-5D-5L)

The EuroQol-5 Dimensions (EQ-5D-5L) is a QOL tool being used globally in which economic outcomes can be analysed. This will help in evaluating the effectiveness of services and identify opportunities for improvement (Morton et al., 2016). Our renal unit commenced using this tool in 2016, it will become our tool of choice from this year onwards to replace the SF-36 tool. The EQ5D score in figure 68 represents how the patient rates their own QOL. The scale the patient uses is represented next to this graph.



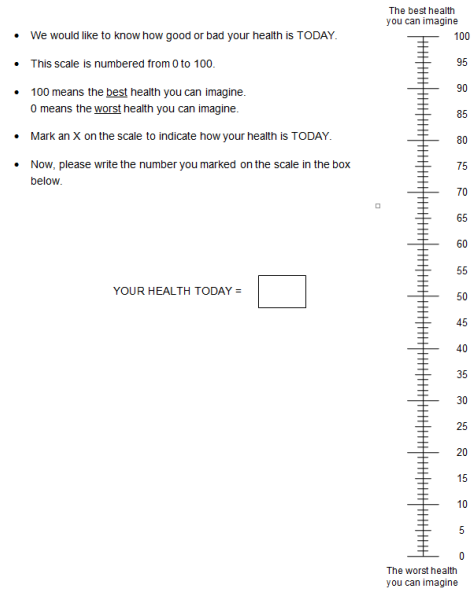


Figure 68. SF-36 summary scores with EQ-5D-5L scores diagram

Regression analysis between EQ5D score and both physical and mental summary scores from the SF-36 showed r^2=0.262 and r^2=0.231 respectively, indicating weak relationships. There is a moderate correlation between EQ5D score and general health in the SF-36 (Pearson correlation 0.605, p<0.001), and vitality (0.570, p<0.001). Figure 69 shows the scatterplots for the EQ5D scores.

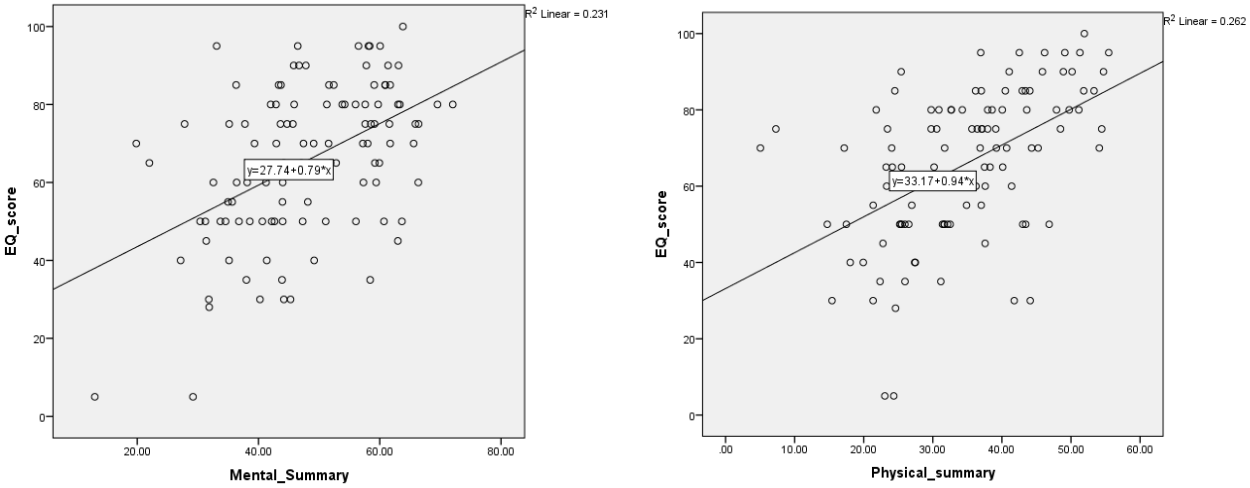


Figure 69. Scatterplots comparing the EQ5D scores with SF-36 Mental and Physical summary scores

Diabetics excluding transplant

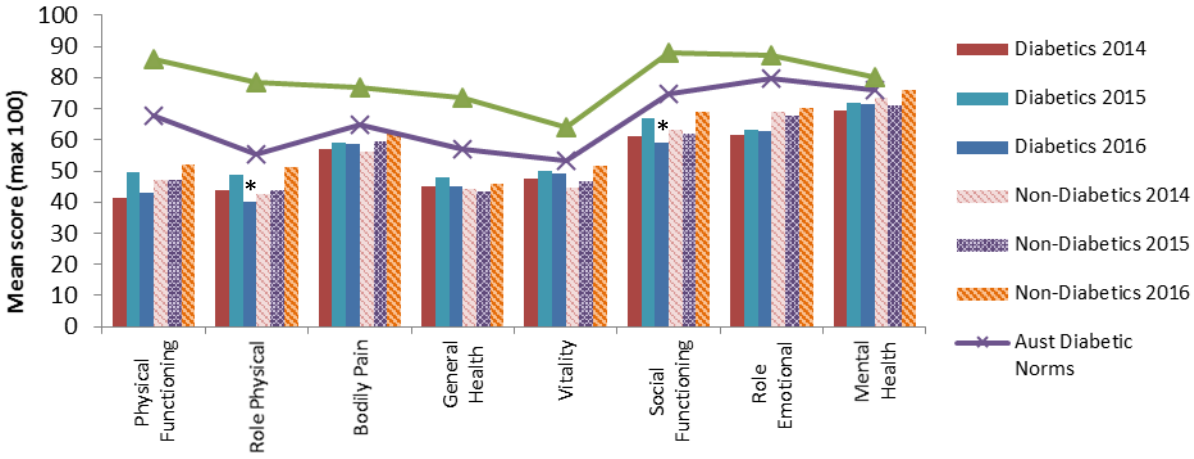
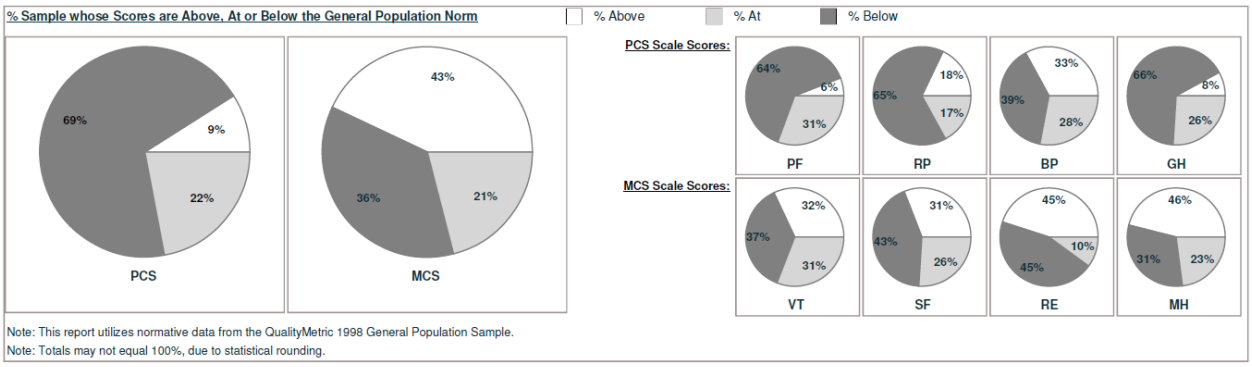


Figure 70. Quality of Life scores by diabetic status

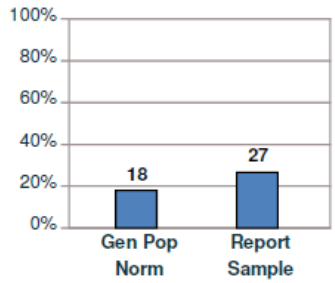
There was a statistically significant difference in Kt/V, role physical and social functioning between diabetics (median 1.76) and non-diabetics (median 1.92) in 2016 using the Mann-Whitney U Test ($p < 0.05$). These Kt/V (mean and median) results are above the benchmarks for both haemodialysis and peritoneal dialysis and although significantly different, may not be clinically significant.

QualityMetric Health Outcomes Summary

Respondents mean scores compared to the American general population norms are demonstrated in the graphs below. These graphs are a direct output from the QualityMetric Health Outcomes program. These are all patients including transplant. This program also produces a depression screening which highlights the importance of mental health support for these patients as 27% of this group are identified as 'at risk' of depression.



First Stage Positive Depression Screening: % at Risk



Abbreviation
PCS = Physical Component Summary
MCS = Mental Component Summary
GH = General Health
PF = Phsical Functioning
RP = Role Physical
BP = Bodily Pain
VT = Vitality
SF = Social Functioning
RE = Role Emotional

Transplant

Renal transplantation is not a cure for kidney failure but an alternate form of renal replacement therapy (RRT). Not every patient is eligible for a transplant as there are strict medical criteria that patients must meet. As such these patients are analysed separately to dialysis patients. The response rate in 2016 was poor at 43%.

	2015	2016
Age	59.5 ± 11.5	59.2 ± 11.8
Male	57%	50%
Diabetes	47%	41%

Table 32. Transplant responder demographics

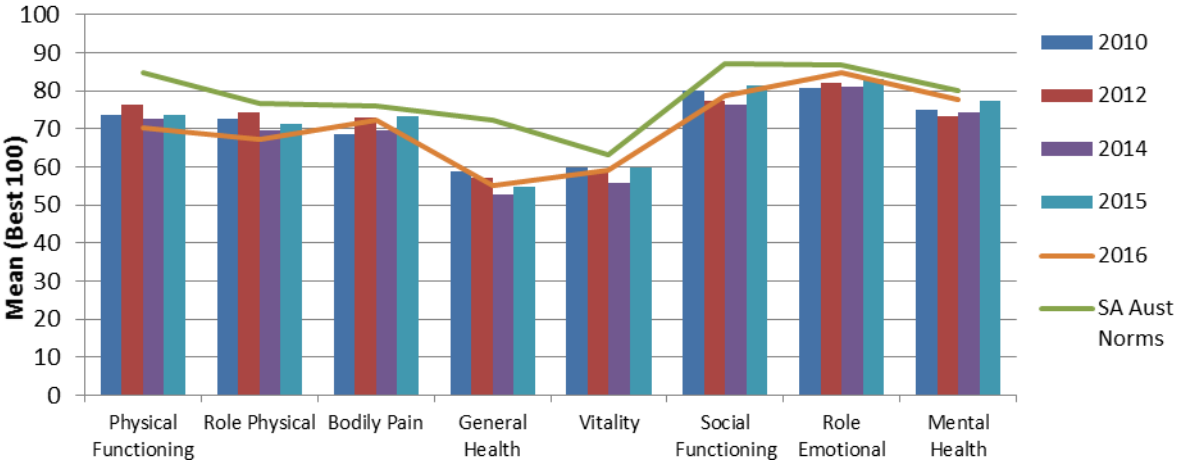
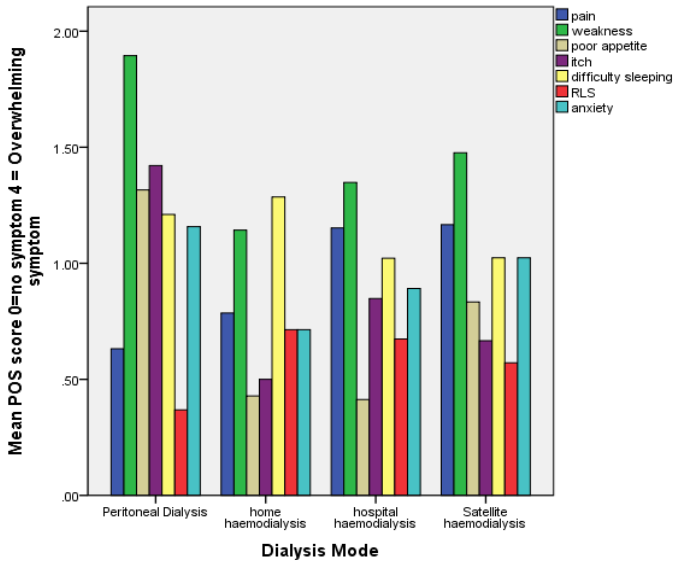


Figure 71. Quality of Life score for transplant patients in St George Hospital

Auditing the QOL of transplant patients commenced in 2010. Scores are similar to the Australian population scores in every parameter. Transplant is a form of renal replacement therapy as is dialysis, therefore it was important to capture this information. Some transplant patients may have never received any dialysis if they received a live donor transplant. More research is required in this group to measure change over time, QOL post transplant if the patient had been undergoing dialysis beforehand, QOL post failed transplant etc.

Palliative care Outcome Scale (iPOS-renal)

IPOS-renal was developed recently and integrates the most important questions from POS, POS-S and the APCA African POS. IPOS-Renal is a short measure (11 questions), combining the most common symptoms renal patients experience plus additional items from IPOS on concerns beyond symptoms, such as information needs, practical issues, family anxiety. IPOS has been validated in a mixed population of those with cancer and non-cancer diagnosis, including renal patients, and shows good content and construct validity, reliability, and responsiveness to change (results being prepared for publication)(Cicely Saunders Institute, 2012) . The following graph illustrated some of the frequently reported symptoms experienced by patients undergoing different forms of RRT. Weakness, itch, loss of appetite and anxiety are experienced to a higher degree in peritoneal dialysis while all dialysis modalities result in a mild to moderate loss of sleep.



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12. Hypertension in Pregnancy

Franziska Pettit and Jennifer Beddoe

Aims

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

Activity

- In 2016 there were 2544 pregnancies recorded on Obstetrix at St George Public Hospital.
- 200 (8%) of these were identified as having a hypertensive disorder of pregnancy, gestational proteinuria, renal disease or at a higher risk of developing hypertension this pregnancy due to previous hypertension in pregnancy.
- 9 of these were twin pregnancies & not included in this analysis
- Of the 191 singleton pregnancies 164 (86%) were consulted to the Renal Obstetric Medicine group. The remaining 27 were managed by the obstetric team. 24 of these women had a diagnosis of Gestational hypertension, 2 women had Pre-eclampsia & 1 woman had Essential Hypertension with super imposed Pre-eclampsia.
- There were 448 DAU (Day assessment) attendances throughout the year.
- There were 518 attendances at the Monday obstetric medicine clinic in 2016.
- There was one Perinatal death in a singleton pre-eclamptic pregnancy with severe HT at 27/40
- One woman, with known IgA Nephropathy, was transferred to RPA at 25/40 pregnant and required 11 sessions of dialysis prior to delivery at 27+5 days/40. Baby has done well. Dialysis was stopped at delivery.
- There were no maternal deaths.
- There were no episodes of Pulmonary Oedema.
- PNM rate was 5 per 1000 births

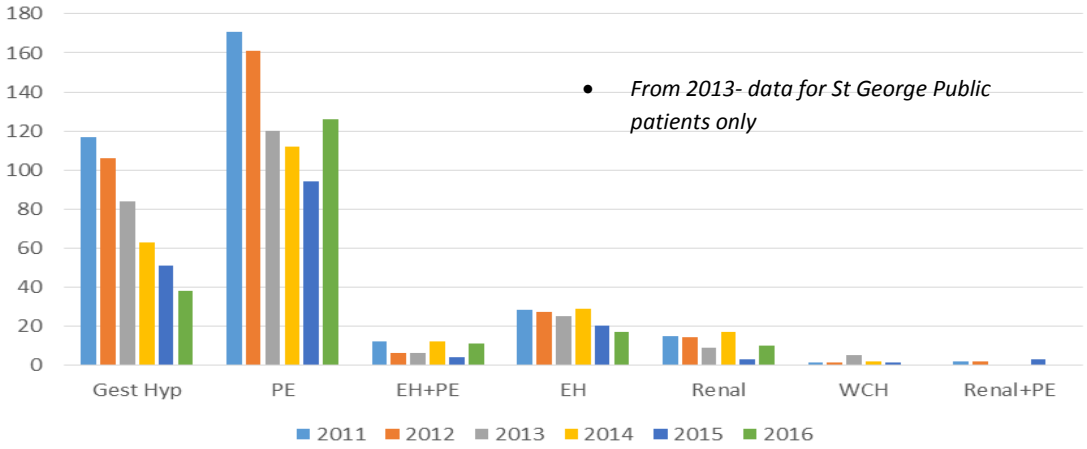


Figure 72. Comparison 2011-2016 diagnosis of women with Singleton Pregnancies

GH=Gestational hypertension; PE=Preeclampsia; EH+PE=Essential hypertension +Preeclampsia
EH= Essential hypertension; WC=White coat

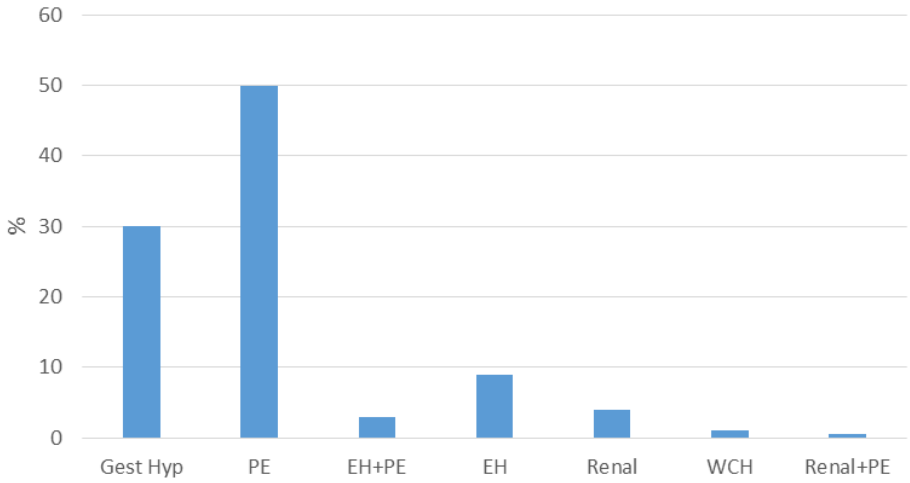


Figure 73. Diagnosis of women with Singleton Pregnancies 2011-2016

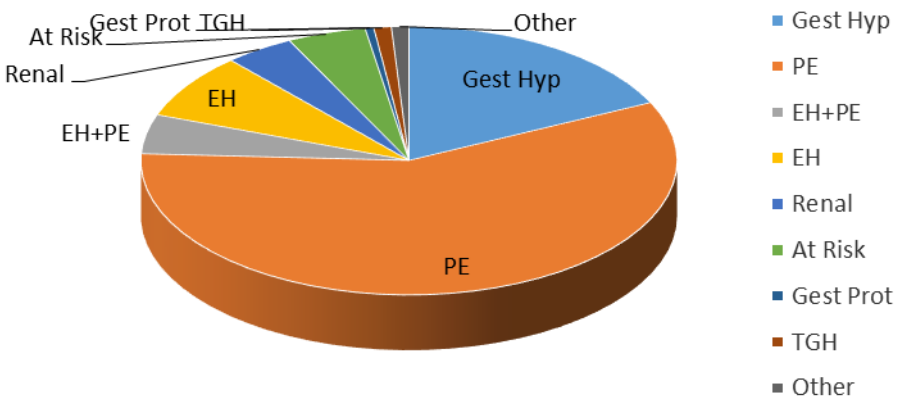


Figure 74. Breakdown by Diagnosis om 2016

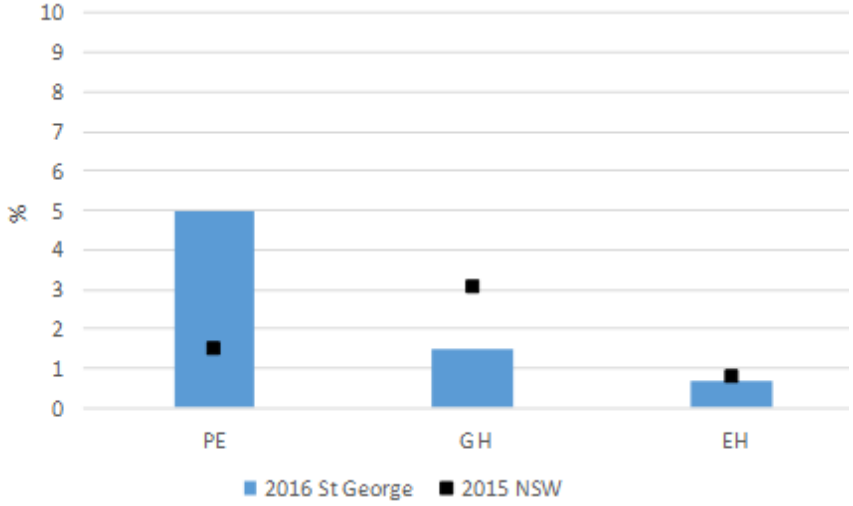


Figure 75. Comparison of all pregnancies at St George Hospital, 2016 complicated by PE, GH or EH against NSW Health data, 2015[1]

Outcomes

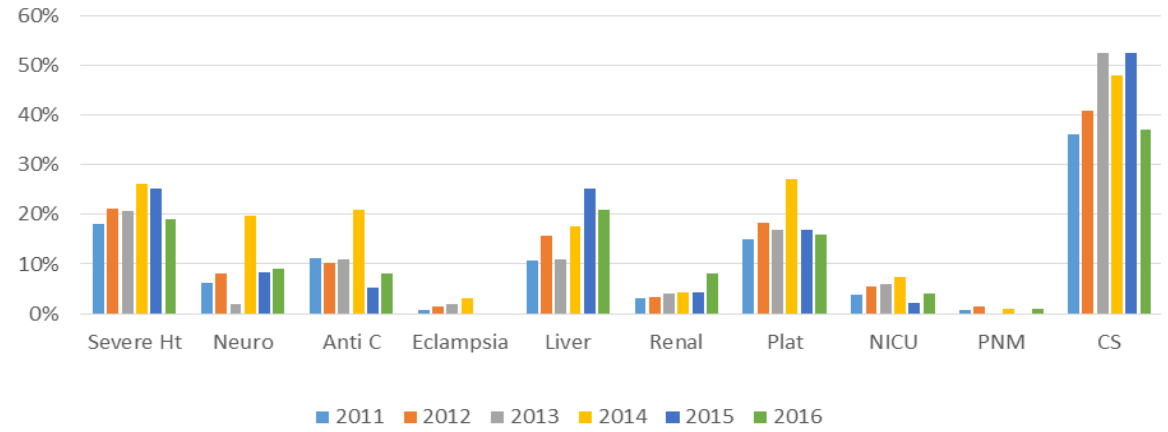


Figure 76. Trend in Outcomes of PE for singleton pregnancies 2011-2016

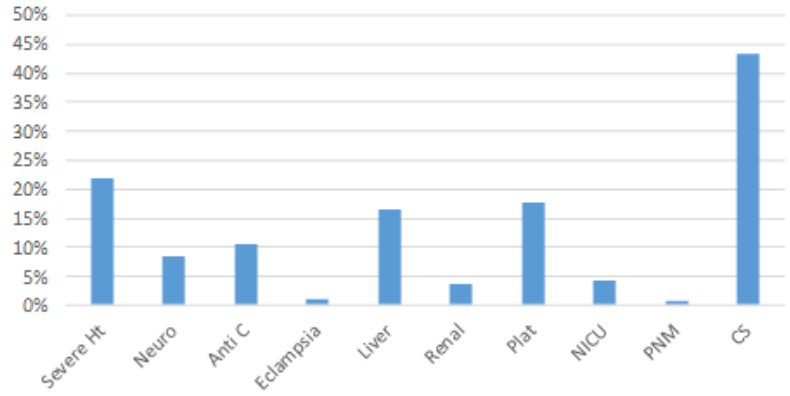


Figure 77. 2011-2016 Pre-eclampsia

Singleton Pregnancies (n, (%))

	No	SevHT	Neuro	Anti C	Eclampsia	Liver	Renal	Platelets	SGA<10	NICU	PNM	CS
Gest Hyp	36	4 (11)	0	0	0	0	0	1(3)	7(19)	0	0	13(37)
PE	112	21(19)	10 (9)	9 (8)	1 (1)	24(21)	9 (8)	18(16)	23(21)	5(4)	1(1)	41(37)
EH+PE	9	4 (44)	2 (22)	2(22)	0	1(11)	0	1(11)	1(11)	1(11)	0	7(78)
EH	17	0	0	0	0	0	0	0	0	0	0	6(35)
Renal	10	1 (10)	0	0	0	0	2(20)	0	1(10)	1(10)	0	4(40)
At Risk	12	0	0	0	0	1(8)	0	0	1 (8)	0	0	6(50)
Gest Prot	1	0	0	0	0	0	0	0	0	0	0	1(100)
TGH	2	0	0	0	0	0	0	1(50)	0	0	0	1(50)
Other	2	0	0	0	0	0	0	0	0	0	0	1(50)
Grand Total	**201**	**30 (15)**	**12 (6)**	**11(5)**	**1(<1)**	**26(13)**	**11(5)**	**21(10)**	**33(16)**	**7(3)**	**1(<1)**	**80(40)**

Figure 78. Singleton Pregnancies

GH=Gestational hypertension, PE=Preeclampsia, EH+PE=Essential hypertension +Preeclampsia, EH= Essential hypertension, WC=White coat

Conclusions

- There appeared to be a further fall in the number of women presenting with hypertensive disorders of pregnancy at St George Hospital.
- There was a small fall in the overall number of deliveries and of these 7% developed a hypertensive complication and had data collected on them. 5% of pregnancies state-wide were complicated by a hypertensive disorder of pregnancy during 2011-2015[1].
- Fewer women were seen in DAU.
- There was a reduction in the number of women delivering via CS at St George. The CS rate for all deliveries in NSW in 2015 was 32.4%[1].
- While direct comparators with which to compare our outcomes are not available we do compare favourably with published outcomes.
  - We have lower rates of SGA in women with EH and EH+PE and similar CS rates[2].
  - Our maternal and fetal outcomes for women with GH and PE are comparable to others with similar rates of end organ involvement and fetal growth restriction. Our PNM rate is far superior to what is published in the literature (1-2%)[3].
- PNM rate was excellent (5 per 1000 cases) – NSW PNM rate for **all pregnancies** is 8.2 per 1000 pregnancies
- A stricter surveillance system has been implemented to ensure we are capturing the outcomes of women, who have previously had a hypertensive pregnancy, but did not develop hypertension in their recent pregnancy.

[1] Centre for Epidemiology and Evidence. New South Wales Mothers and Babies 2015. Sydney: NSW Ministry of Health, 2016
[2] Hypertension during pregnancy in South Australia, Part 1: Pregnancy outcomes Adrian R. et al Epidemiology Branch, Department of Human Services and 2 Department of Obstetrics and Gynaecology, University of Adelaide, Lyell McEwin Health Service, South Australia, Australia
[3]Pre-Eclampsia Sibai B et al The Lancet Volume 365, Issue 9461, 26 February–4 March 2005, Pages 785–799

13. Chronic Kidney Disease

Ivor Katz, Saiyini Pirabhahar and Kylie Turner

Aim and Background of the Report

The aim of this report is to describe the patterns of referral to the St George Hospital Nephrology and Hypertension outpatient clinics for the years to 2016. With this data we aim to provide and improved service as was trailed through our recent research trail looking at the role of a virtual consultation service which was completed in 2015. Data was captured from all new patients referred to two consultant clinics.

Introduction and Recommendations for referral

The Kidney Health Australia (PEAK) CKD management initiative outlines in the General Practice' Guidelines and suggests a referral to a Specialist Renal service should be for

- an eGFR < 30ml/min/m^2 or
- a sustained decrease in eGFR of 25% or more OR a sustained decrease in eGFR of 15mL/min/1.73m^2 within 12mths
- macroalbuminuria irrespective of eGFR (uACR >30mg/mmol),
- suspected glomerulonephritis and
- CKD with uncontrolled or difficult to control hypertension already on antihypertension treatment.

Reference: Chronic Kidney Disease (CKD) Management in General Practice (3rd Edition) Kidney Health Check (PEAK), Melbourne

Variations in referral take into account an individual's wishes and comorbidities.
The aim of the Renal Department 'CKD Group' is to be able to prevent kidney disease in the community, detect and track those with existing CKD and support those with existing disease through the stages of CKD.

From 2017 we will have a CKD Clinical Nurse Consultant who will help coordinate these services and develop our community based component to care as well as further develop our Virtual Medical Consultation (VMC) Service

Referral patterns

We have analysed the referral patterns to our department in order to improve our services to General Practitioners (GP) and patients. It also serves to understand the community needs and develop our Virtual Medical Consultation service. It does not reflect what is occurring in the private practice sector. It should also be noted that many CKD patients are seen in Private Nephrologist Clinics.

Referrals are tracked to all outpatient department clinics. From data reflected in figure 79 it is clear that there continues to be both a need and rise in referrals of new patients to this service. We also had additional nephrologist providing outpatient services in 2016.

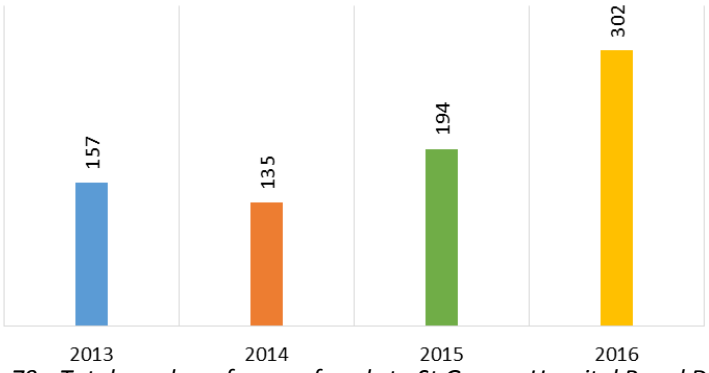


Figure 79. Total number of new referrals to St George Hospital Renal Department

Most referrals are for patients with a decline in renal function (41%). Most are not reflective of a decline of >5mls over 6 months and not necessary reflecting a 25% decline or persistent drop. It is usually a decline over a short period. Referrals meeting KHA criteria included 12% for an eGFR<30ml/min/1.73m2 and 12% with macroalbuminuria (urine ACR>30mg/mmol Cr). Other common reasons for referral include difficult to control hypertension (11%) and haematuria (8%)

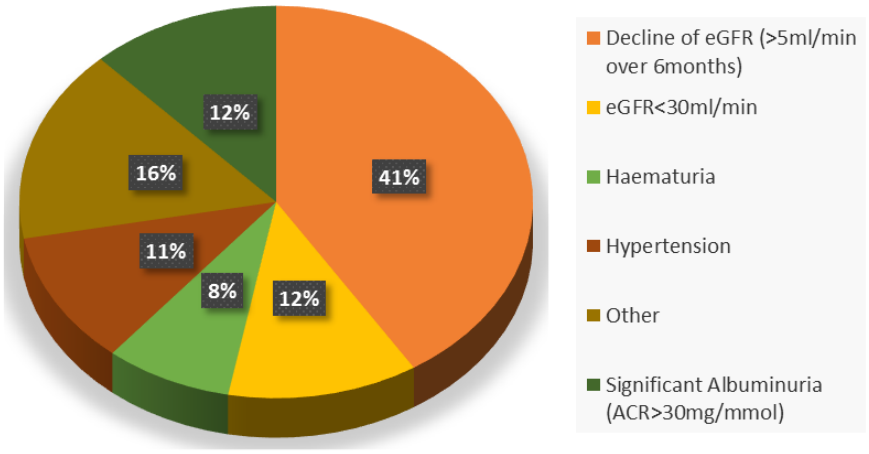


Figure 80. Reason for referral to St George Hospital Renal Department

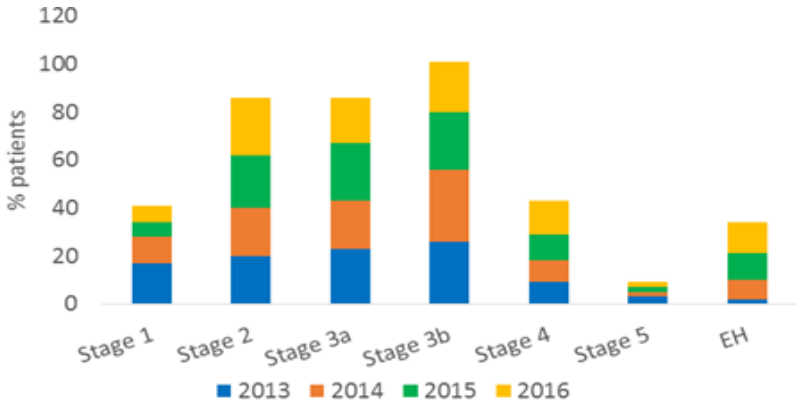


Figure 81. Figure 3 – Referral by eGFR Stage and Year

Most patients are referred early in stages 2-3b i.e. when eGFR is >30mls/min and this despite the referrals protocols indicating referral to a nephrologist should be at stage 4. Since collecting data in 203 there remains a high referral early and the aim in future is to reduce referrals in stage 1-3a.

Profile of New Patients referred to the service

Most patients are referred from our huge network of general practitioners in the Sutherland and St George area (61%) (Figure 82). However, just over a quarter are patients are those following a hospital admission (28%) and a further 9% from other specialists, with only a small number of inter unit/hospital transfers.

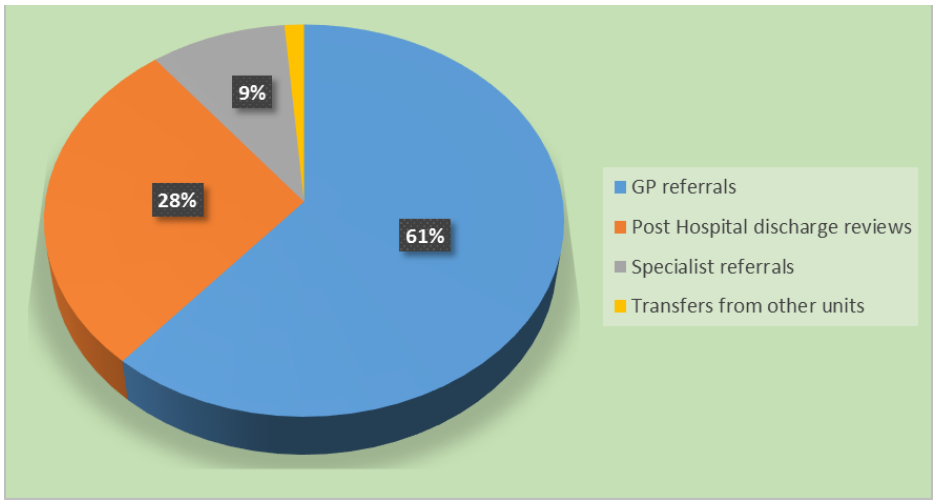


Figure 82. Origin of CKD referrals to Renal Outpatient

Clinics

Most patients are > 60 years of age (Table 33). There is an increase in age according to CKD stage (stage 1 mean age 46 years and stage 4 75 years) up until stage 5 when it drops back down again to 68 years. More patients in the earlier stages have glomerulonephritis as a cause. However, renal vascular and hypertension comprise the primary cause for referral. The most common diagnosis at referral was diabetes mellitus

As is expected with increasing stage of CKD there is worsening of albuminuria and proteinuria.

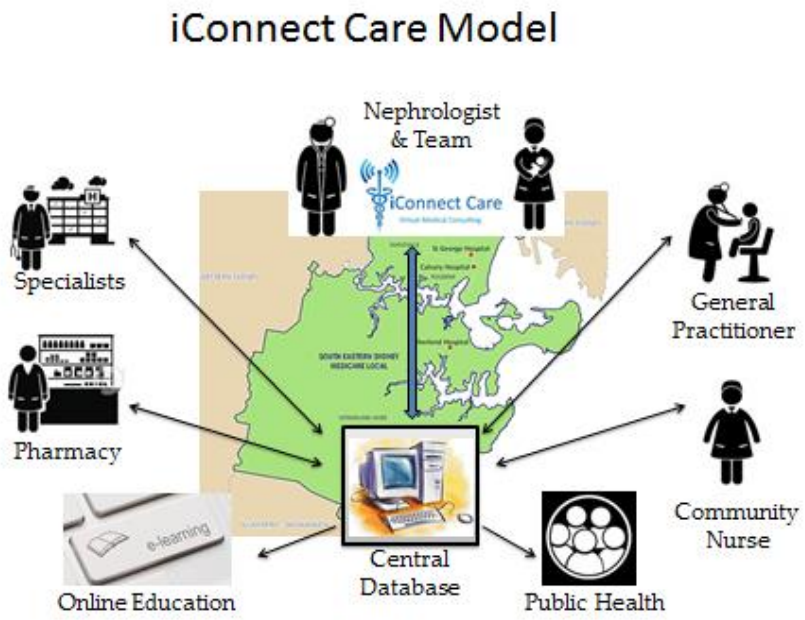
The average time to review from referral was 35 days. It was 18 days if the person had advanced kidney disease (stage 5).

2016	Stage 1	Stage 2	Stage 3a	Stage 3b	Stage 4	Stage 5	Essential Hypertension
N=	21	72	58	65	42	5	39
Age (SD)	46(13)	60 (16)	68 (12)	71 (12)	75(10)	68 (11)	43(16)
Male	56%	56%	57%	58%	67%	80%	31%
Female	44%	44%	43%	41%	33%	20%	69%
Primary cause							
Glomerulonephritis (100, 110, 151, 160)	9%	14%	8%			15%	
Renal vascular/Hypertension (300,301, 302)	19%	36%	52%	57%	41%	5%	40%
Diabetic Nephropathy (802, 803)	5%	13%	6%	17%	41%	5%	20%
Reflux/Obstruction (41,40,32, 33, 304, 500)		10%	2%	5%	5%	3%	
Pyelonephritis (600)	5%	3%	3%			13%	20%
Loss of single kidney (10)		3%	3%	3%			
Others (8, 183, 185, 700)	29%	11%	17%	9%	12%	23%	20%
UNK (1)	33%	10%	9%	9%	1%	36%	
Blood Creatinine	67 (12)	88 (18)	113 (15)	144(22)	222(60)	495(119)	64(14)
eGFR	>90	74 (9)	51 (5)	38 (4)	23(5)	10(3)	>90
Alb:Crt	12 (18)	44 (107)	39 (109)	46(126)	131(241)	143(194)	3.2(7.2)
Prot:Crt	20(11)	139(286)	37(49)	55(106	154(246)	150(149)	14(11)
Type of consult							
GP Referral (61%)	76%	65%	65%	48%	60%	40%	67%
Post Hospital Discharge (28%)	19%	22%	28%	34%	33%	40%	28%
Specialist (9%)	5%	13%	7%	17%	2%		5%
Transfer from another unit (2%)				1%	5%	20%	
Referral time to review time (days)	38(25)	47(36)	32(20)	35(30)	42(69)	18(17)	
Follow Status							
On Follow up	67%	71%	84%	83%	88%	40%	46%
Discharged from Clinic	33%	25%	16%	15%	10%		51%
Lost to Follow up		3%		2%			3%
Dialysis						60%	
Death		1%			2%		

Table 33. Demographics of CKD patients referred to the Renal Unit

IConnect Care and Virtual Consultation as a component of CKD management

We continued to follow up 27 patients through our iConnect CKD Virtual Consultation clinic. The aim was to continue to grow this component of care.



Summary and Conclusions

Poor National data exist for patient referral to renal specialist health services and their progress over time. A significant number of new patients are referred who do not meet the Kidney Health Criteria for referral, indicating that the criteria do not take into account the needs of general practitioners. Many require decision support for issues which are concerning but do not necessarily meet the guidelines e.g. decline in renal function. Improving communication and/or decision support may reduce referrals and need for follow up but ultimately also reduce hospitalisation.

Currently no CKD benchmarks exist but we have begun to set benchmarks for the future and these include:

i) >50% of referrals meeting Kidney Health Australia Guidelines for referral (currently 24%)
ii) >80% patients having a urine albumin creatinine ratio, a renal ultrasound report and an eGFR at the time of referral to a specialist
iii) Continue to see newly referred low risk referrals (eGFR>30/uACR<30) within 36 days and high risk referrals (eGFR<30 and uACR>30) within less than 20 days.
iv) 25% of patient follow up through virtual medical consultations within a year
v) 50% reduction or at least unchanged urine ACR at 12 months post referral or at the time of discharge or to referral to VMC
vi) Hb 100-115g/L
vii) Prior to the commencement of ESA iron stores at target (Ferritin 200-50ug/L and TSAT 20-40%)
viii) Glycaemic control HbA1C ≤7% (53mmol/mol)
ix) Hyperkalaemia at least ≤5.5mmol/L
x) Hypertension ≤140-90mmHg or
xi) Establishement of hospital admission rates for our group of patients and reduce this rates of admissions within our cohort

14. St George Renal Biopsy Review – Audit of Complications

Partha Shanmugasundaram

	Total	Transplant biopsies
Number	134	39
Total complications	7 (5.2%)	3 (7.7%)
Macroscopic haematuria	4 (3%)	2 (5.1%)
Symptomatic Perinephric haematoma	2 (1.5%)	1 (2.6%)
Transfusion	None	None

Table 34. Data for the year 2016

	2009	2010	2011	2012	2013	2014	2015	2016
Total Number	107	85	109	86	118	123	98	134
Complication rate	7.5%	9.4%	10%	7.2%	5.1%	6.5%	12.2%	5.2%

Table 35. Comparison of total complication rates from previous years

Year N	2012 N=86	2013 N=118	2014 N=123	2015 N=98	2016 N=134	Last 5 years N=559
Total complications % (n)	7.2(6)	5.1(6)	6.5(8)	12.2(12)	5.2(7)	7(39)
Macroscopic Haematuria, %(n)	3.5(3)	3.3(4)	6.5(8)	9.2(9)	3(4)	5.2(29)
Perinephric Haematoma, %(n)	3.5(3)	1.7(2)	0.8(1)	3.1(3)	1.5(2)	2(11)
Perinephric bleed – angioembolisation, %(n)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Required blood transfusion	4.7(4)	0.8(1)	0(0)	6.1(5)	0(0)	1.8(10)

Table 36. Comparison of specific complication rates expressed as percentage (number)

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

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

- The rate of complications over the last 5 years was 7%.
- All three parameters above met the accepted benchmark in 2016.
- A structured (formative and summative) assessment of renal biopsy skills of the advanced trainees is in place and the efficacy and acceptance of this assessment process will be evaluated over the next few years.

15. Nutrition Services

Maria Chan, Su Bahceci and Ashleigh keep (TSH), Renal Dietitians
Jessica Stevenson– see report under RSC

Dietitian activity in patient care (SGH)

2016		Non-dialysis dependent CKD	RRT				total
			Home HD	In-centre HD	PD	TP	
Outpatient/day-stay patient	*New	57(ROC) + 50+ (direct referral to Renal Clinic, Nutrition & Dietetics dept.)	10	~75	~19	10	~221
	** Total number of patients who require regular long term follow-up	~160	47	131	55	204	~597
	Short term & *ad hoc* intervention (e.g. early CKD, stones, HT)	~30+					~30
Inpatient							~220 (admissions)

Table 37. Dietitian Activity

*New Patients: all new patients of Renal Option Clinic (ROC), CKD nutrition clinic, haemodialysis (HD), peritoneal dialysis (PD) and transplant (TP) are under "blanket referral" as per protocols. Audit of new issue arise/intervention in the established patients was not performed due to time constraint e.g. new potassium or phosphate management in CKD, NODAT from TP patients etc.

** Remark: this denotes the total number of patients who should be reviewed regularly as per best practice guidelines:

- Advanced CKD and dialysis: ~ 2 hours (new/initial) + minimum 6-8 hours /year for review.
- Transplant: 5 hours in first 3 months, then minimum ~ 2hours /year for review.
- Plus additional time as clinically indicated, e.g. development of other issues, e.g. co-morbidities/illnesses, malnutrition, diabetes or nursing home placement etc.
  Nearly all new patients received initial assessment and education. However, due to inadequate staffing level, mainly in-centre HD and ~ 50% non–dialysis dependent CKD patients received regular reviews.

Chronic Kidney Disease (non-dialysis dependent)

- ***Renal Option clinic (ROC)***

Parameter	2016
Number	n=56/57 (new), 98.3 % S/B dietitian
Gender, M (%)	55
Diabetes mellitus (%)	45
Malnutrition, SGA B &C (%)	36

Table 38. Nutrition characteristics of patient attending the ROC:

Comments:

- > 95% of patients did not receive nutrition intervention for CKD prior to the clinic
- Prevalence of malnutrition was high, 36%
- ~45% of patients have diabetes, > 95% of these patients did not receive structured nutrition intervention for diabetes prior to the clinic. Majority of these patients did not attend regular endocrinology services either.

Haemodialysis

- ***Six monthly routine nutrition assessment***

  Patients attending SGH & TSH dialysis centres receive 6 monthly routine nutrition assessment and intervention as per protocols

2016	SGH		TSH	
	April	October	April	October
Total number of patient in the unit during review period	118	117	50	49
No. of patient assessed n & (% compliance)	106* (89.8%)	111* (94.9%)	48‡ (96%)	47‡ (96%)
Prevalence of Malnutrition % (SGA score B and C)	28.3	36.0	21%	20%
Nutrition support required + oral nutrition supplements, % total	37.3	29.1	27.0	23.0

Table 39. 6 monthly Nutrition review for HD

Remark: reasons for patients didn't receive routine 6 monthly nutrition assessment due to: *SGH: hospital admission or on night shift, ‡TSH: hospital admission

Comments: prevalence of malnutrition was consistent with the literature. Furthermore, most patients' nutritional status improved after intervention similar to the outcomes audit presented in the 2015 report.

- ***"Referral Trigger" QI activity at SGH***

To facilitate timely referral for nutrition intervention, a "Referral Trigger" page has been designed in consultation with staff on 4W and inserted directly opposite to the blood results page in the dialysis chart. Two in-service sessions were given before the October dialysis adequacy review. Results: appropriate referral by nurse staff increased from 8 (April) to 36 (October). Further audit will be performed to evaluate other components, e.g. missing referral.

Peritoneal dialysis (PD)

- ***At commencement***
  All 19 new PD patients received initial assessment and education by the dietitian (100% compliance).
- ***QI activity on Follow – up***
  Less than 10% of PD patients received regular follow-up. A QI project was carried out in an attempt to improve follow-up in PD patients. Invitation letters were mailed to all PD patients (n=56) in May, 2016. Results: response rate was poor, only 12/56 (21.4%) arranged F/U appointment with the dietitian.

Transplant

- 100% (10/10) newly transplanted renal patients received nutrition intervention at the acute transplant clinic. However, <60% received structured follow-up care within 3 months compared to protocols. Structured follow-up of chronic transplant patient is minimal, < 5 *ad hoc* referral received.

Inpatients

- Dialysis patients accounted for ~60% of caseload of inpatient dietitian, and 100% of these required follow-up after discharge from hospital. Main reasons for review were nutritional support and electrolyte imbalance.

Miscellaneous

- ***Research***
  - CKD nutrition intervention on progression and outcomes after initiation of dialysis.
  - Development of eHealth using SKYPE to improve follow-up.
- ***Publications and invited lectures***
  - Please see Research Report for details. These included two invited manuscript contribution to the American Journal of Kidney Disease and BioMed Central (Nephrology).
- ***Visiting dietitian/shadowing***
  - One renal dietitian from a NSW public hospital received up-skilling and shadowing for one day in March 2016.
- ***Education/consultation (provision of)***
  - Maria is the founding / steering committee member on the Council of Renal Nutrition, International Federation of Kidney Foundations to develop international renal specialist dietitians training. This has become a joint project with NKF, USA.
  - Organised Renal nutrition education day on 8/3/2016 with open invitation to all NSW renal unit staff.

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:
  - To implement MDT case conference and Medicare remuneration.
  - To review dietitian staffing level.
  - To develop and implement eHealth using SKPYE.
  - To liaise with team to implement better referral and follow-up strategies to achieve structured care.